

A Reference Model of Sustainability Disclosure based on Four Sustainability Stock Indexes

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Abstract

The study proposes to develop a reference model of sustainability disclosure based on the models and requirements of four sustainability indexes - Dow Jones Sustainability Index, Corporate Sustainability Index ISE, Frankfurt STOXX and Financial Times FTSE ESG. The approach employed to develop the model is a qualitative analysis of the complementarity among the Stock indexes above mentioned alongside a literature review on sustainability disclosure frameworks. There is no consensus around what should be measured and how. Yet, there is no study in the literature that has ever discussed the models of the sustainability stock indexes and the respective data required in each one of them or compared these models and their requirements. The present study attempts to fulfill this gap by examining the initiatives

and requirements of four prominent sustainability indexes. This study contributes to the sustainability responsible investment literature. The inclusion of a firm in a sustainability index can be perceived as a positive signal by investors and this can be explained by signaling theory. This analysis can help investors and/or socially responsible fund managers to screen the stocks against this reference model and determine those firms that are more adherent to it.

Keywords: Sustainability stock indexes, responsible investment, sustainability disclosure, reference model, signaling theory

1. Introduction

Integrating environmental, social and corporate governance (ESG) policies and practices into a company's strategy and daily operations is increasingly regarded by investors as relevant to its ability to realize the long-term value (SSE, 2015). The businesses seeking to build long-term value are those that are anticipating and responding to the changing needs of their stakeholder community, society and the external environment (Morrow and Yow, 2014). Companies have been pressured to report on their sustainability performance and some effort has been made to establish initiatives to guide them in doing so (Delai and Takahashi, 2011).

Due to rising demands for ESG integration of asset owners and the growing materiality of ESG metrics, this type of information is increasingly being used by asset managers in portfolio construction (Morrow and Yow, 2014). Most of the big companies are providing sustainability information which provides the base for responsible investors to take wise decisions, to invest in socially and environmentally concerned companies (Tuli, 2013). This is called Responsible Investment RI. This is an approach to investment that explicitly acknowledges the relevance to the investor of environmental, social and governance factors, and the long term health and stability of the market as a whole. It requires investors and companies to take a wider view, acknowledging the full spectrum of risks and opportunities facing them, in order to allocate capital in a manner that is aligned with the short and long term interests of their clients and beneficiaries (PRI, 2015). A large and growing proportion of assets managed globally are with asset managers and owners who are incorporating ESG considerations in the investment process. By the middle of 2015, the United Nations-supported Principles for Responsible Investment (PRI) had nearly 1,400 signatories with USD 54 trillion in assets under management, up from 800 signatories with USD 22 trillion in 2010 (SSE, 2015).

This investment strategy refers to the practice of choosing stocks on the basis of environmental and social screens (Ziegler and Schroder, 2010). One strand of economic responsible investment studies directly examines the financial performance of sustainability stock indexes (Ziegler and Schroder, 2010, Oberndorfer, Schmidt, Wagner and Ziegler, 2013). The sustainability indexes linked to financial markets that have been developed around the world aim at providing investors with further insight into corporate sustainability performance (Searcy and Elkhawas, 2012, Orsato, Garcia, da Silva and Simonetti, 2015, Oberndorfer et al, 2013). According to Dow Jones Sustainability Index DJSI, sustainability means creating long term shareholder value by embracing opportunities and managing risks deriving from economic, environmental and social developments (Jones, 2005).

The inclusion of a firm in a sustainability stock index can be perceived as a reliable signal for a high intensity of environmental and social activities and for having corporate social responsibility (Bechetti, Giacomo and Pinnachio, 2008, McWilliams and Siegel, 2000). Reputation gains through this positive signal can also attract customers and employees sensitive to sustainability issues (Oberndorfer et al, 2013 and Ziegler, 2012) and help to create intangible value for the firm (Orsato et al, 2015). Corporate sustainability is seen as providing external benefit and will signal on corporate reputation (Lourenço and Branco,

2013). This view is in line with signaling theory. Its core consists of the analysis of different types of signals that signaler sends to the receiver and the situations in which they are interpreted and used. Signals convey information about signaler characteristics and receiver examines them to evaluate signaler credibility (Spence, 2002).

A wide variety of initiatives and requirements have been employed and/or required by stock exchanges around the world to address sustainability issues on their stock indexes or to include a firm in their stock indexes. The sustainability indexes indicate the degree companies listed in the capital market commit to social and environmental responsibility (Orsato et al, 2015).

Research on literature on sustainable measurement and/or disclosure systems shows that there is not a single system that tackles all sustainability issues as well as there is no consensus around what and how should be measured or assessed. To the best of our knowledge, we have not come across any study that has either discussed the model of the sustainability stock indexes and the respective data required in each one of them or compared these models and their requirements. Therefore, the present study attempts to fulfil this gap by examining the initiatives and requirements of four prominent sustainability indexes, namely the Dow Jones Sustainability Index DJSI, Corporate Sustainability Index ISE, the Frankfurt Stock Exchange STOXX and Financial Times ESG.

