Social Key Performance Indicators – Assessment in Supply Chains

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Abstract

Competitiveness in the global markets has highly increased leading to a dramatic intensification of the market pressures both in terms of quality and response time demanded by the consumer. Such a quasi-unsustainable situation in the production of products and services is imposing multiple burdens on societies leading to growing awareness towards Sustainability.

In particular, the study of the Social dimension of Sustainability is lagging in comparison with the Economic and Environmental dimensions and the link between social aspects in the supply chain context is fragile. The literature shows that several authors have attempted to establish a standardised and universally accepted framework to evaluate social sustainability, however this goal has yet to be achieved, given the mismatch of information and concepts that is still being presented.

The aim of this work is to contribute to the definition of a new taxonomy for the social impact categories (mid- and end-point), which improves upon and systematises the existing indicators for Social Life Cycle Assessment. Also, it proposes a new framework, which links these social impact categories and the internal and external drivers that influence social responsibility across the supply chain design.

The employed methodology starts with a literature review on social responsibility/sustainability in companies and social indicators, followed by a content analysis on corporate sustainability reports. A set of face-to-face interviews held with EU corporate managers in charge of sustainability tested and validated the categories.

The findings suggest that stakeholders' dimensions should be incorporated in the decision-making design process. This will allow the identification of the critical aspects and associated measures that need to be considered when designing, planning and operating supply chains. Additionally, the results show that companies and the scientific community have different interests when assessing social sustainability. Furthermore, it is concluded that companies and industries address social sustainability in different ways and have divergent priorities.

Keywords: Social Sustainability; Indicators; Sustainable Supply Chain Management (SSCM); SocialSCOR

Resumo

Nas últimas décadas observa-se um forte aumento da competitividade nos mercados globais originando uma intensificação dramática das pressões de mercado, em termos de qualidade e de tempos de resposta exigidos pelo consumidor. Esta situação quase insustentável na produção de produtos e serviços acarreta externalidades negativas para as sociedades, criando nelas uma crescente consciencialização da Sustentabilidade.

Em particular, o estudo do pilar Social da Sustentabilidade é diminuto em comparação com as dimensões Económicas e Ambientais, sendo frágil o estudo da relação entre os aspectos sociais no contexto da cadeia de abastecimento. A literatura indica que vários autores tentaram estabelecer um modelo padronizado e universalmente aceite para avaliar a sustentabilidade social, porém, este objectivo não foi alcançado dada a incompatibilidade de informações e conceitos apresentados.

Este trabalho contribui para a definição de uma nova taxonomia de categorias sociais (*mid-* e *end-points*), que melhoram e sistematizam os indicadores existentes da análise social do ciclo de vida. Propõe-se um novo modelo que liga estas categorias sociais de impacto aos factores internos e externos que influenciam a responsabilidade social ao longo do planeamento das cadeias de abastecimento.

A metodologia utilizada baseia-se numa revisão da literatura académica relativa a responsabilidade social nas empresas e em indicadores sociais. Fez-se depois uma análise de conteúdos a relatórios de responsabilidade social de empresas a nível mundial. Um conjunto de entrevistas presenciais realizadas a gestores responsáveis pela sustentabilidade permitiu testar e validar as categorias.

Os resultados sugerem que os *stakeholders* devem ser integrados no processo de tomada de decisão, conseguindo-se assim uma identificação dos aspectos críticos e das suas métricas para o desenho, planeamento e operação das cadeias de abastecimentos. Adicionalmente, a comunidade científica e as empresas têm interesses distintos na avaliação da sustentabilidade social. Concluiu-se ainda, em função da indústria, as empresas reportam prioridades distintas e encaram a sustentabilidade social de forma diferente.

Palavras-chave: Sustentabilidade Social; Indicadores; Gestão da Cadeias de Abastecimento Sustentável (GCAS); SocialSCOR

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“If you cannot measure it, you cannot improve it” – Lord Kelvin (William Thompson)

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Glossary

3BL – Triple Bottom Line

BSC – Balanced Scorecard

CIDA – Canadian International Development Agency

CSR – Corporate Social Responsibility

DJSI – Dow Jones Sustainability Indices

GreenSCM – Green Supply Chain Management

GRI – Global Reporting Initiative

ISO – International Organization for Standardization

LCA – Life Cycle Assessment

LCI – Life Cycle Inventory

NGO – Non-Governmental Organisation

SC – Supply Chain

SCM – Supply Chain Management

SETAC – Society of Environmental Toxicology and Chemistry

SLCA – Social Life Cycle Assessment

SSCM – Sustainable Supply Chain Management

UNEP - United Nations Environment Programme

WBCSD - World Business Council for Sustainable Development

WCED - World Commission on Environment and Development

1. Introduction

1.1. Background and Context

Nowadays, modern societies in developed countries demand high standards of living, which imply high consumption of products and services. The production of these products and services requires the use of high amounts of resources imposing multiple burdens on the societies and the planet. This paradigm leads to an unsustainable situation regarding resources depletion, climate changes and consequently human health problems that might have no return (Carvalho et al., 2013).

In the last two decades, competitiveness in the global markets has highly increased. The market pressures intensified dramatically in terms of quality and response time demanded by the consumer. The new business context is characterised by an increasing globalisation that leads organisations to higher levels of competition, cost pressures and complexity (Beske et al., 2008; Hutchins and Sutherland, 2008). Supply Chain Management (SCM) practices have arisen as a crucial element to bridge this gap. On the one hand, organisations are continuously forced to achieve competitive advantages, their ultimate goal being the creation of superior value to not only shareholders but to stakeholders in general. On the other hand, Humanity and its societies have become more sensitive towards sustainability and sustainable development (Hutchins and Sutherland, 2008; WCED, 1987; Wu and Dunn, 1995).

Thus, the achievement of long-term economic sustainability in supply chains is no longer a sufficient requirement to fully assess sustainability. Henceforth, the value creation in organisations must also incorporate environmental and social dimensions, forcing organisations to face up to new challenges (Ageron et al., 2012; Bai and Sarkis, 2010). It is urgent to implement new sustainable development strategies resting on the Profit/Planet/People thinking (Azapagic and Perdan, 2000; Azapagic, 2003; Barbosa-Póvoa, 2009; Kleindorfer et al., 2005).

At the 1992 United Nations Conference on Environment and Development (Earth Summit) in Rio de Janeiro, social inequalities/disparities were not forgotten. In reality, the *Agenda 21* programme reinforced the social dimension of sustainable development as a key aspect and suggested that governments, national and international organizations and communities should work together to mitigate poverty, illiteracy, hunger, among others (Tanzil and Beloff, 2006; UNCED, 1993).

Twenty years later Seuring (2012) concluded that the Social Pillar was essentially not addressed in the classic sustainable supply chain management concept. Nevertheless, Social sustainability importance is slowly growing in business communities, even though some scholars still avoid the usage of social indicators as they are subjectively perceived and hard to evaluate (Azapagic and Perdan, 2000; Ruiz-Mercado et al., 2012). The evaluation of sustainable supply chain management must go through the establishment of key performance indicators and metrics (Hassini et al., 2012) and much has yet to be done concerning the identification of a set of social indicators leading to a proper assessment of the social performance in supply chains (Carvalho and Barbosa-Póvoa, 2011).

1.2. Problem Statement

Many authors have attempted to establish a standardised universally accepted framework to evaluate sustainability and performance in supply chains, but this has not been achieved so far (Corbière-Nicollier et al., 2011). There is a lack of standardisation on what to measure and how to measure sustainability in supply chains (Hassini et al., 2012; Ranganathan, 1998; Tanzil and Beloff, 2006) leading to a defective identification of the supply chains processes and activities to improve. One of the most highlighted reasons in the literature is the use of very distinct metrics and a multitude of suggested sustainability indicators in different contexts (Krajnc and Glavič, 2005; Mota and Soares, 2013).

