

# Materiality Matrixes in Sustainability Reporting: An Empirical Examination

Liad Ortar  
College of Law & Business

*The purpose of this article is to critically explore the concept of materiality in sustainability reporting. Materiality is a concept adopted from financial accounting practice, in which it is used to differentiate between financially influential activities and those that carry no financial risk. As sustainability reporting is a concept rooted in stakeholder theory, materiality has been adapted to include stakeholders' perspectives in the prioritization process.*

*The findings presented in this article indicate that an empirical quantitative method for materiality is feasible. While there is still much to explore in the field of materiality in order to broaden the applications of this model, it does provide an important contribution as a scholarly starting point.*

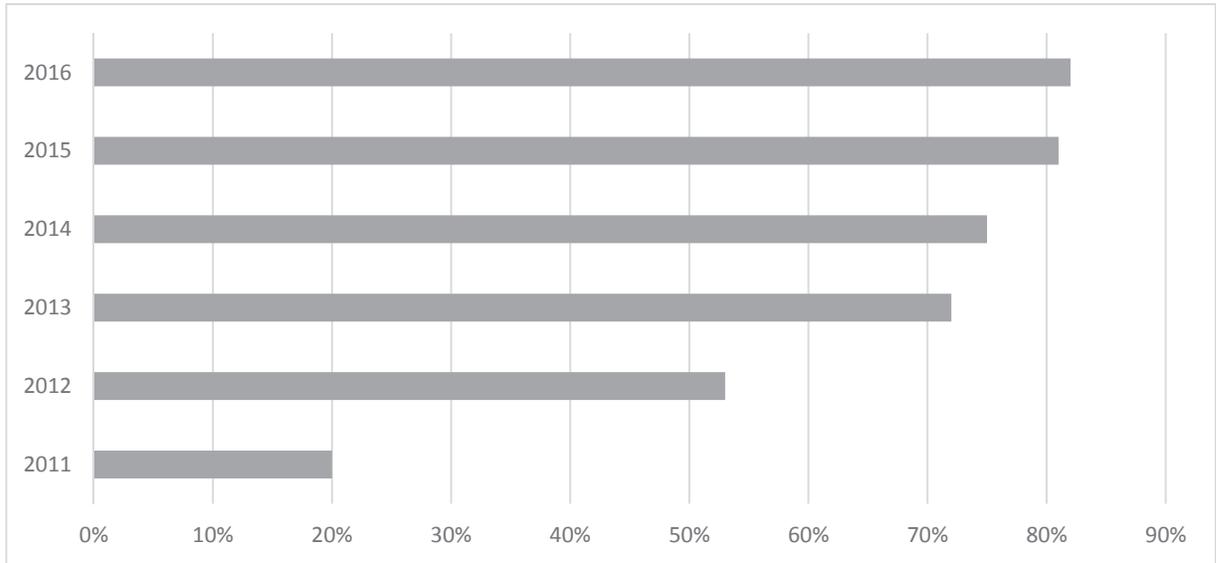
*Social implications – The model proposed in this article has vast social implications mainly in the realm of sustainability reporting. As the article explains, sustainability reporting is currently in a phase of transition from a voluntary approach to a more regulated one. This transitional phase demands the exploration of alternative validated means of prioritizing the issues reported.*

*Keywords: corporate social responsibility, sustainability reporting, materiality, accounting, non-financials, stakeholders*

## INTRODUCTION

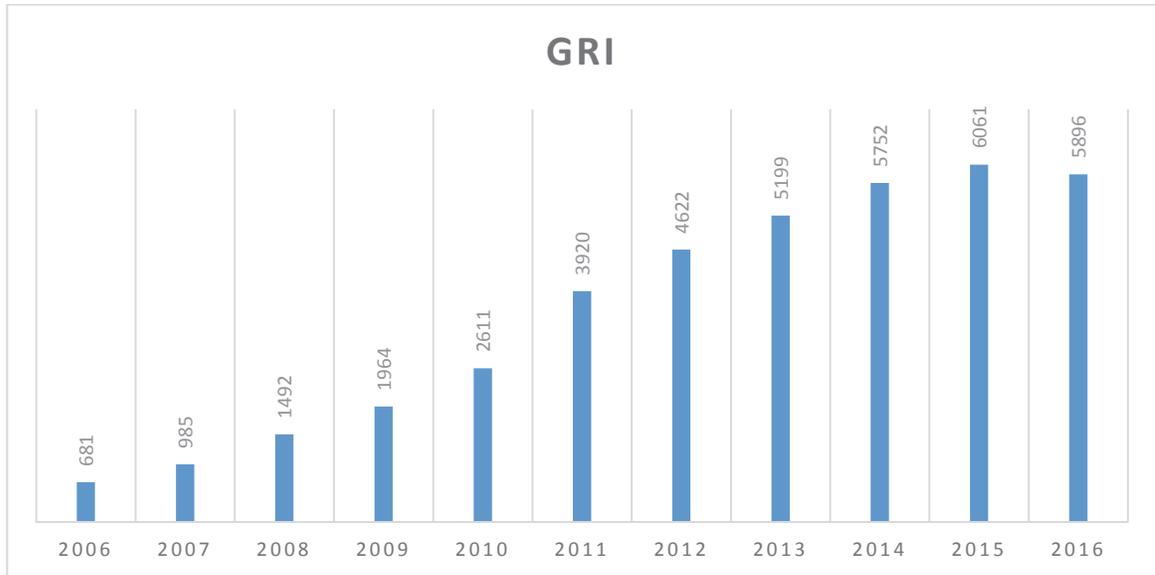
In recent years, there has been a constant increase in the number of companies (and other public agencies) committing themselves to non-financial disclosure. A recent publication by G&A (Governance & Accountability Institute, Inc.) noted that in 2016, 82% of the corporations listed in the S&P 500 published a corporate sustainability report (G&A, 2016). This is a sharp increase compared to the 20% of S&P 500 companies that published such a report in 2011 (see Figure 1). Another set of data that displays the proliferation of non-financial reporting is taken from the GRI Database.<sup>1</sup> According to a year by year search (see Figure 2) conducted by the author, there has been a consistent increase in the number of sustainability reports published, with a total of more than 10,000 reporting organizations and 27,200 reports published up till now.

**FIGURE 1  
PERCENTAGE OF S&P 500 COMPANIES THAT PUBLISH  
SUSTAINABILITY REPORTS**



(G&A, 2016)

**FIGURE 2  
NUMBER OF SRs PUBLISHED YEARLY**



GRI Database, 2017

These increasing numbers attest to the fact that today transparency has become firmly established as a keystone of corporate social responsibility (CSR) architecture (Searcy and Buslovich, 2014). It is widely understood that a corporation that embraces CSR is obligated to committing itself to publicly communicating its environmental, social, and governance (ESG) performances and challenges. Perhaps this is the fulfillment of Robert G. Eccles’s vision of a coming “performance measurement” revolution

(Eccles, 1991) and his understanding that "[n]onfinancials are the overheads of the 21st century" (Gazdar, 2007) and thus should be reported accordingly.

Historically, the concept of nonfinancial reporting first appeared in the early 1930s, when Prof. Theodore Kreps introduced the subject of business and social welfare to Stanford University and used the term "social audit" for the first time in relation to companies reporting on their social responsibilities.<sup>1</sup> Sixty years later, in the early 1990s, several non-financial reports were published by companies such as The Body Shop, which issued its *Values Report* on a regular basis. The evolution of the terminology from 'nonfinancial' to 'sustainability report' (as we know it today; hereafter - SR) came only in the late 1980s, following the introduction in 1987 of the report *Our Common Future*, which introduced the term 'sustainable development.' An important landmark in non-financial reporting was included in the concluding declaration of the June 2012 Rio +20 conference<sup>2</sup> in Rio de Janeiro, which states: "We acknowledge the importance of corporate sustainability reporting and encourage companies, where appropriate, especially publicly listed and large companies, to consider integrating sustainability information into their reporting cycle."<sup>3</sup>

SR was and continues to be a part of the overarching CSR architecture, e.g., it is a voluntary action conducted 'beyond compliance.' As such, it is regulated by various 'soft law' mechanisms with several internationally accepted sustainability frameworks with complementarities and synergies; the principles of the UN Global Compact<sup>4</sup> and the OECD Guidelines for Multinational Enterprises<sup>5</sup> provide normative frameworks to assist companies in shaping their sustainability visions and management approaches and to measure their impacts. ISO 26000<sup>6</sup> is a private management standard that provides guidance for organizations on the concept and definition of CSR. The Global Reporting Initiative's (GRI) sustainability reporting framework provides organizations with disclosure items and metrics that align with the most important international normative frameworks, allowing them to benefit from each initiative's complementarities and strengths. The International Integrated Reporting Council (IIRC) advocates for the integration of financial and non-financial information in a way that shows their quantified mutual impact using established guidelines, standards, and key performance indicators (KPIs) (Deutsche Bank Group, 2012). It was first introduced in 2003 in a report called *The Blended Value Map*, which represents an attempt to design a reporting framework by developing integrated metrics for triple bottom line reporting (Emerson et al., 2003). Despite the ongoing development of different reporting guidelines, there is still a primary need for a coherent definition and classification of non-financial reporting (Gazdar, 2007).