The study proposes to develop a reference model of sustainability disclosure based on the models and requirements of these four stock indexes. We contribute to the sustainability responsible investment literature with this study. It can be used as a benchmarking tool for stock exchanges looking to keep pace with a core set of sustainability disclosure requirements. This analysis can help investors and/or socially responsible fund managers to screen the stocks against this reference model and determine those firms that are more adherent to it.

The final step is to confront this reference model with a model based on literature and organizations such as GRI Global Reporting Initiative and United Nations Global Compact and examine their similarities and differences.

This article is divided into five parts. Section 2 presents the main concepts of signaling theory, the four sustainability indexes and correlated studies concerning sustainability methodologies and/or systems. Section 3 is about the research method, section 4 presents the development of the reference model of sustainability disclosure based on Stock Exchanges and a model based on literature. The reference model is then confronted with the model based on literature. Section 5 presents the discussion and conclusions of the article.

2. Literature Review

2.1 Signaling Theory

The signaling timeline includes two actors (the signaler, a person or firm, which sends the information the receivers would find useful and receiver who observes and interprets the signal) as well as the signal itself (Connelly, Certo, Ireland and Reutzel, 2011).

The information affects the decision-making processes used by individuals in households,

businesses and governments and they make decisions based on public information, which is freely available, and private information, which is available for only a subset of the public, occurring then information asymmetry (Connelly et al, 2011). The disclosure of sustainability reporting can diminish informational asymmetries between the firm and its stakeholders and is used as a communication tool to win their support (Chiu and Wang, 2015). Signaling theory suggests that “good” corporate citizens issue standalone Corporate Social Responsibility CSR reports to eliminate information asymmetries that may prevent them from reaping benefits of their actions. Signaling suggests that firms use standalone CSR reports as a signal of their superior commitment to CSR (Mahoney, Thorne, Cecil and LaGore, 2013). Some signaler characteristics are more likely to enhance the effectiveness of a signal and credibility is a way to reflect the extent to which a signaler is honest (Davila, Foster and Gupta, 2003).

There is a tension between the costs and benefits to be derived from disclosure as well as the resulting equilibrium in information asymmetry of a firm, either in the form of a voluntary disclosure (namely, sustainability report) or listed in a sustainability stock index (Cormier, Ledous and Magnan, 2011). The results of their study suggest that social disclosure and environmental disclosure substitute each other in reducing the information asymmetry between managers and stock market participants.

2.2 Sustainability Stock Indexes

The four stock indexes analyzed in this article have been designed to measure the performance of companies that meet globally recognized corporate social responsibility standards and to facilitate investments in those companies.

2.2.1 Frankfurt/Stoxx

Frankfurt Stock Exchange uses STOXX ESG Index Methodology Guide (2014) for listing their sustainable firms. STOXX Limited is owned by the Deutsche Börse Group and responsible for the STOXX Global ESG Leaders Index. The index tracks the performance of the global leading companies with regard to corporate sustainability, which is divided into three dimensions: Environmental, Social and Governance sustainability with 56, 50 and 28 indicators in each dimension respectively.

The weight of the indicators in each dimension varies according to the company’s sector and some indicators do not apply for every sector. According to the STOXX Methodology Guide, the evaluation is based on a continuous research and analysis process using company data, media reports, sector studies and public institutions. Below there is a list of examples of the key indicators related to the three dimensions.

Environmental – Formal Environmental Policy, Environmental and Social Impact Assessments, Oil Spill Reporting and Performance, Waste Intensity, Water Intensity, Programs and Targets to Reduce Water Use, Carbon Intensity, Programs and Targets to Increase Renewable Energy Use, Environmental and Social Standards in Credit and Loan Business.

Social – Employee Turnover Rate, Supply Chain Audits, Community Involvement Programs,

Local Community Development Programs, Number of Fatalities, Formal Policy on the Elimination of Discrimination, Programs to Increase Workforce Diversity, Customer Related Controversies or Incidents, Activities in Sensitive Countries.

Governance – Policy on Bribery and Corruption, Policy on Money Laundering, Policy on Responsible Investment, Board Independence, CSR Reporting Quality, Business Ethics Related Controversies or Incidents, Separation of Board Chair and CEO Roles, Public Policy Related Controversies or Incidents, Transparency on Payments to Host Governments.

After assigning a grade to each indicator, there is a formula to calculate the company's overall score and its score per dimension. A set of indexes is derived from these scores – the STOXX Global ESG Leaders Index lists top companies on the overall score, while the STOXX Global ESG Environmental Leaders lists only the companies with the highest scores on the environmental dimension. There are clear rules that also assists the analysts to review and adjust the indexes using the STOXX methodology.