There is still a lack of consensus on what the best approach to evaluate social sustainability is and which social supply chain indicators to select, mostly because it is difficult to successfully combine qualitative and quantitative indicators into a performance measurement system. The fact that social sustainability indicators are not accurately defined, subjectively perceived and hard to evaluate hinders the correct assessment of social aspects within the supply chains and therefore proper benchmarking between organisations cannot be achieved. This study aims to bridge this gap, evaluating social key performance indicators for supply chain performance measurement.

1.3. Purpose and Goals

This work has three major contributions: 1) a comprehensive literature review of the current social key performance indicators (KPIs) for supply chain performance measurement in several industries and sectors; 2) suggestion of new indicators and reinforce the already existent mid-point and end-point social impact categories, for assessing products and services based on the Social Life Cycle Assessment (SLCA) principles; 3) proposed a new framework, which classifies these indicators according to their dimensions and social impact area (SocialSCOR).

The first objective required collecting relevant empirical material and to get an overview of the existing social indicators and of their impact categories. A literature review regarding sustainability and supply chain fundamentals is conducted as well as an evaluation of the already existing social methodologies for assessing supply chain performance. This sets the theoretical cornerstones concerning SSCM and social indicators theory and strives to present the interrelationships between the keys aspects of these two topics.

The second objective contributes to the definition of a new taxonomy for the social impact categories (mid- and end-points), which improves upon and systematises the existing KPIs for conducting a more complete cradle-to-grave SLCA on products and services as well as to provide valuable information on critical criteria for decision-making.

The third objective aims at proposing a general framework, which links supply chain entities, indicators and the best practices that can be used as a guideline by all entities in the supply chain, for social impact assessment. On the whole, this new framework provides a mean to not only assess supply chains' performance but also to improve supply chain sustainability. Also, it enables to better

understand which stakeholder dimensions shall be further enriched and incorporated into the decision-making process to enhance supply chain value creation.

1.4. Methodology of the Master Dissertation

The following methodology will be applied in this master dissertation. It is composed by the under mentioned six different stages (see Figure 1):

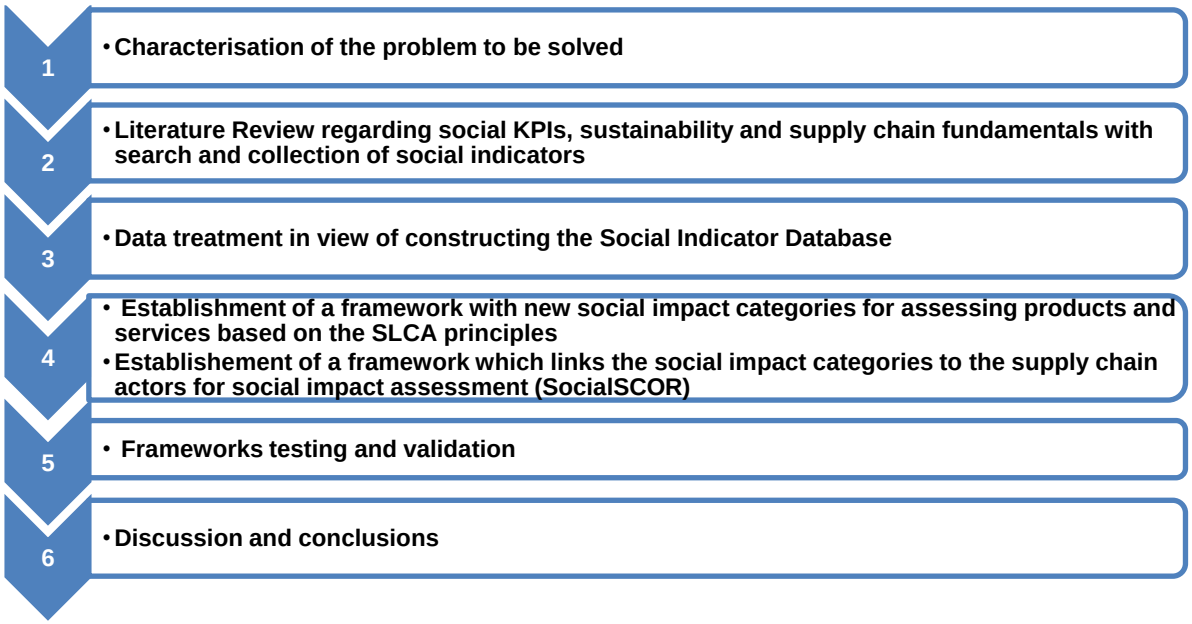

Figure 1. Master dissertation methodology phases

The first level consists of characterising and contextualising the studied problem. The different topics researched are introduced as well as the motivation to investigate them.

The second stage is the literature review. This research is underpinned by an exhaustive literature review aiming at identifying, analysing and evaluating a collection of relevant data and indicators based on the identified problem subjects. This process is essential to compile theoretical key concepts about sustainability, supply chains, metrics and indicators. This step of the methodology is the basis of the whole work.

On the third stage, the evaluation and analysis of the collected data is going to be conducted according to an innovative procedure. A social indicator database will be created allowing the screening and classification of the social key performance indicators. This stage is considered fundamental as it lays the basis to establish the frameworks.

The fourth stage aims at establishing two social sustainability supply chain frameworks for assessing social impacts. Firstly, a framework including a set of social key performance indicators, which assesses systematically social sustainability in supply chains will be developed: it strives to systematise and standardise the most common indicators as well as the main areas assessed by those indicators. Secondly, the SocialSCOR framework links the most studied social impact categories with the internal and external drivers that influence social responsibility across the supply chain.

At the fifth stage the frameworks are tested and validated. A content analysis is performed on a selection of 142 sustainability reports of worldwide companies recognised as sustainability leaders in twelve different industries. This not only will enable checking which social categories and indicators are the most disclosed by the companies, but also to test if the established social categories are relevant for assessing the social impacts. Furthermore, a set of face-to-face in-depth interviews held with EU corporate managers in charge of sustainability will reinforce the testing process. This strives to validate both frameworks in the context of strategic industries and sectors by enabling to understand their specificities and requirements when it comes to social impact assessment.

Finally, the results are analysed and discussed. At that point, it is possible to draw conclusions about social sustainability indicators and corporate social responsibility in supply chains. The measurement nuances between the different industries will be emphasised.

1.5. Master Dissertation Structure

This master dissertation is composed of six major chapters.

This first chapter describes the background and context of the problem under study striving to set the baseline for this work. It also presents the purpose and sets the goals of this study.

The second chapter provides a state-of-the-art on 1) the major concepts and strands of sustainability, its tools and measurement indexes; 2) Sustainable Supply Chain Management (SSCM) theory; 3) social sustainability in supply chains: relevant theory on social sustainability performance, metrics and indicators are gathered. Several social sustainability frameworks/approaches are reported and discussed in-depth. This chapter is particularly important since it discourses on the main gaps and problems concerning the measurement of the social impacts in supply chains in view of establishing new meaningful indicators and assessment methodologies. Furthermore, it highlights the tiered approach regarding the Social Life Cycle Impact Assessment. At the end of the chapter, the opportunities and limitations of making supply chains more sustainable are analysed. Also, the research process model and the methods that underpin the whole work are presented.

In the third chapter, the steps of the procedure used to build the social indicator database are comprehensively explained. A description of the data treatment as well as the assumptions made owing to achieve the goals is provided.

In the fourth chapter will present in detail both the new taxonomy for the social impact categories based on the SLCA theory and the new SocialSCOR framework which links the supply chain stakeholders to these social categories.