The notion that voluntarism in SR carried no promise in terms of increasing accountability was a well-known academic assumption (Searcy and Buslovich, 2014; Gray, 2001), but has only recently come to be understood by legislators. Michel Barnier, former European Commissioner for Internal Market and Services stated at the GRI conference in May 2013 that "[t]he existing legislation has proven to be ineffective. At this point, not even 10% of the largest EU companies regularly disclose such information."<sup>7</sup> One year after that speech, the UN Parliament adopted the Non-Financial Reporting Directive, which will obligate Europe's 6,000 largest corporations to publish SRs.<sup>8</sup> This directive is a cornerstone of the evolution of sustainability reporting, but not the only frontier in which such reporting is taking shape as a hard-regulated framework (E&Y, 2014; KPMG, 2016). In the last seven years, a series of research papers called Carrots and Sticks was published by KPMG, GRI, UNEP, and the Centre for Corporate Governance in Africa (KPMG, 2016). In the most recent publication, the authors find that policymaking and regulation have markedly increased. This includes a notable increase in the number of mandatory reporting measures. In 2006, 58 percent of policies were mandatory, while currently more than two thirds (72 percent) of the 180 policies in the 45 reviewed countries are obligatory (ibid., p. 8). This transition from "soft law" to "hard law" has its advantages and disadvantages, but mainly challenges the existing SR guidelines as they are adapted to concrete legislative formats in different countries (Ioannou and Serafeim, 2011).

This trend indicates that apparently financial reporting was not sufficient to account for the multiple, evolving dimensions of corporate values (Simnett et al., 2009). The dimensions of environmental protection, social commitment, governance, and engagement must also be advocated. And so, a new

practice has emerged, the practice of SR, in which trust is the key currency and the information that exists beyond financial reporting is crucial (Alonso-Almeida et al., 2014).

## **BACKGROUND AND LITERATURE**

### **SR as Part of Stakeholder's Management**

The information a SR contains is partly quantitative (carbon footprint, water usage, consumption of raw materials, and so on) and partly qualitative (ethics, fighting corruption, managerial commitments, supply chain, and so on). The final target audience of an SR is diverse and includes various societal groups that are internal and external to the corporation (Alonso-Almeida et al., 2014). SR may influence clients and customers in their engagement decision making, e.g., the purchase of goods and services based not only on price, but also on ethical considerations (Calabrese et al., 2015). It may be read by larger audiences with different interests regarding the corporation and its behavior, e.g., nongovernmental organizations, those interested in future generations, and so on. Today we are well aware of that fact that the financial sector and investors take into consideration the notions presented in SRs (Khan et al., 2016) when making financial decisions. This diversification in terms of audience is theoretically articulated in the stakeholder theory, first presented by Ed Freeman in the mid-1980s (Freeman, 1983) and currently considered one of CSR's key theories.

One of SR's main goals is nourishing the overall stakeholder management efforts of the business corporation. Thus, it should reflect stakeholders' interests in and expectations of the corporation, expectations that, if not sufficiently fulfilled, could materialize into risk (Alonso-Almeida et al., 2014). It is seen as a vital element in communicating with stakeholders about how the corporation faces and answers social and environmental challenges (Jones et al., 2016). Stakeholders inherently have the right to receive information that may reveal environmental risks or socially unjust deeds for which the corporation must be held accountable (Gray, 2001). If these disclosures are not made, stakeholders might punish and revoke the corporation's "license to operate" and thus create risk and cause real financial damage (Searcy and Buslovich, 2014).

A recent study of 35 Canadian corporations (Searcy and Buslovich, 2014) revealed that the extent of external stakeholders' involvement in the development of SR varied widely, although most corporations did mention taking into consideration stakeholders' input. Another study reported similar results. Jones, Comfort, and Hillier (2015) examined the sustainability practices of the UK's 20 leading house building companies and found that "there is a marked variation in the extent, charter and detail of the sustainability reporting process" and that these companies "might also be seen to be essentially responsible for identifying [their] stakeholders and for collecting, collating and articulating their views on the priorities for the company's sustainability strategies." These empirical insights and the bottom line that they represent, e.g., silencing stakeholders in favor of shareholders' voices and preferences, are becoming dominant in the SR literature (Cooper and Owen, 2007; Bradford et al., 2016).

This lack of consistency may not come as a surprise to those who have been following the writings of one of the dominant thinkers in the field, Rob Gray, who noted that corporations will tend to remain in their comfort zones and engage only with those stakeholders who pose minimal risk and potential conflicts (Gray, 2001). As Gray put it, "We must begin to recognize that social accounting should hurt. If it doesn't raise difficulties, cause unwelcome re-examinations of the organization and so on, then it is probably not good social accounting" (Ibid.). Clearly, then, integrating stakeholders' expectations into managerial processes is always challenging and never a simple task

### **Materiality in SR**

Materiality, as a guiding principle, originated in the financial accounting practice that chronologically preceded SR (Jones et al., 2016). According to the International Accounting Standards Board (IASB),<sup>9</sup> materiality is a process that provides a threshold or cut-off point that determines what is included in a financial statement and what is left out.<sup>10</sup> It elaborates and explains that "[i]nformation is material if its omission or misstatement could influence the economic decisions of users taken on the basis of the

financial statements."<sup>11</sup> Financially, therefore, materiality relates to the significance of transactions, balances, and errors contained in financial statements. It defines the threshold or cutoff point after which financial information becomes relevant to the decision-making needs of users. Thus, information contained in the financial statements must be complete in all material respects in order for the statements to present a true and fair view of the affairs of the entity. The adaptation of the term “materiality” to SR presents major challenges that must be addressed, primarily because in SR materiality is a social construct (Eccles and Krzus, 2014; Edgley, 2014).

In order to be included in the financial accounts, all non-financial performances must have a financial yearly value attached to them. If non-financial performances are not expressed in terms of monetary value, there is simply no way to incorporate them into the periodic financial report. In sustainability reporting, materiality, as a conceptual framework, faces different challenges. Because SR encompasses a wide range of issues, when designing its SR, a company always faces dilemmas with regard to what to report about and what is important to communicate. Public criticism has been raised by stakeholders and the media, who suggested that these reports are no more than public relations efforts, and portray only the positive aspects of corporations and not their material influences. The question remains how can/should a company decide what is materially important to report? This is the issue of materiality, on which the present research is focused.

In the discourse on SR, materiality is the conceptual bedrock of the whole approach (Eccles and Krzus, 2014). In implementing materiality analyses, companies are expected to choose the issues that are most material in terms of their sustainability implications and then act accordingly. If an issue is identified as material, it should be included and explained broadly in the sustainability report and in the company's allocation of resources and efforts (Khan et al., 2016). If an issue is not material, then it is simply not important and calls for less attention on both organizational and communicative levels.