2.2.2 FTSE ESG

The FTSE ESG Ratings are based on a consistent methodology that measures companies' performance on Environmental, Social and Governance (ESG) practices. Each company is assessed through an analysis of its publicly available data and also through direct contact with the companies to request additional information. All research and company assessments for the FTSE4Good Index and ESG ratings are carried out by EIRIS (global provider in ESG research and investment solutions) (SustainAbility, 2013).

The rating score applied to evaluate companies consists of more than 300 Indicators (which focus on key operational issues), divided into 14 Themes (such as Climate Change and Health & Safety) and inserted into 3 Pillars (Environment, Social and Governance) (FTSE, 2015).

Over 100 indicators are sector specific tailored for different industrial sectors, and another 60 are quantitative or performance indicators that use data to make performance judgements. Qualitative indicators assess the quality of management approach, quantitative indicators measure corporate data disclosure. The FTSE method of analysis is based only on publicly available data and its ratings fall under the oversight of an independent committee (FTSE4Good, 2015). The 14 Themes are distributed per Pillar.

Environment: Climate change – related to GHG emissions and energy reduction and adaptation to physical impacts; Water Use – related to policy commitment to address water use and actions taken to reduce it; Biodiversity – policy commitment on biodiversity and to net its impact; Pollution & Resources – policy and targets to reduce pollution, waste and resources; Environmental Supply Chain – policy addressing energy use, GHG emissions, water use, biodiversity, pollution, waste and resources.

Social: Health & Safety – related to health and safety and contractors; Labour Standards – policy addressing International Labour Organisation ILO, non-discrimination, working hours and living wage; Human Rights & Community Indicators – related to UN Guiding Principles on Business and Human Rights, Children's Rights and Business Principles and commitment

to local employment; Customer Responsibility – related to responsible advertising and marketing and policy on negative impact on customers; Social Supply Chain – policy addressing ILO conventions, working hours, living wage, health and safety.

Governance: Anti Corruption – related to risk assessment of operations and intermediaries regarding bribery and corruption; Tax Transparency – policy commitment to tax transparency; Risk Management – related to risk management framework, scenario planning and stress testing and code of conduct; Corporate Governance – several issues such as separate chairman and CEO, commitment to diversity on the Board, Board meeting frequency and attendance rate, shareholder voting rights.

2.2.3 Dow Jones Sustainability Index

The Dow Jones Sustainability Indexes follow a methodology that allows investors to benchmark sustainability-driven funds and derivatives over the long run, consisting of many global and regional indexes and sub-indexes. These indexes are maintained collaboratively with S&P Dow Jones Indices and RobecoSAM, an investment firm focused on sustainability investing (RobecoSam, 2015).

The methodology used to evaluate companies is based on a comprehensive assessment (a questionnaire) of long-term economic, environmental and social dimensions, designed to account for both general and industry-specific sustainability trends. Each dimension consists of an average of 6 to 10 criteria, and each of them contains 2 to 10 questions. Every question has a weight and is worth up to a 100 points.

According to RobecoSAM's guidebook, the questionnaire is designed to ensure objectivity by limiting qualitative answer through predefined multiple-choice questions. When qualitative answers are needed, analysts evaluate the response using a predefined appraisal method that converts the response into a quantitative score. In addition to that, companies must also submit documents supporting their answers. The methodology also takes in consideration media stories and stakeholder commentaries (compiled by a leading provider of media monitoring tools), which have different weights varying by criteria and depending on the materiality of the potential impact on the company.

The weights of the economic, social and environmental dimensions of the questionnaire vary by industry. The percentage of industry-specific questions for each dimension also vary by industry, resulting in 59 unique questionnaires. Below there's a sample of criteria related to each dimension for the Banking, Electric Utilities and Pharmaceutical industries.

Economic Dimension – Anti-crime policy/measures, Brand Management, Codes of Conduct/Compliance/Corruption & Bribery, Corporate Governance, Customer Relationship Management, Innovation Management, Market Opportunities, Marketing Practices, Price Risk Management, Research & Development, Risk & Crisis Management, Stakeholder Engagement, Scorecards/Measurement Systems.

Environmental Dimension – Biodiversity, Business Opportunities, Business Risks, Climate Change Governance, Climate Strategy, Electricity Generation, Environmental Footprint,

Environmental Policy/Management System, Environmental Reporting, Operational Eco-Efficiency, Transmission & Distribution, Water-related Risks.

Social Dimension – Addressing Cost Burden, Bioethics, Corporate Citizenship and Philanthropy, Controversial Issues, Health Outcome Contribution, Human Capital Development, Labor Practice Indicators, Social Reporting, Stakeholder Engagement, Standards for Suppliers, Talent Attraction & Retention.

2.2.4 ISE

The Brazilian Corporate Sustainability Index is an index tracking the economic, environmental, social and corporate governance performance of leading companies listed in the BMF&Bovespa Stock Exchange. It was launched in December 2005 to provide asset managers and investors with a reliable benchmark of the best corporate sustainability practices in the country.