In the fifth chapter, the findings and the results obtained from chapters 3 and 4 are discussed and validated. They are analysed and interpreted through two complementary approaches: 1) an extensive content analysis is performed on 142 sustainability reports of worldwide companies recognised as sustainability leaders in twelve different industries; 2) a set of face-to-face in-depth interviews held with EU corporate managers in charge of sustainability from the three supply chain echelons (upstream; midstream; downstream) in view of providing feedback to further improvements and to reflect on the

most important pinpointed issues. Basically, these two steps are important to in order: 1) to support the decisions in terms of social impact categories and 2) to improve the social impact assessment procedures in supply chains. A great emphasis is given to the differences between the scientific community and the companies' point of views.

Finally, in the last chapter the main conclusions of the dissertation are presented as well as considerations for developing further this work.

2. State of the Art

This chapter presents the theoretical concepts of interest to address the topics of sustainability and sustainable development in the supply chain management context. Section 2.1 presents the evolution of the research in Sustainability and 3BL concepts. In Section 2.2 is defined the concept of supply chain and are described the different kinds of supply chains stressing the growing importance of SSCM practices in the literature. Section 2.3 defines social sustainability and underlines the importance of its study for full sustainability assessment: different kinds of social sustainability methodologies are described with special emphasis on indicators aiming at evaluating social impacts in supply chains. Section 2.4 sums up the state of the art evidences and brings out the subsequent implications and conclusions for addressing the problem in study. Finally the last section (Section 2.5) presents the research process model applied to the study.

2.1. Sustainability

2.1.1. Concepts and Definitions

In 1987 the Brundtland report had the merit of putting the Sustainability discussion on the world agenda (WCED, 1987). According to Carter and Rogers (2008, p. 361) the concept of sustainability "*refers to an integration of social, environmental, and economic responsibilities*".

One of the most cited definitions of Sustainable Development (Azapagic, 2003; Seuring and Müller, 2008a; Winkler, 2010) was established in the Brundtland report by the World Commission on Environment and Development (WCED) which stated that sustainable development "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED, 1987, p. 15). Stakeholders in general, and in particular employees, suppliers, community groups, governments, agencies and NGOs started to impose pressure on these matters. Organisations were forced to adopt new strategies in order to achieve sustainability both in the internal and external operations (Ciliberti et al., 2008; Halldórsson et al., 2009; Sarkis et al., 2012; Seuring and Müller, 2008a, 2008b).

The Brundtland report put forward the need for societies to redefine the system boundaries and the requirements to come up with new coordinated strategies among all the involved stakeholders. Notwithstanding, some authors declared that sustainability still lacks clarity. In fact this is a very broad notion, leading to a lack of success in translating the theory into practice due to the following: 1) sustainability and sustainable development concepts are not clearly standardised and defined; 2) lack of standardisation on what to measure and how to measure sustainability in supply chains; 3) conflicting points of view and interests imposing trade-offs between stakeholders; 4) different values, ethical and cultural backgrounds; 5) reporting of different core activities and impacts (Azapagic and Perdan, 2000; Carter and Rogers, 2008; Clift, 2003; Hutchins and Sutherland, 2008; Mota and Soares, 2013; Vachon and Mao, 2008). The observable outcome is the more than seventy listed sustainability definitions, beside a profuse quantity of frameworks, indicator sets, indexes and methodologies that exist in the literature meaning that no systematic consistent approach or

framework have been adopted yet (Chee Tahir and Darton, 2010; Gallego Carrera and Mack, 2010; Krajnc and Glavič, 2005; Roca and Searcy, 2012).

The growing importance of sustainability in business practices and the persistent lack of consensus on what is the best approach to apply, rendered the concepts of sustainability and sustainable development more than simple buzzwords making the scientific community deeply committed to investigating sustainability and its related issues (Ageron *et al.*, 2012; Dobers, 2009; Hassini *et al.*, 2012).

Similarly, companies have become more interested in sustainable practices also as they are a possible source of value creation for the customers, reputation building and revenue increase. Companies are worried about these subjects and they started to engage effective policies to ensure business sustainability and on the eve of the *Earth Summit* (Rio de Janeiro in 1992) the now renowned World Business Council for Sustainable Development (WBCSD) was founded. WBCSD aims to "galvanize the global business community to create a sustainable future for business, society and the environment" (WBCSD, 2012) and thus to put the principles of sustainable development into practice. These three elements were effectively attached and linked together to form the most generalised model of sustainable development (Azapagic and Perdan, 2000): the Triple Bottom Line.

2.1.2. The Triple Bottom Line (3BL)

The Triple Bottom Line (3BL) concept was presented by John Elkington in 1994 (Elkington, 2004). The 3BL was defined as follows: *"Triple Bottom Line accounting attempts to describe the social and environmental impact of an organization's activities, in a measurable way, to its economic performance in order to show improvement or to make evaluation more in-depth"* (Elkington, 1998). It quickly became a popular way to consider economic, environmental and social aspects in decision making because the major difference from the past models was that all three dimensions were evaluated in an equal way (see Figure 2) (Beske, 2012). Later, Elkington attempted to clarify the pillars' meaning by naming them in a novel way in 1995: Profit; Planet; People (Elkington, 2004). Perhaps the biggest gain of the 3BL was its successful understanding and adoption by several global companies (e.g. Royal Dutch Shell) in the quest to demonstrate to their stakeholders the progresses over efficiency and sustainability in the long-term (Closs *et al.*, 2010; Hassini *et al.*, 2012).

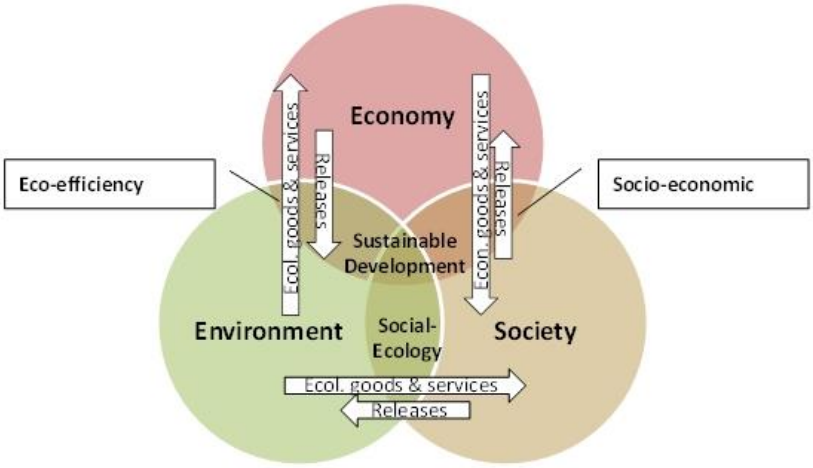

Figure 2. The Triple Bottom Line (Ruiz-Mercado *et al.*, 2012)

In the following paragraphs the three dimensions will be described in more detail.

“The economic dimension of sustainability concerns the organisation’s impacts on the economic conditions of its stakeholders and on the economic systems at local, national, and global levels” (Global Reporting Initiative, 2011, p. 25). The economic sustainability pillar has always been addressed when it is intended to assess sustainability. Edum-Fotwe and Price (2009) argued that traditionally only the economic dimension of sustainability is covered. Stamford and Azapagic (2011, p. 6042) state that “in a competitive market, financial viability is a prerequisite”. Notably, the organisations’ survival relies on the capacity to manage the “economic sustainability which can be interpreted as how companies stay in business” (Doane and MacGillivray, 2001, p. 15). Put simply, the economic pillar is about ‘the business of staying in business’.