Although materiality is a shared feature of SR guidelines (Jones et al., 2015), no definitive definition of it exists at an institutional level or in deductive SR research (Jones, Comfort and Hillier, 2016). Business for Social Responsibility (BSR)<sup>12</sup> is a global network of organizations and companies that endorse CSR. In August 2013, BSR published a short report, *Navigating the Materiality Muddle* (BSR, 2013), which explains that today there are three major sustainability reporting organizations: The International Integrated Reporting Council (IIRC),<sup>13</sup> the Sustainability Accounting Standards Board (SASB), and the Global Reporting Initiative (GRI). The three diverge in their approaches toward materiality decision making, based upon the stakeholder groups on which they focus their initiatives.<sup>14</sup> The SASB adopts a shareholders' viewpoint in defining materiality. According to their approach, a material issue is one that raises interest mainly in the financial market (Khan et al., 2016).

Similarly, the IIRC is directed at the financial audience and the primary purpose of an integrated report as they define it is to explain to the providers of financial capital how an organization creates value over time (Flower, 2015). In the IIRC publication *Materiality in Integrated Reporting* (IFAC, 2015), a matter is defined as material “if it could substantively affect the organization's ability to create value in the short, medium or long term. The process of determining materiality is entity specific and based on industry and other factors, as well as multi stakeholder perspectives. This emphasis seeks to improve the quality of information available to providers of financial capital to enable a more efficient and productive allocation of capital.” (Ibid., p. 4). The GRI takes quite a different approach, much more oriented to the engagement of stakeholders rather than shareholders.

### *The GRI Materiality Approach*

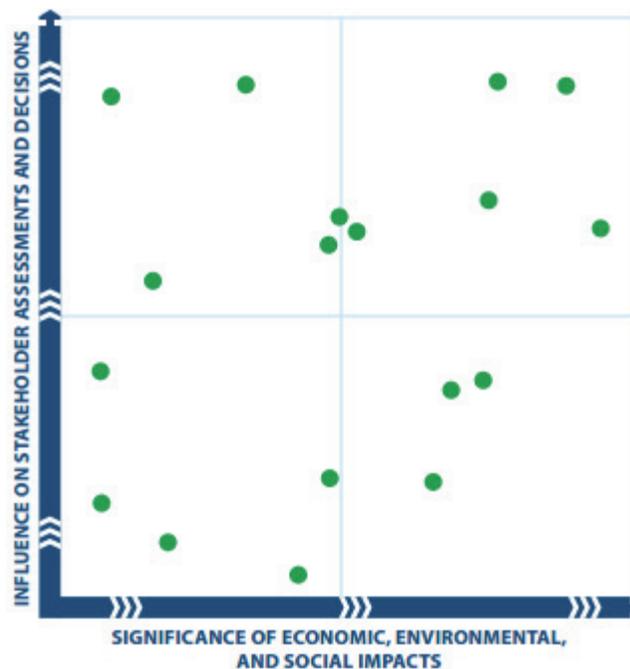
The GRI was founded in the United States in 1997 as a stakeholders' organization, but with a strong affiliation to global institutions such the United Nations Environmental Program (UNEP), Global Compact, and others. It is currently situated in Amsterdam and its SR guidelines are accepted as the most widely used worldwide (Alonso-Almeida et al., 2014). The GRI guidelines, while they at first focused on environmental performance, have developed over time and today include general guidance and a vast set of (sector-specific) indicators for sustainability reporting. In May 2013, the GRI published a revised version of its sustainability reporting guidelines, the G4, which includes two documents: a general one

called: *Reporting Principles and Standard Disclosures*<sup>15</sup> and a second one, which gives a broader perspective and guidance, called *Implementation Manual*.<sup>16</sup> Materiality is addressed in both documents with the following instructions: “Material Aspects are those that reflect the organization’s significant economic, environmental and social impacts; or that substantively influence the assessments and decisions of stakeholders. To determine if an Aspect is material, qualitative analysis, quantitative assessment and discussion are needed.” (GRI, G4 Reporting Principles and Standard Disclosures, 2013, p. 92)<sup>17</sup>

Materiality is thus the threshold at which aspects become sufficiently important to be reported. Beyond this threshold, not all material aspects are of equal importance, and the emphasis within a report should reflect the relative priority of these material aspects. Determining materiality for a sustainability report also includes considering economic, environmental, and social impacts that cross a threshold in affecting the ability to meet the needs of the present without compromising the needs of future generations. These material aspects often have a significant short- or long-term financial impact, so they are also relevant for stakeholders who focus strictly on the financial condition of an organization.

A combination of internal and external factors should be used to determine whether an aspect is material, including factors such as the organization’s overall mission and competitive strategy, concerns expressed directly by its stakeholders, broader social expectations, and the organization’s influence on upstream (such as supply chain) and downstream entities (such as customers). Assessments of materiality should also take into account the basic expectations expressed in the international standards and agreements with which the organization is expected to comply (GRI, G4 Implementation Manual, 2013, p.11). In addition to the written explanations, the GRI also provides graphic guidance in the form of what they call the Materiality Matrix:

**FIGURE 3**  
**GRI, G4 IMPLEMENTATION MANUAL**



(GRI, 2013, p.12)

The GRI expands the definition of materiality from a narrow (single bottom line) shareholder perspective to a broad (triple bottom line – social, environmental, and governance) stakeholder

perspective. It includes the creation of virtual meeting points of the different topics incorporated in the overall approach of sustainability along two axes. According to the GRI, the variable values result from a process that involves stakeholders' dialogues with the corporation. The materiality matrix depicts two axes. The horizontal one shows the level of importance of the specific sustainability issue to the corporation's success, while the vertical one presents the importance of the selected issue to the stakeholders.

The GRI externalizes the materiality decision-making process from the organization to a collaborative process between the organization and the stakeholders (Edgley et al., 2015). However, businesses are still expected to take responsibility for leading and managing the process. The result is that, de facto, material issues for reporting are still being decided by the (corporate) reporters themselves, since they "rule the game."

## RESEARCH MOTIVATION

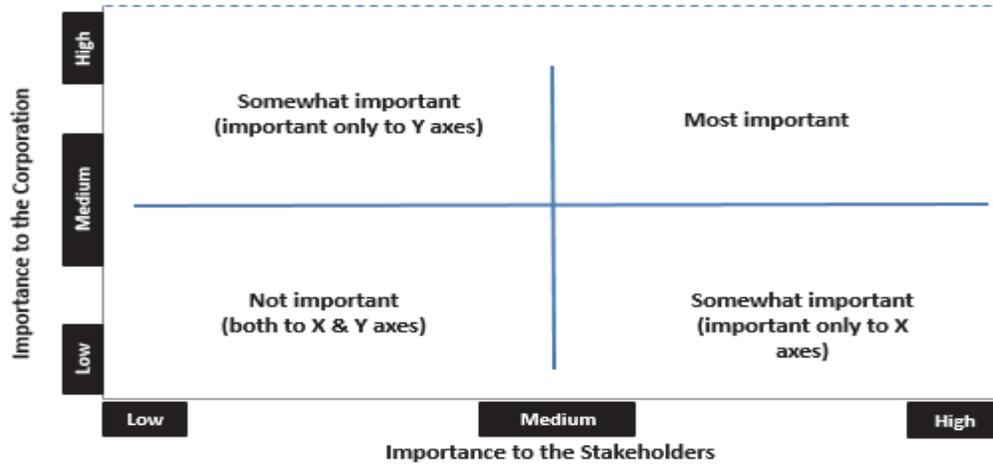
Scholars have already identified a need for the evolution of quantitative methods in materiality decision making (Calabrese et al., 2015; Edgley et al., 2015). Some of them such have already suggested a concrete model for it. Calabrese and colleagues (2016) presented a fuzzy AHP (analytic hierarchy process) method aimed at assisting mainly small and medium-sized enterprises (SMEs) in their reporting processes by creating a grading system based on executives' responses to the level of importance of the different GRI indicators. It is a very interesting approach, but excludes stakeholders' perspectives and thus misses the main point of subjectivity in materiality analysis.

Currently, most CSR literature focuses more on expanding the range of responsibilities that should be assigned to corporate managers and owners (Higgins, 2010) and less on practical real-life observations. The observations upon which this study is based are materiality matrixes as presented in GRI-based sustainability reporting. These matrixes are all based on the outline provided in the GRI guidelines as the analytical tool for identifying material issues for sustainability reporting.