In order to evaluate companies' sustainable practices, BM&FBOVESPA collaborated with Brazilian research institutes to elaborate a questionnaire. This questionnaire is voluntary and applied to the 200 most traded companies listed in BM&FBOVESPA each year. It is a robust questionnaire and encompasses seven aspects related to sustainability. Three of those aspects are defined by the triple bottom line concept: social, environmental and economic-financial. In addition to that, it also evaluates the general compliance and commitment of the company to sustainability, the impact of its products on society and the environment, its corporate governance practices and its actions regarding climate change (a relevant subsection of the environmental aspect) (ISE, 2015).

Every aspect evaluated is divided into several criteria, and those criteria are divided in key indicators. Some examples of criteria are: Policies, Management, Performance and Legal Commitment. Below we present a summary of some aspect's questionnaire.

Environmental and Climate Change – ISE's environmental questionnaire has different questions depending on the sector in which the company operates. For example, companies that deal with food production are assessed with different questions than companies providing financial services. Regardless of that, Management and Risk Assessment, Commitment with Biodiversity and Climate Change, Preservation Areas and Communication and Engagement with Stakeholders are examples of indicators that are always evaluated (ISE 2014, 2014a).

Social – The questionnaire regarding social practices has many indicators, as Relations with the Community, Relations with Suppliers, Relations with Customers and Consumers, Diversity and Equality, Supplier Management, Public Relations and Commitment with Employee Rights (ISE, 2015a).

Economic-Financial – Indicators like Strategic Planning, Crisis and Contingency Plans, Performance Management, Legal Compliance (through time), Risks and Opportunities and Financial Statements compose the economic-financial questionnaire (ISE, 2012).

Corporate Governance – Relationships between Business Partners, Transparency, Structure and Dynamics of the Administrative Council are some of the indicators considered (ISE,

2015b).

After submitting the questionnaire for evaluation, companies need to validate their answers by submitting sample documents – the questionnaire determines companies' performance quantitatively, while the documents determine it qualitatively. Then a council evaluates each company and selects up to 40 to be part of ISE that year.

2.3 Correlated Studies

We examined the scientific literature regarding sustainability measurement or disclosure systems and found out that articles written by scholars are still scarce. In Singh, Murty, Gupta and Dikshit (2009) article, they provided an overview of twelve sustainability assessment methodologies and indexes applied in policy practice. They concluded stating that although there are various international efforts on measuring sustainability, only few of them have an integral approach, taking into account environmental, economic and social aspects. Sustainability is more than an aggregation of the important issues, it is also about their interlinkages and the dynamics developed in a system. Three of our stock indexes studied in this paper – DJSI, ISE and FTSE – were considered in their article as part of Investment, Ratings and Asset Management Indexes.

Morrow and Yow (2014) study investigates the extent to which the world's publicly traded companies are disclosing the seven "first-generation" sustainability indicators: employee turnover, energy, greenhouse gas emissions, injury rate, payroll, waste and water. One key finding is that these companies are failing to disclose their performance on these seven metrics and only 2,8% of them (128 companies) currently disclose all of them.

Labuschagne, Brent and Van Erck (2005) proposed a framework to assess the sustainability of operations in the manufacturing sector in South Africa. This is based on published approaches such as Global Reporting Initiative GRI, Sustainability Metrics of the Institution of Chemical Engineers (IChemE), United Nations Commission on Sustainable Development Framework and Wuppertal Sustainability Indicators. In the economic dimension of their framework, there are four criteria: financial health, economic performance, potential financial benefits and trading opportunities. The criteria in the environmental dimension are air resources, water resources, land resources and mineral and energy resources. Finally, in the social dimension, the criteria are internal human resources, external population, stakeholder participation and macro social performance. There are sub-criteria under each criteria.

Similarly, Krajnc and Glavic (2005) proposed a model for integrated assessment of sustainable development to track information on economic, environmental and social dimensions of the company. The difference between this model and Labuschagne et al framework is that Krajnc and Glavic devised indicators under each dimension with no grouping of the indicators between dimension and indicators level.

Delai and Takahashi's article (2011) is the most comprehensive one found in the literature regarding sustainability measurement system. They developed a reference model based on eight known sustainability measurement initiatives that are: Indicators of Sustainable Development of the Commission on Sustainable Development (CSD); Dashboard of

Sustainability; Barometer of Sustainability; GRI; IChemE; Dow Jones Sustainability Index (DJSI); Triple Bottom Line Index (TBL) and ETHOS Corporate Social Responsibility Indicators. The structure of their model has 3 levels: dimensions (economic, environmental and social), themes (4 in economic dimension, 8 in environmental and 5 in social) and sub-themes. This model has some resemblance with Labuschagne et al framework. Both have three levels, although with different terminologies (criteria instead of themes and sub-criteria instead of sub-themes) and have the same dimensions. Moreover, some of the criteria and sub-criteria in Labuschagne et al framework are the same used by Delai and Takahashi. For example, air, water, land and mineral are the same in the environmental dimension.