“The environmental dimension of sustainability concerns an organization’s impacts on living and non-living natural systems, including ecosystems, land, air, and water” (Global Reporting Initiative, 2011, p. 27). This pillar relates to the natural use of resources, energy use, waste management, and carbon footprint, among others. Due to the growing awareness of the significant impacts of the products on the environment, stakeholder and government pressures forced businesses to rethink their environmental practices across the entire supply chains (Beske, 2012; Seuring, 2012; Winkler, 2010). To achieve this objective, it was necessary to present innovative solutions that will help control the increasingly negative environmental impacts, so as to avoid unrecoverable future consequences.

The Life Cycle Assessment (LCA) methodology became very popular within the industry and the academic world. According to Heas (2002, p. 11) “The core aim [...] is to bring LCA and life-cycle thinking into practice and to give recommendations on best practice regarding data and methods worldwide.” This tool enables the assessment of the environmental impacts of a product, service or process over its whole life cycle. It strives to identify and quantify all inputs and outputs needed to design, produce, deliver and consume a product across the full supply chain (Ashby *et al.*, 2012; Hutchins and Sutherland, 2008; Leona *et al.*, 2012).

Its general requirements, goal and scope are well defined by the International Organization for Standardization (ISO) (ISO14040, 2006; ISO14044, 2006). The methodology for conducting a Life Cycle Assessment of products (goods and/or services) consists of four phases: Goal and Scope, Inventory Analysis, Impact Assessment, and Interpretation (see Figure 3).

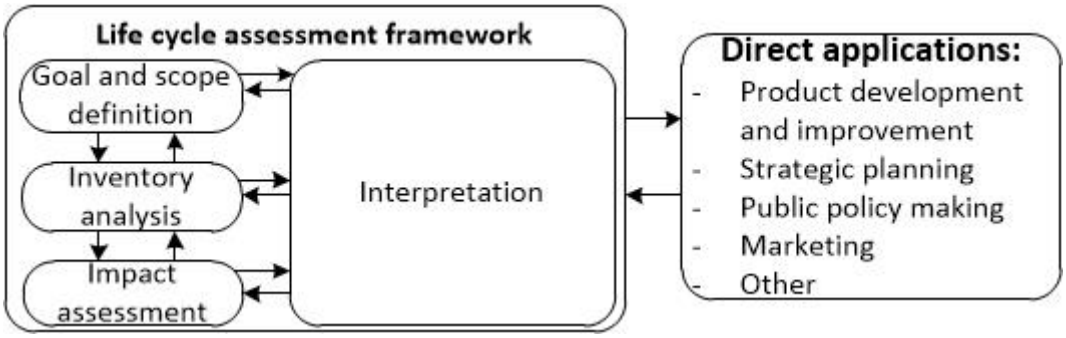

Figure 3. Life Cycle Assessment Framework (ISO14040, 2006)

Definitions and relationships between midpoint, endpoint, damage and areas of protection were presented in detail by Bare *et al.* (2000) and Bare and Gloria (2006). Bare *et al.* (2000, p. 323) defined midpoint indicators as follows: "*a parameter in a cause-effect chain or network (environmental mechanism) for a particular impact category that is between the inventory data and the category endpoints*"; whereas "*end-points are those physical elements that society determines are worthy of protection*" (Bare and Gloria, 2006, p. 1104). As Figure 4 shows, end-points are located further upstream in the cause-effect chain. The main difference between midpoint and endpoint indicators is that the latter are considered more understandable to the decision-makers (see Figure 4).

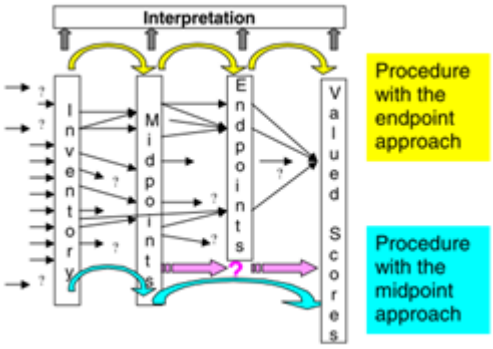

Figure 4. LCA assessment system (Bare *et al.*, 2000)

Littig and Griessler (2005, p. 72) defined social sustainability as follows: *"Social sustainability is a quality of societies. It signifies the nature-society relationships, mediated by work, as well as relationships within the society. Social sustainability is given, if work within a society and the related institutional arrangements:1) satisfy an extended set of human needs; 2) are shaped in a way that nature and its reproductive capabilities are preserved over a long period of time and the normative claims of social justice, human dignity and participation are fulfilled."* The social pillar takes into account a wide range of subjects such as education, potable water, food, equity, employment, business ethics, wealth, human rights, safety, stakeholder relationship, labour standards and social responsibility (Azapagic, 2003; Canadian International Development Agency, 2006; Closs *et al.*, 2010; Klassen and Vereecke, 2012; Sverdrup and Svensson, 2004; Vachon and Mao, 2008; Vallance *et al.*, 2011).

Theoretically, the 3BL should be applicable as "a whole". Taking into account the three pillars is really the required way to assess sustainability and corporate sustainability and many authors argued in favour of the equal treatment of the three dimensions in order to achieve what Sverdrup and Svensson (2004) called *Integrated Sustainability* (Ashby *et al.*, 2012; Halldórsson *et al.*, 2009; Kleine and Hauff, 2009; Spangenberg and Omann, 2006; Wittstruck and Teuteberg, 2012).

In reality that is not generalised because companies and communities face four recurring problems: 1) lack of theory such as protocols, tools, indicators; 2) metrics to assess the pillars; 3) the methodologies and guidelines are not universally accepted (Clift, 2003; Meehan *et al.*, 2006); 4) existence of trade-offs between the pillars and the stakeholder groups add to the problem (Heemskerk *et al.*, 2002; Kruse *et al.*, 2008; Stonebraker *et al.*, 2009; You *et al.*, 2012).

Traditionally only two out of the three pillars are commonly discussed and taken into account: the environmental and the economic ones (Labuschagne and Brent, 2006; Seuring and Müller, 2008a). Environmental issues have recently dominated the discussion and there is little research on integrating the three systems altogether (Ashby et al., 2012; Seuring and Müller, 2008a). Economic and environmental systems were frequently optimised together, leaving the third pillar in the background (Edum-Fotwe and Price, 2009; Hutchins and Sutherland, 2008). Also, Seuring (2012) claimed that social issues have not been addressed by themselves meaning that the social pillar is not studied enough by itself as the others are. In light of this, some companies have the tendency to only run a sustainability analysis on one of the three systems (first order state), showing effectively a lack of ability/awareness to integrate and inter-relate the outcome (Edum-Fotwe and Price, 2009; Kruse *et al.*, 2008). Indeed some of the previous concepts of sustainability did not recognise the crucial importance of the interdependencies among the systems, thus presenting theoretical models with isolated pillars (Kleine and Hauff, 2009; Wittstruck and Teuteberg, 2012). This type of analysis is no longer satisfactory in general for the stakeholders, and organisations must make a serious effort in measuring all the Bottom Lines.

2.2. Supply Chain (SC)

The concepts of Supply Chain Management (SCM) emerged in the 1980's and they have been evolving over the past two decades as the markets and consumers' requirements changed. For the purpose of this work, supply chains (SC) may be classified into three different models and concepts: 1) traditional SC; 2) *Green* SC; 3) Sustainable Supply Chain Management (SSCM). These SC will be defined and analysed in the next pages as it is important to establish the connection between sustainable practices and SC.

The Traditional Supply Chain and Supply Chain Management

The extended literature available on supply chains and supply chain management fails to provide a universal definition of these two concepts (Croom *et al.*, 2000). According to Aitken (1998, p. 2), a supply chain (SC) is a "*network of connected and interdependent organisations mutually and co-operatively working together to control, manage and improve the flow of materials and information from suppliers to end users*". Beamon (1998, p. 281) provides a similar definition: "*A supply chain may be defined as an integrated process wherein a number of various business entities (i.e., suppliers, manufacturers, distributors, and retailers) work together in an effort to: (1) acquire raw materials; (2) convert these raw materials into specified final products; and (3) deliver these final products to retailers. This chain is traditionally characterized by a forward flow of materials and a backward flow of information.*" According to Christopher (2011, p. 3), the concept of Supply Chain Management (SCM) means "*the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole*."