These are qualitative matrixes with two axes (see Figure 3). The horizontal axis represents an evaluation of the importance of any given sustainability issue to the stakeholders. The vertical axis represents the importance of the given sustainability issue to the corporation itself. The importance might be negative, for example, a future potential risk to the company, or positive, for example, the manifestation of positive rewards that demonstrate an increase in financial achievements or any other goal.

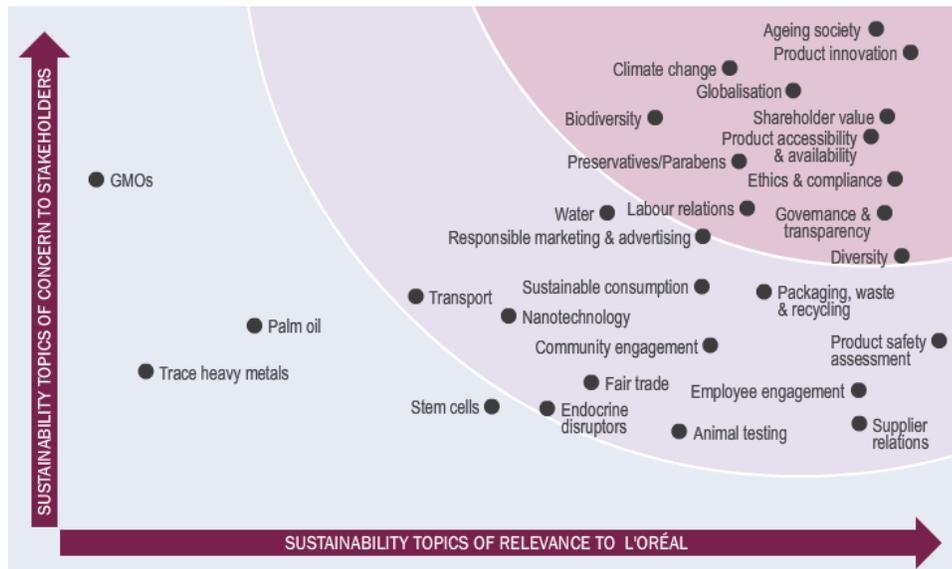
The starting point of both axes is (0, 0), at which the importance of the given issue is at its lowest degree, that is, it has no importance to stakeholders or to the reporting organization. The continuation of the axis is a qualitative scale with a middle point that represents an evaluation of mild importance to both stakeholders and the company. The maximum point of the matrix is the highest point of the right corner, in which the discussed issue receives the highest evaluation both from stakeholders and from the reporting organizations.

**FIGURE 4**  
**THE BASIC LAYOUT OF A MATERIALITY MATRIX**



Reporting organizations are thus asked to convey in the SR their findings and present the materiality matrix that was employed in writing the report. The positioning of the issues is to be based upon "stakeholder engagement," which is a dialogue-based process through which corporations reveal the degree to which sustainability issues are perceived by their stakeholders as important. The engagement outcomes are then semi-quantified so that they may be positioned properly on the matrix according to a low-high rough scale. Following is an example of a materiality matrix as it was presented in the 2012 L'Oréal sustainability report.<sup>18</sup>

**FIGURE 5**  
**L'OREAL MATERIALITY MATRIX**



An examination of the materiality matrix confirms that the two most important sustainability issues for the company and its stakeholders are ageing society and product innovation. Next in line are issues such as climate change, globalization, shareholder value, and product accessibility and availability. Moving away from the upper right corner of the matrix, the importance valuations of the issues become



1. **They are qualitative**, with no numerical attributes.
2. They are (supposed to be) **based on feedback** from two different, and sometime conflicting, audiences: stakeholders (through engagement), on one hand, and internal evaluators, on the other.
3. They present a large **variety of issues**, some of which are covered in accordance with the GRI (or other) guidelines, but some of the matrixes have no specific reporting requirements or tools.
4. There is considerable **diversity** in presentation, a fact that makes **comparison difficult** (whether over the course of time or between two or more companies).

In short, the problematic aspects of the current usage of materiality matrices as graphic representations of the outcome of an engagement process concern their basic methodological results, their reliability, and their validity.

Currently, each dot on the graph represents a multidimensional valuation:

- i. The valuation of the importance of the issue to the corporation from the stakeholders' perspective.
- ii. The valuation of the importance of the issue to the corporation from the corporation's perspective.

These two perspectives are unclear in terms of their mode of scaling and are qualitatively harvested from two juxtaposed survey groups, undermining the accuracy (and thus the validity and reliability) of the whole result. Firstly, from a conceptual angle, a two-dimensional matrix reveals in graphic terms the meeting point of two measured (or estimated) positions. It can either examine two positions on one issue of one surveyed group or, alternatively, one position of two surveyed groups. There are only two dimensions to the matrix, so the outcome must align with this limitation. The current matrix takes into account two surveyed groups, each of which has a different perspective on a single issue, merging four perspectives into two.

Secondly, stakeholders are by nature societal groups that have an interest in the specific stake that they hold. For example, Greenpeace (GP) is an environmental NGO, so it is expected that in any dialogue, its representatives will take a strong stand on environmental issues and scale them as very important (although there may be differences in the environmental issue themselves). The same holds true for other NGOs or groups with other concerns, such as human rights, life-work balance, and so on. Thus, in any well-prepared stakeholders' engagement process, stakeholders' groups will scale their own interests on the highest side of the axis, so large parts of the available space for answers will be disregarded.

Thirdly, the GRI materiality matrix method justifies its reasoning by claiming that the most important issues (in the upper right corner) must be reported because they represent the most important issues from a sustainability point of view. I would like to seriously question this paradigm and claim that from a normative point of view, the most important issues are those found important by stakeholders (the relevant half of the matrix). Thus, the key question is whether the stakeholders are those the corporations found fit to consult with and whether the chosen groups surveyed are those considered to have a low potential of conflict with the reporting organizations. Since corporate methodology is vague and cannot be deduced from SRs, it can only be assumed that the stakeholders represented are those chosen by the corporations for their suitability in terms of low potential for conflict.

These three fundamental flaws undermine the methodological grounds of materiality matrixes and prevent further explorations with commonly used research tools, for example, determining whether there are systematic errors and thus revealing the true score to increase reliability. These flaws may all affect the preliminary face (or consensus) validity, which claims that the method at hand simply does not reflect or represent the various aspects of the phenomenon as it claims to (Aaker et al., 2008).

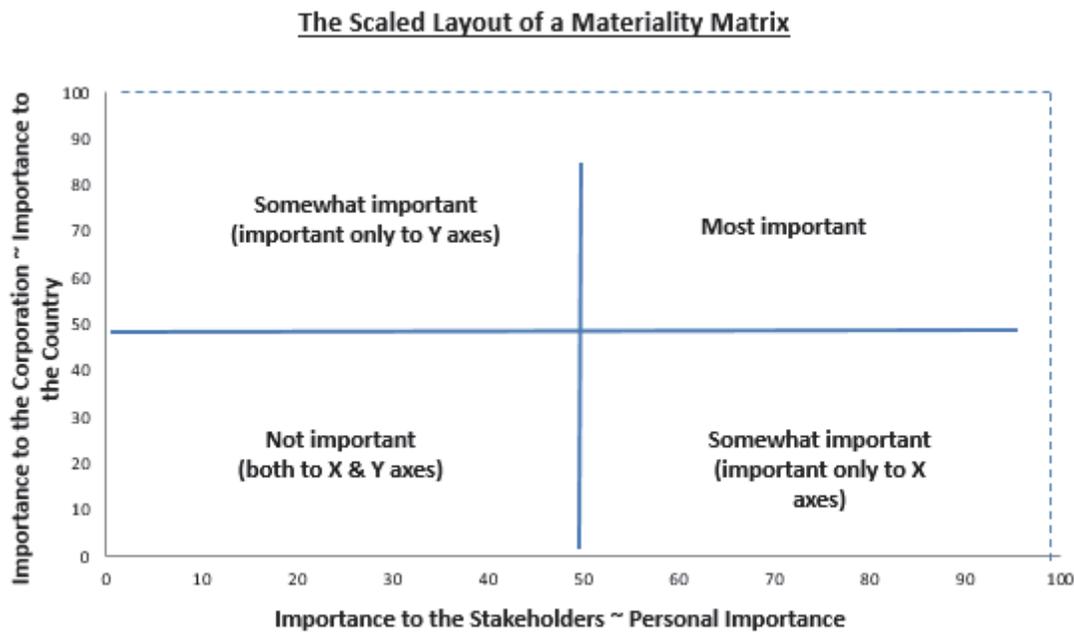
The GRI concept of having one analytical tool for both stakeholder's and corporations' perspectives should not be dismissed, but there is a need to formulate it into a well-established methodology that can be used repeatedly and by different corporations. This research aims to present such a tool: a surveyed materiality matrix based on two quantitative multiple-item scales.