An increasing number of studies on corporate sustainability performance are using sustainability indexes as a proxy for sustainability performance. These authors question if it is worth or beneficial joining them (Orsato et al, 2015 and Ziegler, 2012) or whether the stock market value the inclusion in a sustainability stock index (Oberndorfer et al, 2013) and the determinants of the inclusion of a firm in a sustainability stock index (Ziegler and Schroder, 2010).

These latter authors show that the selection process by DJSI has a strong influence so that the composition of this index is biased by factors that need not necessarily be directly connected to corporate environmental or social activities. On the other hand, Ziegler (2012) claims that the inclusion in a sustainability stock index is a positive signal for a higher corporate sustainability performance and this leads to a higher firm reputation with positive consequences for financial success. For Orsato et al (2015), being in the ISE is more a consequence of the natural process that the company undergoes to incorporate social and environmental issues into business strategy than an isolated effort of valuing the company's shares. Intangible value such as access to knowledge, new capabilities and reputational gains are the benefits for the inclusion in ISE index.

3. Research Method

The approach employed to develop the reference model described in this paper is a qualitative analysis of the complementarity among the sustainability disclosure systems of four prominent Stock indexes around the world alongside a literature review on sustainability disclosure frameworks. The development of the reference model of sustainability disclosure proposed in this article was carried out in two phases: the definition of the structure of this model and its content. The first phase was undertaken looking the documents downloaded from the websites of four Stock Exchanges: BM&FBovespa, Dow Jones, Frankfurt and Financial Times. See the structure of the model in the next section.

To build the content of the reference model, the themes and sub-themes involved were taken from Delai and Takahashi proposed model (2011) as a template to start. Content analysis of the documents from the Stock indexes was performed to match what was already included in the template and additions/deletions were then made to the final model. The complementarity approach is because the model proposed is intended to be a reference.

The criterion for the addition of a new theme is that it should have at least one sub-theme

considered by at least 50% or more of the four Stock indexes, i.e., two or more. An existing theme was deleted from the template whenever there is no sub-theme represented in the documents. Regarding sub-themes, a new one was added whenever two or more Stock indexes (50% or more) have considered in their documents and an existing one was deleted whenever less than two Stock Exchanges (less than 50%) have considered in their documents.

4. Development of the Reference Model

The development of the reference model of sustainability disclosure was undertaken through a comparative analysis of the complementarity of four sustainability stock indexes. The comparative analysis of the four stock indexes structure is displayed in Table I.

Table I. Stock Indexes structure

Stock Index	1st level	2nd level	3rd level	4th level
ISE	Aspects	Criteria	Indicators	Questions
DJSI	Dimensions	Criteria	Questions	
STOXX	Dimensions	Indicators		
FTSE ESG	Pillar	Themes	Indicators	

It can be observed that most of them have three levels, although differently named in each level, for example, aspect, dimension and pillar for the first level or criteria, indicator and theme for the 2nd level. ISE has four levels and STOXX has only two levels. This demonstrates a lack of standardization. When the first level of the four stock indexes is expanded in table II, it shows that there is not a consensus around the three dimensions of sustainability. While environmental and social dimensions appear in all of them, economic dimension is present only in ISE and DJSI. However, governance is present in three of them. ISE is the only stock exchange that presents seven sub levels.

Those tables show that not only each stock index has their own terminology, but that the assessment in each of them is made on different levels of the structure. STOXX derives its indicators directly from the 1st level, while ISE segregates the 2nd level into more specific matters and applies its indicators only on the 3rd level. In addition, ISE has seven dimensions on their first level, while DJSI, STOXX and FTSE have only three. This leads to a difference in what kind of information each index evaluates, apart from how they are evaluated. The model proposed by the authors takes into consideration this difference in information assessed and tries to establish similarities between them, providing a model of sustainability disclosure that utilizes the best metrics from each index.

Table II. First level of stock exchange structure

ISE	DJSI	STOXX	FTSE ESG
Environmental	Environmental	Environmental	Environmental

Climate Change			
Social	Social	Social	Social
Economic	Economic		
Corporate Governance		Governance	Governance
General Compliance			
Product impact			

Based on these results, the structure of the reference model has three levels: dimensions (the basic 3 dimensions of sustainability plus Governance), themes (major issues of each dimension) and sub-themes (important topics of each theme). The expected characteristic of the structure is to promote a holistic view.

4.1 Content of the environmental dimension – themes and sub-themes

The environmental dimension of the proposed model is concerned with the firm's impact on ecosystem wellbeing. As used by IChemE (2002), the themes should give a balanced view of the environmental impact of inputs – the usage and consumption of resources, and outputs - emissions, effluents and waste and the products and services produced.