Basically, a traditional supply chain is composed by two distinct business processes. The first one relates to the production planning and inventory control process which encompasses the inbound logistics, the manufacturing activities and the storage issues. The second one deals with the physical

distribution and logistics processes, *i.e.*, customer service and transportation activities aiming at managing the transportation services and delivery process. (Beamon, 1998; Carvalho and Ramos, 2009; Min and Zhou, 2002; Tsiakis *et al.*, 2001)

The supply chain concept takes the perspective beyond the individual firm, and focuses on the coordination of something larger: a chain, network, and all the other crucial aspects and functions essential to the chain integration. As matter of fact, competition is not bounded anymore to individual firms, rather it is supply chains that compete (Christopher, 2011). Additionally, it is the end customer who has the ultimate power to appraise the success or failure of supply chains (Christopher and Towill, 2001). Thereby, the competitive advantages of the companies do not rely only on their own internal strengths, but also on their ability to achieve value added integration throughout the SC with customers and suppliers.

Summarizing, the traditional supply chain may be defined as a set of companies operating individually (echelons) where a forward flow of materials and products is created and a backward flow of information (orders and cash) is generated (see Figure 5) (Disney *et al.*, 2003; Tsiakis *et al.*, 2001; Vidal and Goetschalckx, 1997).

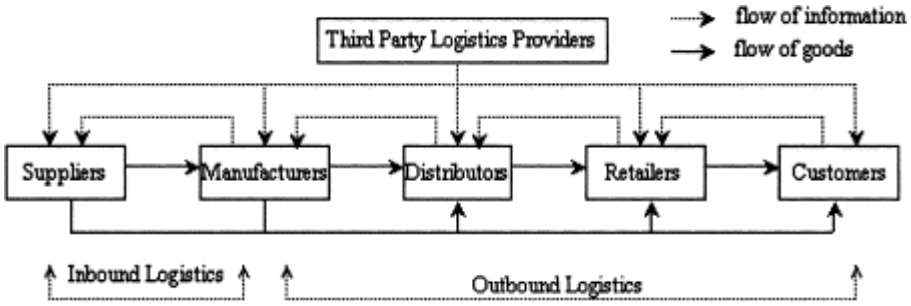

Figure 5. The Traditional Supply Chain (Min and Zhou, 2002)

Green SC and Sustainable Supply Chain (SSC)

The concept of Green SC and Sustainable Supply Chain emerged as the consumers and stakeholders started to value environmental issues and scarce resources. Consequently, they pressured governments and companies to modify their operations (Seuring and Müller, 2008a; Srivastava, 2007; Wu and Dunn, 1995). Srivastava (2007, p. 54,55) defines Green SCM as "*integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life*". Green SCM deals with environmental practices in the SCs striving to improve the holistic environmental performance in all its tiers and to minimise the environmental impacts of the operations.

Green SCM is more than implementing some green practices, but rather a concerted strategy in the whole supply chain that have following common processes, such as: 1) "Green design": product design and conception; 2) "Green sourcing" and "Green purchasing": better sourcing strategies and policies; 4) "Green manufacturing": production and transformation stage; "Green marketing": service level and channel decisions and 4) "Green logistics": transportation, handling; warehousing, waste

management, among others. (see Figure 6) (Ageron *et al.*, 2012; Barbosa-Póvoa, 2009; Srivastava, 2007; Wu and Dunn, 1995).

Initially, Green SCM met the customer and NGOs' requirements, but this situation shifted due to the tightening legislative measures other than environmental ones, and growing opportunities to increase revenue if reverse flows were implemented. Meeting economic and environmental stakeholder expectations were *sine qua non, i.e.,* necessary but not sufficient to achieve sustainability in supply chains. Thus a new concept called SSCM emerged with the objective to bridge this gap. The difference between Green SCM and SSCM is that that Green SCM is included in SSCM, and fundamentally SSCM is a more general concept that embraces all three pillars from the 3BL.

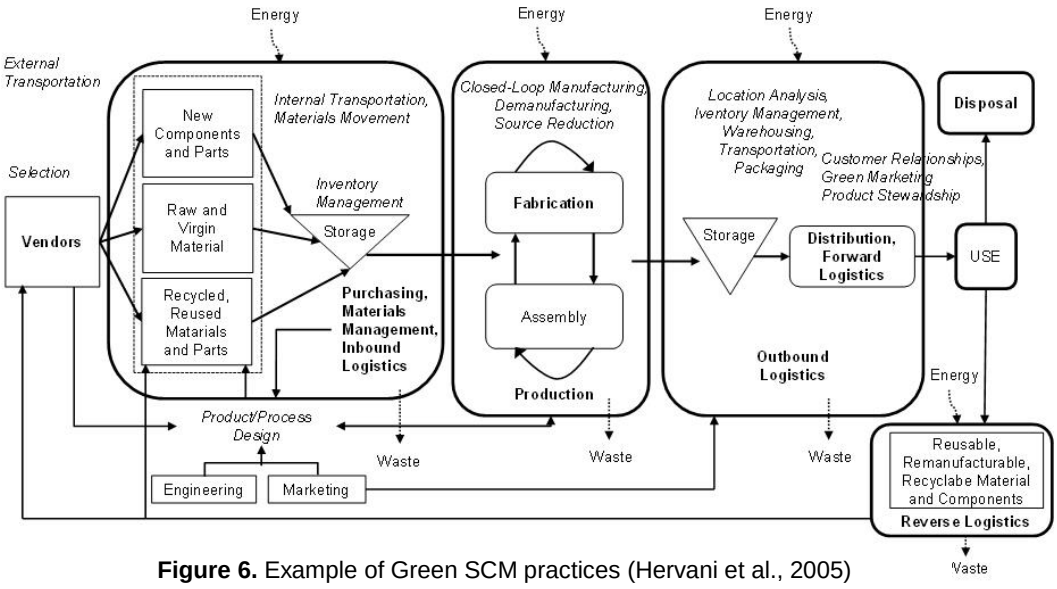

Figure 6. Example of Green SCM practices (Hervani et al., 2005)

SSCM can be defined as "*the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements*" (Seuring and Müller, 2008a, p. 1700). Wittstruck and Teuteberg (2012) said that Sustainable Supply Chain Management (SSCM) relied on the adoption and extension of the SCM principles and foundations. Thus it may be seen as a materialisation of sustainability philosophy and of the 3BL into Supply Chains (Barbosa-Póvoa, 2009; Halldórsson *et al.*, 2009; Pagell and Wu, 2009; Teuteberg and Wittstruck, 2010).

Although Pagell and Wu (2009) claimed that *no truly sustainable supply chain exists,* SSCM issues have been increasingly studied alongside with its implications (Ageron *et al.*, 2012; Seuring and Müller, 2008a; Winkler, 2010). In fact, for the past two decades researchers attempted to define and implement sustainability in supply chains struggling to integrate the basic concepts from the three sustainability systems (Ageron *et al.*, 2012; Hassini *et al.*, 2012; Seuring and Müller, 2008a).

More importantly the literature indicates that there is not a *single* path to implement SSCM because in theory all SC activities from purchasing to end-customer delivery are susceptible to change in order to incorporate sustainability. An important thing to remember is that Seuring and Müller (2008a) in a Delphi study found *win-win* situations between the three pillars to be more likely to occur than trade-

offs, so the organisations should explore the best strategies to implement sustainability. In the next section, the integration of social sustainability measures in supply chains is presented.