## METHODOLOGY

### Questionnaire-based Matrix

The method used in this study is based on setting a quantitative scale of the matrix from 1 to 100 (see Figure. 8). Alongside the scaling, a survey was conducted among 39 Israeli CSR practitioners in a random sample. An online questionnaire was sent electronically to a list of 150 people, all with CSR backgrounds (consultants, executives, scholars, and so on). All 39 participants completed the survey, so it can be seen as a representative sample of the CSR community in Israel. However, in this study, the issue of representativeness is less important and any group of people could have been chosen for this case.

**FIGURE 8**  
**THE MATRIX WITH THE NUMERICAL SCALE ADDED TO IT**



The goal of the survey was to study the feasibility of a numerical materiality matrix based on real answers. As explained in the previous section, in order to enhance the validity of the outcome, the survey focused on one group (and not on both stakeholders and the reporting organization) and posed two sets of questions (both on a Likert scale) to its members. One set of questions requested their evaluation of the personal importance of a series of 10 sustainability issues, as follows: 1) local supply chain; 2) start-up nation;<sup>19</sup> 3) obedience to the law; 4) human rights; 5) environmental protection; 6) corporate governance; 7) diversity in the work place; 8) transparency; 9) unionization; and 10) corruption prevention.

The 39 participants were asked to evaluate these 10 issues on a continuous scale from 0 to 100 and to relate to how important the specific issue was to them. Following several socio-demographic questions, the participants were asked to evaluate the importance of the same issue for the success of the State of Israel. The issues were presented in random order. In this survey, the corporate angle was replaced by a general perspective on the country (Israel) as a representative of common ground known to all participants equally. Since the current study can be seen as an exploratory one, it was less important to limit it to the realm of the business sector than to find an empirical structure suitable for all participants, since the goal was to juxtapose the two perspectives over one matrix and test the survey tool appropriately.

## RESULTS

In order to validate the questionnaire, the results were analyzed using principle component analysis (PCA). The two sets of questions are presented as "country perspective" (see Appendix 2, Appendix 3) and "personal perspectives" (see Appendix 4, Appendix 5).

### Country Perspective Analysis

In the PCA (see Appendix 2), component 1, with 43.7% explained variance, included seven of the most important contributing items: human rights, environment, corporate governance, diversity, transparency, unionization, and corruption prevention. The reliability (Cronbach's alpha) for the set of 10 items was found to be high ( $\alpha=.83$ ). In an inter-item correlation table (see Appendix 3), the top correlations were found between environmental protection and human rights (Pearson=.759), corruption prevention and transparency (Pearson=.726), and environmental protection and unionization (Pearson=.715).

### Personal Perspective Analysis

In the PCA (see Appendix 4), component 1, with 39.9% explained variance, included all 10 items. The reliability (Cronbach's alpha) for the set of 10 items was found to be high ( $\alpha=.82$ ). In an inter-item correlation table (see Appendix 5), the top correlations were found between local supply chain and obedience to the law (Pearson=.654), start-up nation and corporate governance (Pearson=.628), corporate governance and local supply chain (Pearson=.627), and environmental protection and unionization (Pearson=.609). In comparison to the country perspective items, the correlations are weaker, with no correlation above 0.7 (no Pearson >0.7).

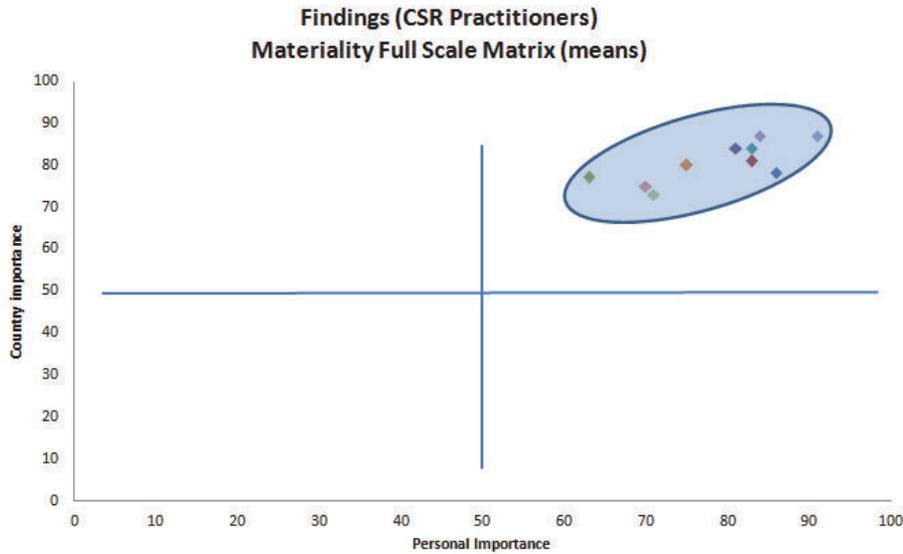
### Cross-item Correlation

A cross-item correlation (see Appendix 6) was also generated as part of the PCA analysis in order to reveal the cross-relations between the same items from the two sets of questions. The related matrix shows that there is no consistent correlation diagonal, although there seem to be higher correlation values in the diagonal line. The items that correlate the highest are obedience to the law (Pearson=.639), human rights (Pearson=.746), local supply chain (Pearson=.71), and transparency (Pearson=.663).

### The Survey-based Materiality Matrix

The empirical results presented above proved that the two sets of items were reliable and thus could be used in the next step, in which we presented a juxtaposition of the answers on one matrix and revealed the most material issues for the selected survey sample. The first matrix (Figure 7) reveals that all mean scores of the answers were above 50 on both axes. The only relevant quarter is the upper right one. The next figure focuses only on this quarter.

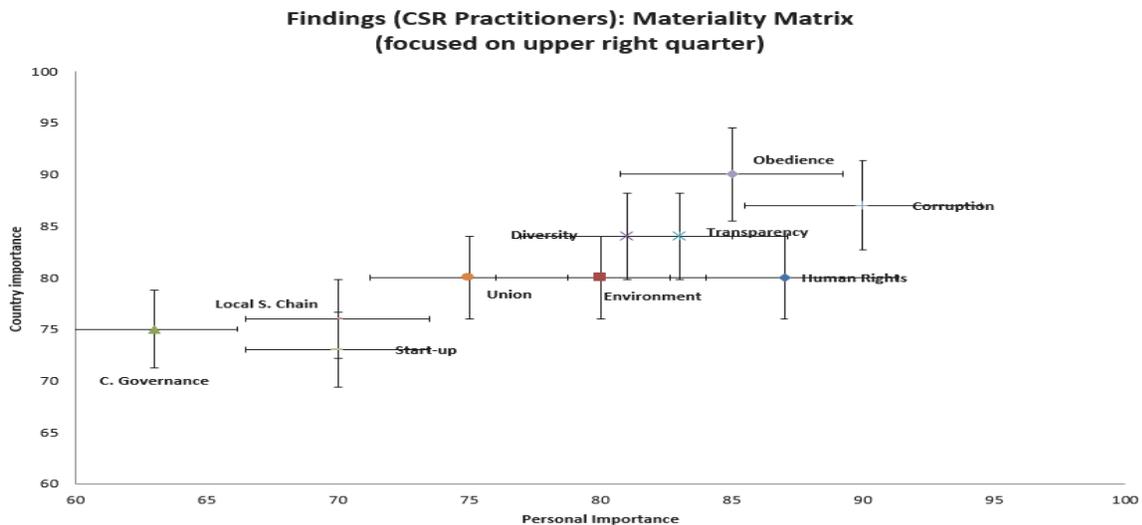
**FIGURE 9**  
**MATERIALITY FULL SCALE MATRIX – MEANS**