We have added four themes in our model that were not considered in the template – Suppliers, Compliance, Environmental Policy and Management and Responsibility before future generations because there are sub-themes considered in the documents. We have deleted two themes of the template. All the other five themes of the template were kept in our model. However, there is not a consensus on sub-themes that should be measured on the documents analyzed. As a result, there are only three sub-themes that were considered by all four Stock indexes - Greenhouse gas emissions (theme Air), Major impacts on biodiversity associated with activities and/or products and services (theme Biodiversity) and Environmental targets (theme Environmental Policy and Management). Ten sub-themes were added in our model distributed in the four new themes. Finally, sub-themes of the template that were not found in the documents were deleted from our model. Table III summarizes these findings, showing the sub-themes that are present in at least two or more Stock indexes.

Based on the above results, the environmental dimension encompasses nine themes divided into 23 sub themes. The themes related to the inputs (the usage and consumption of resources) are:

Water – this theme focuses the firm's impact on quality and quantity of water as well as initiatives to reduce its usage.

Land – it assesses the impact on land caused by the waste generated (pollutants), targets

aimed to reduce and recycling it. Its mismanagement can have a bad effect on firm reputation.

Energy – it evaluates the consumption of energy (renewable and non-renewable sources) and initiatives to increase the usage of renewable energy.

Table III. Themes and sub-themes of environmental dimension of the reference model

Theme	Sub-theme	ISE	DJSI	STOXX	FTSE ESG	Reference Model
Air	Greenhouse gas emissions (global warming)	x	x	x	x	x
	Greenhouse gas - target reductions	x	-	x	x	x
	NOxSOX, and other significant air emissions	x	-	-	x	x
Water	Quantity - total consumption	-	x	x	x	x
	Initiatives to reduce water use	-	x	x	x	x
	Quantity - recycled and reused water consumption	x	-	-	x	x
Land	Waste produced	x	x	x	-	x
	Waste recycled	x	-	-	x	x
	Targets to reduce waste	-	-	x	x	x
Energy	Direct and indirect consumption (renewable sources or not)	-	x	-	x	x
	Consumption from renewable sources	x	-	x	-	x
	Initiatives to increase renewable energy usage	x	-	x	-	x
Suppliers	Performance of suppliers relative to environmental issues	x	-	x	x	x
	External environmental certification	x	-	x		x
	Initiatives to improve suppliers' environmental performance	x	-	x	x	x
Compliance	Incidents of non-compliance with all applicable environmental legislation	x	-	x	x	x
Biodiversity	Major impacts on biodiversity associated with activities and/or products and services in terrestrial, freshwater, and marine environments	x	x	x	x	x

Environmental Content Policy and Management		x	x	-	-	x
Environmental policy		x	x	x	-	x
Environmental targets		x	x	x	x	x
Public availability		x	x	-	-	x
Responsibility before future generations	Environmental management system: certification, audit, verification and coverage	x	x	-	x	x
	Participation in Carbon Disclosure Project	x	-	x	-	x

Suppliers – it deals with environmental impacts that can be caused by the suppliers and the firm’s responsibility in having a proactive approach to prevent these impacts.

Responsibility before future generations – this theme deals with firm’s commitment to strength on environmental management systems and participation in carbon disclosure project.

The themes related to the outputs are:

Air – it assesses the firm contribution to air quality effects (nitrogen oxide and sulfur oxide) and to global effects such as global warming.

Compliance – it focuses on potential incidents arising from non-compliance with all applicable environmental legislation.

Biodiversity – it assesses biodiversity impacts associated with activities and/or products in terrestrial, freshwater and marine environments.

Environmental policy and management – this theme deals with the existence of environmental policy and targets in place, its content and how the firm discloses it to the public in general.

4.2 Content of the social dimension – themes and sub-themes

The social dimension of the proposed model is concerned with the firm’s impact on the social systems inside and outside its boundaries, the society and its stakeholders. It reflects the attitude of the firm to the treatment of its employees (work conditions, human rights, talent attraction and retention, etc.), customers, suppliers and society. This dimension has definite internal and external focuses.

We have added six themes in our model that were not considered in the template – Human Rights, Product Responsibility, Talent attraction and retention, Codes of Conduct, Knowledge and Culture and Health because there are sub-themes considered in the documents. We have deleted one theme from the template – Public Sector because there was no sub-theme

considered in the documents. All the other four themes of the template were kept in our model. As for social dimension, there is not a consensus on sub-themes that should be measured on the documents analyzed. As a result, there are only five sub-themes that were considered by all five Stock indexes – Training and education, Health and Safety and Diversity /Opportunity /Equal wage (theme Labor Practices and decent work), Respect for privacy (theme Product Responsibility) and Corruption/bribery policy and reporting (theme Codes of conduct). Fifteen new sub-themes were added in our model as a consequence of the new themes. Finally, sub-themes of the template that were not found in the documents were deleted from our model. Table IV summarizes these findings, showing the sub-themes that are present in at least two or more Stock indexes.

Based on the above results, the social dimension encompasses ten themes divided into 25 sub themes. The themes of the internal focus are:

Labor practices and decent work – this theme is about equality and quality of life of the employees. A good work environment has a direct impact on the employees’ motivation and performance. It addresses training and education, health and safety and mainly how the firm deals with diversity, equal opportunities and equal wage.