2.3. Social Sustainability in Supply Chains

Basically, Social sustainability aims at fulfilling society and people's needs (Littig and Griessler, 2005; Vallance et al., 2011). According to Klassen and Vereecke (2012, p. 103) "social issues in the supply chain are defined as product- or process-related aspects of operations that affect human safety, welfare and community development." Spangenberg and Omann (2006) stated that social sustainability is composed of the human notion and of the societal notion. The 'Human notion' relates to sustaining over time the living conditions with enough quality, and to the existence of basic and 'higher-order' needs among individuals. The 'Societal notion' concerns the reproduction of societal institutions, transparency and citizen participation in the daily society.

Vallance *et al.* (2011) introduced a three-layer framework to depict social sustainability, with the important distinction between tangible and less tangible social needs in order to mitigate conflicts and incoherence in the strategies (see Figure 7):

- *Development sustainability:* addresses the poverty and inequity in societies;
- *Bridge sustainability:* a set of strategies that will influence the bio-physical system in order to reach the goals;
- *Maintenance sustainability*: to protect and preserve the existent socio-cultural patterns in societies.

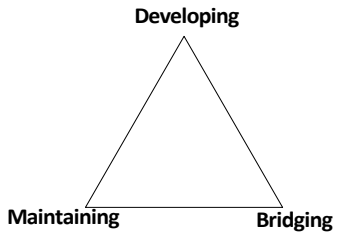

Figure 7. The strands of social sustainability

The major problem is to find the balance between the three strands and while preserving their own needs leading to the very important issue on how to deploy the tools and implement strategies. Vallance *et al.* (2011) argued that social sustainability may be reached through *transformative* or *non-transformative* strategies. The former implies a re-definition of basic concepts leading to question the current interactions between the existing social systems and their interrelations with the other two sustainability dimensions. Basically, *transformative strategies* demand a new form of thinking and conceptualising the current social systems. It is about recasting the social systems and challenging the "fundamental ways in which 'the environment' is socially constructed" (Vallance *et al.*, 2011, p. 344). For that purpose it is required to change firstly the Societies' Values because it is important to prioritise and define the values influencing social behaviour and influencing the way Societies are constructed. Then it is indispensable to implement new Norms to regulate the Social system because they are fundamental to achieve the social goals and to effect the pretended actions. Conversely, non-

transformative strategies maintain the existing paradigm but promote the adoption of complementary tools and actions helping to bridge social sustainability and social balance. This type of strategies is far less complex than the previous one as it does not transform the *structure* of the social systems.

Another very relevant aspect of sustainability is the prioritisation of Social *vs.* Economic and Environmental issues. The Social system is intimately linked to the Economic one because the Employment and Work components are a vital step to ensure the fulfilment of the most basic needs of an individual over time (Littig and Griessler, 2005; Spangenberg and Omann, 2006). That is why social sustainability is interelated to the country's wealth as an individual needs education, justice, income and employment to participate actively in the society.

Furthermore, the literature recognises the importance of assessing social sustainability in companies and the supply chains leading to the development of several standards. The recent ISO 26 000:2010 provides guidance about social responsibility and best practices of corporate social responsibility (Andersen and Skjoett-Larsen, 2009; Benoît-Norris *et al.*, 2011; Lozano and Huisingh, 2011; UNEP, 2009). Also, the worldwide accepted SA 8000 certification standard set by Social Accountability International aims at evaluating working conditions and rights (Kleine and Hauff, 2009; Lozano and Huisingh, 2011; UNEP, 2009). In the following sub-sections different methodologies and social sustainability tools will be presented and discussed as both Academia and the business world strive to put into practice the aforementioned social sustainability principles.

2.3.1. Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) is closely related to Social Sustainability (Ashby *et al.*, 2012). CSR is perceived as a set of programmes, strategies, actions and initiatives to achieve social sustainability (van Marrewijk, 2003; Wan-Jan, 2006).

The idea of Corporate Social Responsibility was formally introduced by Howard R. Bowen's work *Social Responsibilities of the Businessmen* in 1953 (Carroll, 1999; Meehan *et al.*, 2006) but one of the most persistent problems with CSR is the absence of a clear definition (Coelho *et al.*, 2003; Dahlsrud, 2008; McWilliams and Siegel, 2001; Sternberg, 2009; Whitehouse, 2006). Nevertheless, the Commission of the European Communities (2002, p. 5) defined CSR as follows: *"a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis"*.

For the time being, the concept of CSR has become a cornerstone in major global firms, whereby organisations must meet a wider set of requirements and needs other than customers' (Carroll, 1991; Holme and Watts, 2000; Huang, 2010). CSR forces the supply chain actors to operate in an ethical, legal, responsible and transparent way towards the stakeholders (Garriga and Melé, 2004; van Marrewijk, 2003). More explicitly, CSR relates to the following subjects: human rights, employee rights, environmental protection, community involvement, supplier relations, ethics, legal issues, economic responsibilities, social responsibility and corporate governance (Berkhout, 2005; Carroll, 1979, 1999; Holme and Watts, 2000; Huang, 2010).

As can be observed, Corporate Social Responsibility not only includes the 3BL but also extends the scope towards a bigger system as CSR attempts to enlarge the boundaries of the system beyond the individual firm (Andersen and Skjoett-Larsen, 2009). It considers both what Azapagic (2004) called the micro and the macro contexts in which the firm business activities and operations (micro) have the power to influence an outer bigger system (macro) where the stakeholders lay.

The implementation of CSR programmes also shows some drawbacks. Firstly, smaller companies have a lower amount of resources, which constitutes a handicap to launch CSR programmes (Ciliberti *et al.*, 2008). Secondly, CSR is a rather complex notion to conceptualise and implement in companies (Wan-Jan, 2006) because it is important to take into consideration the markets' differences in terms of needs, culture and beliefs leading to heightened requirements for keeping tight cooperation between the SC members. Moreover, there is the risk that different CSR policies may be adopted by the SC members due to different organisation cultures, business relationships and types of products (Ciliberti *et al.*, 2008).

In terms of methodologies and frameworks for assessing CSR, much has been published in the literature. First of all, Carroll (1979) proposed "A Three-Dimensional Conceptual Model of Corporate Performance" to be used in academia and in the business world. This model integrated three dimensions: social issues, social responsibilities and finally philanthropy of social responsiveness leading to incorporate these aspects when evaluating social issues in the organisations. It aimed at systematising and conceptualising social issues for better decision making. Later on, "The Pyramid of Corporate Social Responsibility" was introduced containing four distinct hierarchical responsibilities: economic at the base; then legal; and ethical and philanthropic at the top (Carroll, 1991). This framework established the "duties" that businesses have towards their stakeholders, enabling better strategies and actions to address these obligations. An alternative approach to the Pyramid model is proposed by Schwartz and Carroll (2003): the "Three-Domain Model". It contained economic; legal and ethical dimensions in a Venn diagram. Schwartz and Carroll (2003) opted to abandon the pyramid structure because they judged it confusing and inappropriate for some applications. The Venn diagram attaches equal importance to the three dimensions. Additionally, the "philanthropic dimension", which was discarded in this new model due to its "voluntariness nature", is now part of the ethical and economic dimensions. These authors provided numerous practical examples of companies assessed using this framework.

Also, Meehan *et al.* (2006) established the "3C-SR model" with three intersected circles: ethic and social commitments; connections with partners and value networks; consistency of behaviour over time to build trust. Intersecting the three circles denotes effective corporate citizenship.