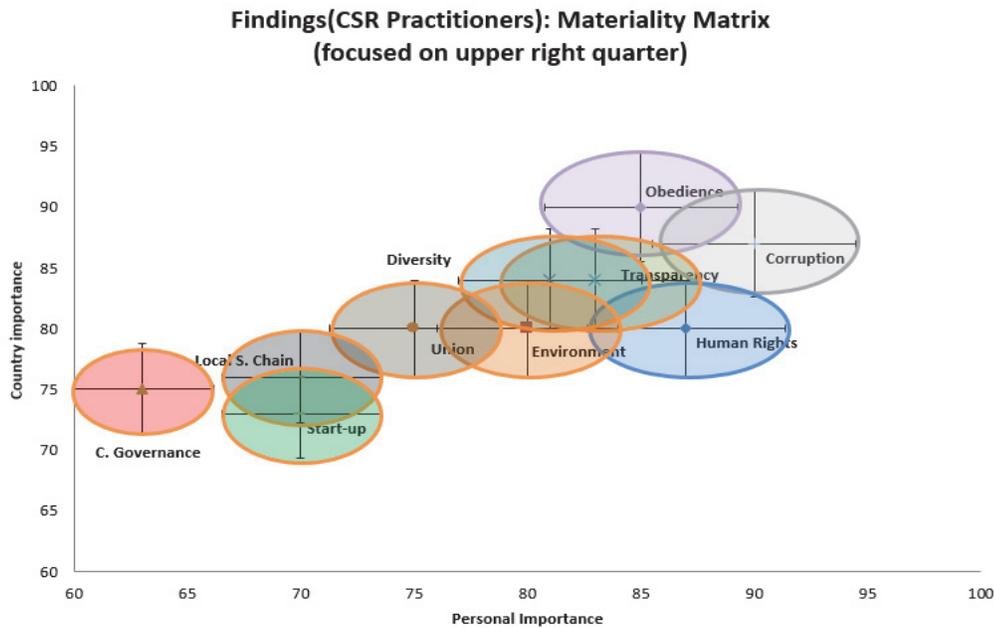
Focusing only on the upper right quarter (Figure 9), we can see that the two most material issues are obedience and corruption. Following them are diversity, transparency, and human rights. The matrix also presents the range of answers to each question. Using this range as the latitudes and longitudes of circular shapes (Figure 9), we can expose the interrelations between the items and see that obedience, corruption, and human rights are detached, with little overlap.

Transparency, diversity, and environment are clustered in the matrix with large overlapping areas. The two most overlapping items are transparency and diversity, but when examining their cross-correlation ratios (country-personal and vice versa), we find that their rates of correlation are low, only Pearson=.287 and Pearson=.261, respectively.

**FIGURE 10**  
**MATERIALITY MATRIX – UPPER RIGHT QUARTER**



**FIGURE 11**  
**MATERIALITY MATRIX – OVERLAPPING THEMES**



This infographic and the real use of the qualitative principles of the materiality matrix reveal that it is indeed a very useful instrument. We can easily identify the material sustainability issues as corruption, obedience, human rights, and transparency.

## CONCLUSION

In the current capitalist market structure, corporations' financial reports are based on long and established accounting forms. While the original goal of accounting was to provide a true and fair view of a company's performance, today its efficacy is being seriously questioned (Gazdar, 2007) because major public concerns are not always addressed in a sufficient manner. Issues such as child labor, lack of diversity in the workplace, slavery, poor environmental performance, and others have no tangible presence in corporations' reporting and disclosure procedures.

Currently, we are witnessing a transitional phase in which sustainability reporting is changing from a voluntary, "soft" regulation system to a more concrete, "hard" one. This change presents many challenges to the members of the sustainability reporting professional community – scholars, guidance organizations, NGOs, governments, and primarily the reporting organizations themselves. One of the main challenges is modifying the materiality process from a voluntary one to a regulated one without losing touch with the stakeholders. In order to do this, we must deepen our understanding of the materiality process in SR.

Materiality is the conceptual bedrock of the whole SR approach (Eccles and Krzus, 2014). It is a guiding principle both in financial and non-financial accounting. In financial accounting, the concept relates to the significance of transactions, balances, and errors contained in financial statements. It defines the threshold or cutoff point after which financial information becomes relevant to the decision-making needs of users. We now know that when trying to adapt the term "materiality" to SR, there are major challenges that need to be addressed, primarily because in SR materiality is a social construct (Eccles and Krzus, 2014; Edgley, 2014) and not merely an accounting directive.

In implementing materiality analyses in SR, companies are expected to choose the issues that are most material in terms of their sustainability implications and then act accordingly. If an issue is identified as material, it should be included and explained broadly in the sustainability report and in the

company's allocation of resources and efforts (Khan et al., 2016). If an issue is not material, then it is simply not important and calls for less attention on both organizational and communicative levels.

Although materiality is a shared feature of SR guidelines (Jones, et al., 2015), no definitive definition of it exists at an institutional level or in deductive SR research (Jones, Comfort and Hillier, 2016). The GRI takes quite a different approach, much more oriented to the engagement of stakeholders rather than shareholders. Materiality is thus the threshold at which aspects become sufficiently important to be reported. Beyond this threshold, not all material aspects are of equal importance and the emphasis within a report should reflect the relative priority of these material aspects. Determining materiality for a sustainability report also includes considering economic, environmental, and social impacts that cross a threshold in affecting the ability to meet the needs of the present without compromising the needs of future generations. These material aspects often have significant short- or long-term financial impact, so they are also relevant for stakeholders who focus strictly on the financial condition of an organization.

Materiality is a complex term. It is built upon assemblages of historical conditions, with altering chronological and sectorial meanings (Edgley, 2014). But still there is room to draw the discussion from a philosophical level to a more practical one, and that is what this article has aimed to do by exemplifying an empirical attempt to counter the public criticism raised by stakeholders and the media, who suggested that these reports are no more than public relations efforts, and portray only the positive aspects of corporations and not their material influences. This attempt externalizes the materiality process from an inter-organizational one to an external, verified method. It was created in order to assist corporations in answering the question of how a company can/should decide what is materially important to report about.

Ultimately, a reliable materiality process aims to overcome the existing deficiencies in the reliability and completeness of SR (Moroney and Trotman, 2016). The deficiencies are a result of the fact that even today, when analyzing materiality in SR of the same sector in the same country, significant variations are found (Jones et al., 2016). The survey-based materiality matrix presented in this article can now be further developed as a generic tool for legislators, think tanks, corporations, and other entities, and applied to the task of identifying the sustainability issues on which their stakeholders expect them to communicate, reevaluating these issues at a later time, and assessing whether there have been any normative shifts that require SR modifications. In light of the fact that sustainability reporting seems to be headed for a bumpy road, especially in the face of increasing efforts to transform existing guidelines into mandatory legislation formats, academic research methods should provide tools and methods to rely on and refer to in the reporting process. This article attempts to do this by taking one specific key component of SR and applying a reliable measuring tool to it.