Human rights – it addresses the way a firm deals with the aspects of human rights relevant to the success of its operation. The main aspects considered are non-discrimination, freedom of association, public commitment, security practices and child labor.

Talent attraction and retention – ultimately this theme has to do with employee satisfaction by addressing how the firm will attract and retain its employees.

Table IV. Themes and sub-themes of social dimension of the reference model

Theme	Sub-theme	ISE	DJSI	STOXX	FTSE ESG	Reference Model
Labor practices and decent work	Training and education	x	x	x	x	x
	Health and safety	x	x	x	x	x
	Diversity/opportunity/equal wage	x	x	x	x	x
	Employees turnover	-	x	x	x	x
Human rights	Non-discrimination	x	-	x	-	x
	Freedom of association/collective bargaining	-	x	x	-	x
	Public commitment	x	x	-	-	x
	Security practices	x	-	-	x	x

	Child labor	x	-	-	x	x
Society	Indigenous rights	-	-	x	x	x
	Relations with community	x	-	x	-	x
	Political contributions	-	-	x	x	x
	Stakeholder engagement	x	x	-	x	x
	Corporate Citizenship	x	x	-	-	x
Product responsibility	Customer health and safety	x	-	x	-	x
	Advertising	-	-	x	x	x
	Respect for customer privacy	x	x	x	x	x
Talent attraction and retention	Employee satisfaction	-	x	x	-	x
Customer relationship management	Customer satisfaction	x	x	-	-	x
Codes of conduct	Corruption/bribery policy and reporting	x	x	x	x	x
	Selection criteria and assessment of suppliers	x	-	x	x	x
Selection, assessment and partnership with suppliers	Child labor in the supply chain	x	-	-	x	x
	Supplier's sustainability performance	x	-	-	x	x
Knowledge	Research and development	x	x	-	x	x
Health	Healthcare delivery	x	-	x	x	x

Codes of conduct – it evaluates the efforts to manage reputational risks arising from corrupt practices by employees and business partners as well as policies in place to prevent bribery (Delai and Takahashi, 2011) and reporting when and if happens.

Knowledge and culture – by investing in knowledge to its employees, they will be able to contribute to sustainable product development and innovation through its research and development program (Labuschagne et al, 2005).

Health – this theme focuses on the health of the workforce and evaluates preventive measures as well as the occurrence of health incidents (Labuschagne et al, 2005).

The themes of the external focus are:

Society – this theme has to do with firm’s legitimacy. Legitimation is the process whereby a corporation justifies to its conferring publics its right to continue to operate. Its theory states that the greater the likelihood of adverse shifts in a corporation's conferring public’s perceptions of how socially responsible a corporation is, the greater the desirability on the part of the corporation to adopt legitimation tactics in an attempt to manage these shifts in social perceptions (O’Donovan, 2000). Five sub-themes are considered: indigenous right, relationship with community, political contributions, stakeholder engagement and corporate citizenship.

Product responsibility – it deals with the impacts the products might have on customer health and safety, the communication practices complying with ethical standards and protection of customer information to its right use.

Customer relationship management – it deals with the way the firm meets its customers’ needs and therefore keeping them satisfied and loyal.

Selection, assessment and partnership with suppliers – this theme assesses the relationship the firm maintains with its suppliers along the supply chain. Well managed, it can avoid reputational risks, reduce costs and increase productivity. Three sub-themes are considered: selection criteria and assessment of suppliers, their performance regarding sustainability and child labor along the supply chain.

4.3 Content of the economic dimension – themes and sub-themes

The economic dimension of the proposed model is aimed at evaluating the firm short and long-term financial stability and survival capabilities. In order to achieve these objectives, the focus is twofold: internal and external. On the internal side, the firm should focus in Investments and Economic structure, while on the external side the focus is in Relationship with investors.

Of the four themes in the template, two were deleted because none of their sub themes were considered in the documents from the Stock indexes and one was added – Economic structure. Similar to environmental and social dimensions, there is not a consensus on sub-themes that should be measured on the documents analyzed. As a result, there is no sub-theme considered by all four Stock indexes. Three new sub-themes were added – Research and development (in Investments theme), Waste Generation and Energy use (in Economic structure theme). Finally, sub-themes of the template that were not found in the documents were deleted from our model. Table V summarizes these findings, showing the sub-themes that are present in at least two or more Stock indexes.

Based on the above results, the economic dimension encompasses three themes divided into 5 sub themes. The themes are:

Investments – this theme evaluates the extent to which these investments are related to future growth, concerning research and development in new products and additional cash flow generated in a long-term perspective and the organizational structure and plans in place to prevent and manage and mitigate crisis when it occurs.

Economic structure – it assesses financial benefits other than profits, focusing on business initiatives that might reduce waste generation and improve energy use.