2.3.2. Social LCA (SLCA)

The United Nations Environmental Programme (UNEP) / Society of Environmental Toxicology and Chemistry (SETAC) LCA methodology became very popular and standardised among practitioners worldwide. In fact, the Life Cycle Initiative which was launched in 2002 concerned firstly only the environmental dimension of sustainability. More importantly, a Life Cycle Management (LCM) programme sprang from this initiative. The idea of the LCM was to put in practice the LCA

methodology (Haes et al., 2002). Among other things, one of the goals of LCM was the "inclusion of social and economic dimensions in LCA and life-cycle thinking" (Haes *et al.*, 2002). Indeed, UNEP (2007, p. 11) recognised more recently that "the social and ethical dimensions of sustainability have not been given the same attention within the business community since the benefits are less tangible." Social LCA (SLCA) was thus created to bridge this gap, allowing the assessment of the three dimensions of sustainability in products and services (Benoît *et al.*, 2010).

Benoît *et al.* (2010, p. 158) defined SLCA as follows: " *social life cycle assessment is a systematic process using best available science to collect best available data on and report about social impacts (positive and negative) in product life cycles from extraction to disposal."* Benoît *et al.* (2010), Jørgensen *et al.* (2008), United Nations Environment Programme (2009) asserted that SLCA had two objectives. On the one hand, it should enable product/service and process comparison for decision-making; on the other hand, it attempts to identify potential improvements within the system in order to slash social impacts. The UNEP/SETAC working group published guidelines and recomendations on how to compute a SLCA (Benoît *et al.*, 2010; Benoît-Norris *et al.*, 2011). Kruse *et al.* (2008) proposed a set of socioeconomic indicators to complement LCA in the salmon industry. The works of Brent and Labuschagne (2004) and Labuschagne and Brent (2006, 2008) were an important contribution to social impact quantification and measurement in supply chains and companies.

Hutchins and Sutherland (2008) declared that the establishment of a SLCA was indexed to the success that the traditional LCA would achieve. Social LCA methodologies rely on the traditional Environmental LCA frameworks (ISO framework): goal definition; scope definition; inventory analysis and impact assessment (Jørgensen *et al.*, 2008; Parent *et al.*, 2010; UNEP, 2009). UNEP (2009) said that SLCA is a complement to the traditional Environmental LCA. The difference is the focus: socio-economic *vs.* environment. UNEP (2009) asserted that the Environmental LCA is only related to the product system, whereas the SLCA also incorporates organisation related aspects.

Like the LCA, SCLA does not have a single methodology, rather, a multitude of methodologies have already been set. As SLCA is rather at an embryonic stage, several methodological issues are on the agenda, for which Hutchins and Sutherland (2008) and Jørgensen *et al.* (2008) provide deep insight. Benoît *et al.* (2010) and Jørgensen *et al.* (2008) said that the literature discussed two different approaches. The first was to mirror the LCA approach into the SLCA inputs and outputs meaning that inventory analysis should focus on the business processes. The second line of thinking diverges from the LCA method. It considers that the conduct of the companies are responsible for the social impacts in the system, rather than the business processes. Thus, this faction claims a company oriented assessment. Furthermore, Hutchins and Sutherland (2008) and Jørgensen *et al.* (2008) underlined that much work still needs to be done regarding the interrelationships between mid- and end-point indicators and categories in SLCA.

One of the unsolved problems in the SLCA is related to the allocation of impacts (Social Life Cycle Impact Assessment). The Life Cycle Impact Assessment (LCIA) is the third phase within the LCA framework (ISO14040, 2006; UNEP, 2009). It is defined as the phase "*where the magnitude and significance of environmental impacts associated with the elementary flows compiled during the*

previous phase are evaluated. This is done by associating the life cycle inventory results with environmental impact categories and category indicators" (UNEP, 2009, p. 34).

Haes *et al.* (2002) asserted that LCIA should aim at providing a list of impact categories divided in two different stages: mid- and end-points. Like the LCIA in the LCA, the Social Life Cycle Impact Assessment (sLCIA) seeks to evaluate the social impacts for each of the impact categories established by using the data collected at the inventory stage (Parent *et al.*, 2010). According to the UNEP/SETAC guidelines (2009, p. 70) the impact categories are: "*logical groupings of SLCA results, related to social issues of interest to stakeholders and decision makers*." The reviewed literature indicated two complementary methods to proceed with the classification of social impacts: the classification through the classification according to stakeholder categories *vs.* the establishment of impact categories (Grießhammer *et al.*, 2006; Reitinger *et al.*, 2011; UNEP, 2009). Fundamentally, these Guidelines distinguished between two different types of socio-economic impact categories (type 1 and type 2) that differ in terms of sLCIA methods (Parent *et al.*, 2010; UNEP, 2009): social performances *vs.* social impacts. The two approaches differ from the way they evaluate the inventory data collected in the previous stage of the LCA. Whereas the type 1 impact categories seek to aggregate, weight and score the inventory indicators in order to compare them with Performance Reference Points, the type 2 impact categories strive to assess the social impacts by establishing an impact pathway (this term refers to the modelling and analysis that derives sLCIA results from inventory data (UNEP, 2009)).

For the purpose of the impact categories construction in this study, it was chosen to implement the type 2 which "*model the results for the subcategories that have a causal relationship defined on the criteria*" (UNEP, 2009, p. 71). In a more detailed way, the type 2 impact categories use social impact pathways as evaluation system; meaning that there is a cause-effect chain between the inventory indicators, the mid-point indicators and the end-point indicators (Benoît-Norris et al., 2011; Parent et al., 2010; UNEP, 2009). The main advantage of using impact pathways lies in the fact that not only this type of characterisation model is very similar to the one used in the Environmental LCA, but also it truly assesses the social impacts stemming from the studied system leading to development of causal models (Benoît-Norris *et al.*, 2011; Parent *et al.*, 2010). Furthermore, the use of a sLCIA type method "allows the carrying of the quantitative link between the inventory data to the functional unit over the impact pathway" (Parent *et al.*, 2010, p. 169).

Hutchins and Sutherland (2008) argued that much investigation had to be conducted regarding the use of mid- and end-points in sLCIA phase; notably these authors stated that "some relationships [between mid- and end-points] have been identified, but it appears that there are numerous interrelated variables that may be important and are not yet functionally linked within the constructs of LCA" (Hutchins and Sutherland, 2008, pp. 1690–1691). Some approaches have been proposed though there is still some uncertainty remaining about their choice: in recent years much literature discussed the conceptual and practical issues about the sLCIA phase (see e.g. Dreyer *et al.* (2006); Labuschagne and Brent (2006)), but no there is no consensus yet (Benoît-Norris *et al.*, 2011).

In particular, the Guidelines for Social Life Cycle Assessment of Products sought to provide deep insights on Social LCIA methodology and on how to compute a SLCA (Benoît *et al.*, 2010; Benoît-Norris *et al.*, 2011; UNEP, 2009). Parent *et al.* (2010) attempted to clarify the different impact assessment methods covered in the Guidelines for Social Life Cycle Assessment of Products, by presenting a threefold analysis on sLCIA methods. Furthermore, others have proposed other frameworks for sLCIA based on the UNEP/SETAC guidelines (see Reitinger *et al.*(2011)). Whereas some scholars advocate that the impact allocation should be indexed directly to the products through a weighting process, others think that the company and the supply chains should be evaluated as a whole system (Benoît *et al.*, 2010; Jørgensen *et al.*, 2008).

Another blurry issue concerns the system boundaries and inventory analysis procedure (Benoît *et al.*, 2010; Jørgensen *et al.*, 2008; Kruse *et al.*, 2008). Similarly to the LCA, SLCA uses a cut-off criteria making it difficult to delimit the extent of the impact beyond the focal company of the supply chains (UNEP, 2009). Kruse *et al.* (2008) underlined that at this stage LCA and SLCA still fail to use the same system boundaries. Depending on the chosen method, the data collection changes meaning that it may not be possible to collect the data required in the inventory analysis part. Both traditional LCA and SLCA require a big amount of data input (Benoît *et al.*, 2010; UNEP, 2009).