## ENDNOTES

1. <http://database.globalreporting.org/>  
Prof. Kreps's course, Business Activity and Public Welfare, was introduced in 1931.  
[http://www.gsb.stanford.edu/about/history/timeline/faculty\\_kreps.html](http://www.gsb.stanford.edu/about/history/timeline/faculty_kreps.html)
2. For the full history of UN sustainable development event, see <http://www.uncsd2012.org/history.html>
3. Rio +20, 'The future we want', Article 47: <http://sustainabledevelopment.un.org/futurewewant.html>
4. The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anti-corruption. By aligning operations and strategies with these principles, business, as a primary driver of globalization, can help ensure that markets, commerce, technology, and finance advance in ways that benefit economies and societies everywhere. <http://www.unglobalcompact.org/>
5. The OECD Guidelines for Multinational Enterprises are recommendations addressed by governments to multinational enterprises operating in or from adhering countries. They provide non-binding principles and standards for responsible business conduct in a global context consistent with applicable laws and internationally recognized standards. <http://www.oecd.org/daf/inv/mne/48004323.pdf>
6. ISO 26000 provides guidance on how businesses and organizations can operate in a socially responsible way. This means acting in an ethical and transparent manner that contributes to the health and welfare of society. <http://www.iso.org/iso/home/standards/iso26000.htm>

7. For the full text of the speech, see [http://europa.eu/rapid/press-release\\_SPEECH-13-444\\_en.htm?locale=en](http://europa.eu/rapid/press-release_SPEECH-13-444_en.htm?locale=en)
8. For further information on the EU legislation, see [http://ec.europa.eu/internal\\_market/accounting/non-financial\\_reporting/index\\_en.htm](http://ec.europa.eu/internal_market/accounting/non-financial_reporting/index_en.htm)
9. <http://www.ifrs.org/Pages/default.aspx>
10. IASB Meeting: 17 May 2005, London. Project: Conceptual Framework: link
11. IASB Framework
12. <http://www.bsr.org/en/>
13. <http://www.theiirc.org/>
14. For an elaboration of SR guidelines, see Appendix 1- Global Sustainability Reporting Organizations Initiatives
15. <https://www.globalreporting.org/resourcelibrary/GRIG4-Part1-Reporting-Principles-and-Standard-Disclosures.pdf>
16. <https://www.globalreporting.org/resourcelibrary/GRIG4-Part2-Implementation-Manual.pdf>
17. Global Reporting Initiative, G4 Sustainability Reporting Guidelines, Reporting Principles and Standard Disclosures, 2013, p. 92. Link
18. From: <http://sustainabledevelopment09.loreal.com/business/sustainability-topics.asp>
19. The term “start-up nation” has become common in the Israeli discourse in recent years in describing a culture of entrepreneurship. See Senor, D. and Singer, S. (2011) *Start-up Nation: The Story of Israel's Economic Miracle*. Random House, New York.

## REFERENCES

- Aaker, D. A., Kumar, V., & Day, G. S. (2008). *Marketing research*. John Wiley & Sons, West Sussex, UK.
- Alonso-Almeida, M., Llach, J., & Marimon, F. (2014). A closer look at the ‘Global Reporting Initiative’ sustainability reporting as a tool to implement environmental and social policies: A worldwide sector analysis. *Corporate Social Responsibility and Environmental Management*, 21(6), 318-335.
- Bradford, M., Earp, J. B., Showalter, D. S., & Williams, P. F. (2016). Corporate Sustainability Reporting and Stakeholder Concerns: Is There a Disconnect? *Accounting Horizons*.
- Calabrese, A., Costa, R., Levialdi, N., & Menichini, T. (2016). A fuzzy Analytic Hierarchy Process method to support materiality assessment in sustainability reporting. *Journal of Cleaner Production*, 121, 248-264.
- Calabrese, A., Costa, R., & Rosati, F. (2015). A feedback-based model for CSR assessment and materiality analysis. *Accounting Forum*, 39(4), 312-327.
- Cooper, S. M., & Owen, D. L. (2007). Corporate social reporting and stakeholder accountability: The missing link. *Accounting, Organizations and Society*, 32(7), 649-667.
- Deutsche Bank Group. (2012). *Sustainable Investing*. Routledge, Frankfurt.
- E&Y. (2014). *Sustainability reporting — the time is now*. E&Y.
- Eccles, R. (1991). The performance measurement manifesto. *Harvard Business Review*, 69(1), 131-137.
- Eccles, R. G., & Krzus, M. P. (2014). *The integrated reporting movement: meaning, momentum, motives, and materiality*. John Wiley & Sons.
- Edgley, C. (2014). A genealogy of accounting materiality. *Critical Perspectives on Accounting*, 25(3), 255-271.
- Edgley, C., Jones, M. J., & Atkins, J. (2015). The adoption of the materiality concept in social and environmental reporting assurance: A field study approach. *The British Accounting Review*, 47(1), 1-18.
- Emerson, J., Bonini, S., & Brehm, K. (2003). *The blended value map: Tracking the intersects and opportunities of economic, social and environmental value creation*. Retrieved from [blendedvalue.org](http://blendedvalue.org).
- Flower, J. (2015). *The International Integrated Reporting Council: A story of failure*.

- Freeman, R.E. (1983). Strategic management: A stakeholder approach. *Advances in Strategic Management*, 1(1), 31-60.
- Gazdar, K. (2007). *Reporting nonfinancials*. John Wiley & Sons, West Sussex, UK.
- Goldin, I. (2013). *Divided Nations: Why global governance is failing, and what we can do about it*. OUP. Oxford.
- Gray, R. (2001). Thirty years of social accounting, reporting and auditing: what (if anything) have we learnt? *Business Ethics: A European Review*, 10(1), 9-15.
- Higgins, C. (2010). Is a responsive business also a responsible business? *Journal of Business Systems, Governance and Ethics*, 5(3), 23-32.
- IFAC. (2015). *Materiality in Integrated Reporting*.
- Ioannou, I., & Serafeim, G. (2011). *The consequences of mandatory corporate sustainability reporting: evidence from four countries*. Harvard Business School, Harvard.
- Jones, P., Comfort, D., & Hillier, D. (2016). Materiality in corporate sustainability reporting within UK retailing. *Journal of Public Affairs*, 16(1), 81-90.
- Jones, P., Comfort, D., & Hillier, D. (2015). Materiality and external assurance in corporate sustainability reporting: An exploratory study of UK house builders. *Property Management*, 33(5), 430-450.
- Khan, M., Serafeim, G., & Yoon, A. (2016). Corporate sustainability: First evidence on materiality. *The Accounting Review*, 91(6), 1697-1724.
- KPMG. (2016). *Carrots and sticks*, KPMG, GRI, UNEP, the center for corporate governance in Africa, Amsterdam.
- Kramer, M. R., & Porter, M. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62-77.
- Moroney, R., & Trotman, K. T. (2016). Differences in Auditors' Materiality Assessments When Auditing Financial Statements and Sustainability Reports. *Contemporary Accounting Research*, 33(2), 551-575.
- Nestlé. (2016). Nestlé & nbsp; - creating shared values. Retrieved June 22, 2017, from <http://www.nestle.com/csv/what-is-csv/materiality>
- Searcy, C., & Buslovich, R. (2014). Corporate perspectives on the development and use of sustainability reports. *Journal of Business Ethics*, 121(2), 149-169.
- Simnett, R., Vanstraelen, A., & Chua, W. F. (2009). Assurance on sustainability reports: An international comparison. *The Accounting Review*, 84(3), 937-967.

APPENDIX 1

GLOBAL SUSTAINABILITY REPORTING ORGANIZATIONS AND INITIATIVES

Name	Activity	Link
<b>Sustainable Stock Exchanges</b>	A UN initiative aimed at exploring how exchanges can work together with investors, regulators, and companies to enhance corporate transparency, and ultimately performance, on environmental, social, and corporate governance (ESG) issues and encourage responsible long-term approaches to investment.	<a href="http://www.sseinitiative.org/">http://www.sseinitiative.org/</a>
<b>Accounting for a Sustainable Future</b>	<p>The Sustainability Accounting Standards Board™ (SASB™) is a 501(c)3 non-profit that provides standards for use by publicly listed corporations in the United States in disclosing material sustainability issues for the benefit of investors and the public.</p> <p>SASB standards are designed for disclosure in mandatory filings to the Securities and Exchange Commission (SEC), such as the Form 10-K and 20-F. SASB standards will result in the improved performance of 13,000+ corporations, representing over \$16 trillion in funds, on the highest-priority environmental, social, and governance issues.</p>	<a href="http://www.sasb.org/">http://www.sasb.org/</a>
<b>Global Reporting Initiative</b>	<p>The Global Reporting Initiative (GRI) is a non-profit organization that promotes economic, environmental, and social sustainability.</p> <p>GRI provides all companies and organizations with a comprehensive sustainability reporting framework that is widely used around the world.</p>	<a href="https://www.globalreporting.org/Pages/default.aspx">https://www.globalreporting.org/Pages/default.aspx</a>
<b>Global Compact</b>	<p>The UN Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment, and anti-corruption.</p> <p>By doing so, business, as a primary driver of globalization, can help ensure that markets, commerce, technology, and finance advance in ways that benefit economies and societies everywhere.</p>	<a href="http://www.unglobalcompact.org/">http://www.unglobalcompact.org/</a>
<b>The International Integrated Reporting Council (IIRC)</b>	<p>The International Integrated Reporting Council (IIRC) is a global coalition of regulators, investors, companies, standard setters, the accounting profession, and NGOs.</p> <p>This coalition shares the view that communication about businesses' value creation should be the next step in the evolution of corporate reporting.</p>	<a href="http://www.theiirc.org/">http://www.theiirc.org/</a>