Relationship with investors – this theme evaluates how a firm manages its relation with investors and actual shareholders concerning risk management. The adoption of enterprise-wide risk management should focus the business on operating the “right way” as a normal business practice (Abrams, Von Kanel, Muller, Pfitzmann and Ruschka-Taylor, 2006) and risks viewed as a source of opportunities for value creation for the shareholders (Ching and Colombo, 2014).

Table V. Themes and sub-themes of economic dimension of the reference model

Theme	Sub-theme	ISE	DJSI	STOXX	FTSE ESG	Reference Model
Investments	Research and development	x	-	-	x	x
	Crisis management plan	x	x	-	-	x
Relationship with investors	Responsibility risk management	-	x	-	x	x
Economic structure	Waste generation	x	x	x	-	x
	Energy use	-	x	-	x	x

4.4 Content of the corporate governance dimension – themes and sub-themes

Corporate governance can be defined as the structures and processes by which companies are directed and controlled. Good corporate governance helps companies operate more efficiently, mitigate risk and safeguard against mismanagement, and improve access to capital that will fuel their growth (IFC International Finance Corporation, 2014). We decided to have a separate dimension because of its importance and because it was considered as a separate dimension by ISE, STOXX and FTSE. Corporate governance is the only theme under this dimension and for its sub-themes, we have utilized those from Ching et al study (2015). The sub-themes are board diversity, separation of Board chair and CEO roles (these two considered by all four Stock indexes), percentage of executives on board, transparency of senior management remuneration, whistle blower program, tax transparency and shareholder voting rights. Table VI summarizes these findings, showing the sub-themes that are present in at least two or more Stock indexes.

Table VI. Themes and sub-themes of corporate governance dimension of the reference model

Theme	Sub-theme	ISE	DJSI	STOXX	FTSE ESG	Reference Model
Corporate governance	Board diversity	x	x	x	x	x
	Percent of executives on board	x	x	-	-	x
	Transparency of senior management remuneration	-	x	-	x	x

Whistle blower program	-	-	X	X	X
Tax transparency	-	X	X	X	X
Separation on board chair and CEO roles	X	X	X	X	X
Shareholder voting rights	X	-	-	X	X

5. Discussion and Conclusion

The reliability of the inclusion of a firm in a sustainability index can be questioned not because these firms are not doing environmental and social activities. Oberndorfer et al (2013), Ziegler (2012) and Ziegler and Schroder (2010) argue that stock index may not necessarily include the best-in-class sustainable firms. The composition of a firm in a sustainability stock index, despite meeting all the requirements demanded by the Stock Exchange, is influenced by factors that need not necessarily be directly connected to corporate environmental or social activities. Nevertheless, firms are moving more and more in the direction of listing their stocks in a sustainable index. The signaling theory may explain why the inclusion of a firm in a sustainability stock index may be perceived by investors as an appropriate signal or indicator of corporate sustainability performance. They want to be seen as a responsible investment.

There is still a lack of consensus in the four sustainability indexes of what should be measured. DJSI and ISE have an integral approach, taking into account environmental, economic and social aspects while STOXX and FTSE analyze companies under the ESG view. This is also true in the papers and documents examined from the literature. There is not a single model or framework analyzed that tackles all sustainability issues and yet there is no consensus around what should be measured and how.

The reference model presented in this paper has expanded the proposed model used as our template (from Delai and Takahashi, 2011). Four, six and one new themes were added in our model in the environmental, social and economic dimensions respectively, while five, four and two themes were kept from the template respectively. Four themes from the template in these three dimensions were not used in our model. Themes such as Human rights, Product responsibility in the social dimension and Suppliers and Environmental policy and management in the environmental dimension are important issues and are treated as so by the stock indexes.

Of the four stock indexes used as reference to build our model, ISE has the largest representation in the reference model with 75% of all the sub-themes followed by FTSE ESG with 68%, STOXX with 63% and DJSI with 55%. See table VII.

The extra themes and sub themes added in the reference model are essential to genuinely understand a firm's sustainability standing and improve its reliability. Moreover, it makes sustainability information more useful to investors and socially responsible fund managers while providing them good guidance for decision-making. Information on sustainability disclosure offers a measurable value to those whose business is to assess the sustainability health of companies and influence future actions. The results of the reference model proposed

show it to be applied at the company level, more easily for big companies rather than to small and medium size ones.

This model gives no weight neither to the sub-themes in each theme nor to the themes in each dimension, stressing that each one of them has its own importance. This can be a limitation of this study for those expecting to have a composite sustainability disclosure index as the final output of our model. As a suggestion for future work, a set of indicators should be developed for each sub-theme so as to extend a fourth level in this model.

Table VII. Total of sub-themes per stock index

Stock Index	Environ.	Social	Economic	Corp. Gover.	Total
ISE	19	19	3	4	45
DJSI	11	13	4	5	33
STOXX	16	16	1	4	37
FTSE	15	17	3	6	41
Total of sub-themes/dimension	23	25	5	7	60

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