Name	Activity	Link
<b>OECD Guidelines for multinational enterprises</b>	The Guidelines are far-reaching recommendations addressed by governments to multinational enterprises operating in or from adhering countries. They provide voluntary principles and standards for responsible business conduct in areas such as employment and industrial relations, human rights, environment, information disclosure, combating bribery, consumer interests, science and technology, competition, and taxation.	<a href="http://www.oecd.org/da/inv/mne/">http://www.oecd.org/da/inv/mne/</a>
<b>ISO 26000 - Social responsibility</b>	<p>Businesses and organizations do not operate in a vacuum. Their relationship to the society and environment in which they operate is a critical factor in their ability to continue to operate effectively. It is also increasingly being used as a measure of their overall performance.</p> <p>ISO 26000 provides guidance on how businesses and organizations can operate in a socially responsible way. This means acting in an ethical and transparent way that contributes to the health and welfare of society.</p>	<a href="http://www.iso.org/iso/home/standards/iso26000.htm">http://www.iso.org/iso/home/standards/iso26000.htm</a>

**APPENDIX 2**

**FACTOR ANALYSIS – INTER-ITEM (COUNTRY PERSPECTIVE)**

**Total Variance Explained**

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.375	43.747	43.747	4.375	43.747	43.747
2	1.770	17.700	61.447	1.770	17.700	61.447
3	1.074	10.741	72.188	1.074	10.741	72.188
4	.841	8.414	80.602			
5	.679	6.794	87.395			
6	.436	4.359	91.754			
7	.276	2.758	94.512			
8	.263	2.629	97.141			
9	.173	1.726	98.867			
10	.113	1.133	100.000			

Extraction Method: Principal Component Analysis

**Component Matrix**

	Component		
	1	2	3
Human rights	.833	-.119	-.288
Environmental Protection	.913	.018	-.008
Corporate Governance	.696	.221	.211
Diversity	.674	-.074	-.492
Transparency	.629	-.553	.418
Unionization	.763	-.193	-.122
Corruption Prevention	.730	-.258	.409

The extracted components

**Component Matrix**

	Component		
	1	2	3
Local Supply Chain	.280	.582	.099
Start-Up Nation	.532	.692	-.298
Obedience to the Law	.189	.690	.499

<b>Item-Total Statistics</b>	
	Cronbach's Alpha if Item Deleted
Human Rights	.805
Environmental Protection	.791
Corporate Governance	.814
Diversity	.823
Transparency (in the business sector)	.830
Unionization	.814
Corruption Prevention	.815

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.838	.836	10

**APPENDIX 3**

**INTER-ITEM CORRELATION TABLE - COUNTRY PERSPECTIVES**

	Obedience to the Law	Human Rights	Unionization	Environmental Protection	Diversity in the workplace	Local Supply Chain	Corporate Governance	Transparency	Start-Up Nation	Corruption Prevention
<b>Obedience to the Law</b>	1.00									
<b>Human Rights</b>	.043	1.00								
<b>Unionization</b>	-0.63	.598	1.00							
<b>Environmental Protection</b>	.152	.759	.715	1.00						
<b>Diversity in the workplace</b>	-0.88	.681	.426	.494	1.00					
<b>Local Supply Chain</b>	.306	.067	.099	.205	.201	1.00				
<b>Corporate Governance</b>	.248	.381	.476	.693	.255	.204	1.00			
<b>Transparency</b>	-0.049	.452	.469	.521	.340	-0.037	.360	1.00		
<b>Start-Up Nation</b>	.428	.430	.290	.486	.397	.364	.467	-0.149	1.00	
<b>Corruption Prevention</b>	.158	.546	.464	.569	.396	.164	.389	.726	.124	1.00

Pearson correlation table

**APPENDIX 4**

**FACTOR ANALYSIS – INTER-ITEM (PERSONAL PERSPECTIVE)**

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.997	39.974	39.974	3.997	39.974	39.974
2	1.978	19.784	59.758	1.978	19.784	59.758
3	1.200	11.997	71.755	1.200	11.997	71.755
4	.748	7.479	79.234			
5	.569	5.694	84.927			
6	.464	4.637	89.565			
7	.358	3.577	93.142			
8	.293	2.929	96.071			
9	.236	2.364	98.435			
10	.156	1.565	100.000			

Extraction Method: Principal Component Analysis

**Component Matrix**

	Component		
	1	2	3
Obedience to the Law	.508	.731	.182
Human Rights	.534	-.358	.601
Unionization	.585	-.630	-.065
Environmental Protection	.680	-.406	-.182
Diversity (in the workplace)	.716	-.278	.142
Local Supply Chain	.696	.469	-.158
Corporate Governance	.773	.234	-.334
Transparency	.614	-.394	-.305
Start-Up Nation	.580	.424	-.309
Corruption Prevention	.585	.260	.651

Extraction Method: Principal Component Analysis<sup>a</sup>

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.827	.829	10

### Item-Total Statistics

	Cronbach's Alpha if Item Deleted
Obedience to the Law	.823
Human Rights	.821
Unionization	.819
Environmental Protection	.806
Diversity (in the workplace)	.805
Local Supply Chain	.802
Corporate Governance	.791
Transparency	.814
Start-Up Nation	.815
Corruption Prevention	.817

**APPENDIX 5**

**INTER-ITEM CORRELATION MATRIX – PERSONAL PERSPECTIVES**

	Obedience to the Law	Human Rights	Unionization	Environmental Protection	Diversity in the workplace	Local Supply Chain	Corporate Governance	Transparency	Start-Up Nation	Corruption Prevention
Obedience to the Law	1.00									
Human Rights	.081	1.00								
Unionization	-0.182	.531	1.00							
Environmental Protection	.068	.320	.609	1.00						
Diversity in the workplace	.165	.464	.453	.439	1.00					
Local Supply Chain	.654	.111	.197	.317	.340	1.00				
Corporate Governance	.418	.187	.317	.421	.431	.627	1.00			
Transparency	0.090	.214	.464	.573	.540	.218	.401	1.00		
Start-Up Nation	.438	.112	.157	.202	.207	.502	.628	.176	1.00	
Corruption Prevention	.569	.479	.114	.253	.393	.363	.300	.115	.232	1.00

Pearson correlation table

APPENDIX 6

CROSS-ITEM CORRELATION MATRIX

		Key Sustainability Issues – Country Perspective									
		Obedience to the Law	Human Rights	Unionization	Environmental Protection	Diversity in the workplace	Local Supply Chain	Corporate Governance	Transparency	Start-Up Nation	Corruption Prevention
Key Sustainability issues – Personal Perspective	Obedience to the Law	.639	.000	-.245	.131	.005	.486	.230	-.023	.128	.055
	Human Rights	.070	.746	.271	.504	.663	-.011	.230	.386	.298	.472
	Unionization	-.069	.565	.440	.427	.469	-.075	.285	.317	.209	.182
	Environmental Protection	.020	.215	.263	.385	.229	-.065	.341	.511	-.104	.368
	Diversity in the workplace	.010	.426	.150	.412	.619	.117	.301	.287	.357	.294
	Local Supply Chain	.481	.034	-.067	.212	.139	.710	.344	-.064	.320	.081
	Corporate Governance	.203	.059	-.139	.163	.153	.255	.521	.104	.166	.193
	Transparency	.185	.156	.294	.337	.261	.040	.491	.663	-.048	.353
	Start-Up Nation	.291	-.084	-.211	-.093	.072	.195	.306	-.195	.308	-.040
	Corruption Prevention	.227	.409	.039	.399	.265	.175	.333	.304	.058	.480

Pearson correlation table