On top of that, SLCA uses quantitative and qualitative indicators which are not always easy to assess and measure (Kruse *et al.*, 2008). The aggregation of qualitative and quantitative data still requires much effort (Benoît-Norris *et al.*, 2011). Put it simply, SLCA still lacks standardisation and clarity in terms of what impact categories to measure and how to measure them (Benoît-Norris et al., 2011; Jørgensen *et al.*, 2008).

Andrews *et al.* (2009, p. 566) explained the differences between the LCA and the CSR concepts. According to the article, “LCA probes deep into the supply chain and offers a solid basis for comparison of products”. In contrast, CSR is seen as an approach with a broader scope as it considers additional elements throughout the supply chain. Together with CSR, SLCA forms a powerful tool to assess social impacts in supply chains and companies. Furthermore, SLCA is a methodology that covers all aspects within the supply chain: enterprise; plants and process within the establishment, whereas CSR policies only lay within the enterprise and plants (Benoît *et al.*, 2010; UNEP, 2009).

2.3.3. Global Reporting Initiative (GRI)

The Global Reporting Initiative (GRI) is an American non-profit organisation founded in 1997 in the city of Boston, Massachusetts (Erol et al., 2009; Global Reporting Initiative, 2013). GRI mission aims to “communicate clearly and openly about sustainability, a globally shared framework of concepts, with consistent language, and metrics” (Global Reporting Initiative, 2006, p. 3).

The Global Reporting Initiative takes the 3BL as the base line to make available an effective transparent standard that organisations can easily use to monitor economic, environmental and social impacts. One of the innovations introduced by GRI was to adopt a multi-stakeholder approach facilitating the decision-making of stakeholders and the reporting tasks (Davidson, 2008; Global Reporting Initiative, 2006; Lozano and Huisingh, 2011). The Sustainability Reporting Guidelines

(Global Reporting Initiative, 2006) provides full step-by-step guidance concerning all the aspects for the organisations aiming to start reporting their sustainability performance. Throughout the years, many organisations have decided to adopt these guidelines due to their simplicity and comprehensiveness. This made it probably the most widely used and accepted standard to assess, report and disclose sustainability issues (Beske *et al.*, 2008; Krajnc and Glavič, 2005; Labuschagne *et al.*, 2005; Lozano and Huisingh, 2011; Roca and Searcy, 2012). Roca and Searcy (2012) reported in their study that 47,9% of the studied companies reported using the GRI G3 guidelines and that all the 79 GRI G3 indicators were used at least once by the companies studied.

The 3.0 GRI guidelines divided the social performance indicators into four distinct social categories (Global Reporting Initiative, 2006):

1. Labour Practices and Decent Work (LA) indicators (14 indicators) address issues and topics on: employment; training and education; working conditions; labour/management relations; health and safety; gender discrimination; among others.
2. Human Rights (HR) indicators (9 indicators) focus on non-discrimination, child labour, forced and compulsory work, among others.
3. The Society (S) indicators (8 indicators) strive to assess "the impacts organisations have on the communities in which they operate" (Global Reporting Initiative, 2011, p. 36), and their potential risks. These indicators seek to measure corporate philanthropy, corruption, compliance, among others.
4. Product Responsibility (PR) indicators (9 indicators) aim at measuring parameters that assess the interaction between the customer and the product itself. Hence, aspects such as life-cycle stages, customer health and safety, customer satisfaction, labelling, among others.

The purpose is to place all relevant stakeholders of the focal company and of the supply chain in the limelight. Indeed social performance indicators gather valuable information about customers, employees, community, consumers, shareholders, owners, suppliers providing a social holistic view of the business impacts.

Notwithstanding, some authors criticise the fact that the GRI Social Performance indicators are not easy to assess (Labuschagne et al., 2005). Others remarked that most of them are of the qualitative measurement type whereas quantitative indicators are more suitable to make comparisons than qualitative indicators (Beamon, 1999; Carvalho and Barbosa-Póvoa, 2011; Davidson, 2008). This may hinder a non-biased and accurate evaluation of the social performance of the organisation. In particular Carvalho and Barbosa-Póvoa (2011) stressed that Labour Practices and Decent Work indicators are the most used set of indicators to assess social sustainability performance in companies, because they are the most quantitative indicators.

However, the advantages of the GRI guidelines are numerous. First of all, the GRI framework is flexible, enough allowing it to be adopted by companies with different sizes and from different industries/sectors (Global Reporting Initiative, 2006). The GRI enables tracking the impacts on multiple SC stakeholders, then credited to assess sustainability for the whole company (Global Reporting Initiative, 2006), while encouraging companies to relate the results within a broader systems (e.g.

supply chain). Furthermore, the GRI guidelines set a new approach by classifying the indicators into several aspect performance categories within each of the sustainability dimensions. This introduces the perspective on how to relate the indicators with the broader system rather than monitoring the indicators individually (Davidson, 2008).

Despite the major advantages that this standard offers, some limitations can be pointed. The 3.0 GRI Guidelines propose the usage of 40 social indicators to be reported which may lead companies to just report good performances on the indicators they excel at. With this in mind, Carvalho and Barbosa-Póvoa (2011) proposed a framework to evaluate the most suitable GRI social indicators to report sustainability. However, the processes aiming at assessing indicator measurements are likely to be demanding and potentially expensive (Labuschagne *et al.*, 2005; Lozano and Huisingh, 2011). Equally important is the criticism claiming the absence of linkages between the three dimensions of sustainability supported by the 'tightness' and certain 'segregation' of the indicators (Davidson, 2008). Put it simply, the GRI framework is considered to be too simplistic as it disfavours the interactions and interrelationships between the three pillars (Davidson, 2008).

2.3.4. Social Footprint Method

McElroy *et al.* (2008) argued that corporate sustainability management lacks "sustainability context", leading to deficient measurement and reporting of sustainability in the operations of the organisations. The establishment of a "sustainability context" is particularly relevant as the organisations are assessing and disclosing their sustainability performance: they should contextualise and report that performance but in the context of broader concepts of sustainability. In order to fill this void, these authors proposed the Social Footprint method.

The Social Footprint method is a management tool "that will make it possible for organisations to quantitatively measure and report on the social sustainability of their operations" (McElroy *et al.*, 2008, p. 232). This method is based on anthro capital theory, with social quotients to quantify the performance, and binary scales of sustainability to plot the outcome. It aims at comparing the companies' operations impacts on "anthro" (social sustainability) capital with the desired level of impacts (norms of behaviour) recommended to maintain equilibrium.

There are three distinct types of anthro capitals: human capital (e.g. human knowledge and experience), social capital (e.g. governments; banking systems), and constructed capital (e.g. public utilities; transportation systems). These types of capitals are all considered to be non-fixed supplies as they are not limited and can be produced at any time. According to the capital theory (McElroy et al., 2008), organisations must reform their processes and operations because they influence anthro capital and ultimately they affect social sustainability. McElroy *et al.* (2008) point of view is that social sustainability in the organisations is intimately linked to the ability of preserving/increasing the anthro capital.

Thus, the goal is to quantify these capitals using social sustainability quotients (see Figure 8). A particular important notion is the "carrying capacity of capital" which relates to the proportionate share of anthro capital that is allocated to an organisation in terms of its needs. If the organisation is able to contribute to the anthro capital generation with at least its allocated proportionate share (*i.e.*, quotient

> 1), it means that the organisation is sustainable, if not (*i.e.*, quotient < 1) it is socially unsustainable. (McElroy et al., 2008)

$$\text{Sustainability Performance Score} = \frac{\text{Net rate of Anthro Capital Produced From Organisational Operations}}{\text{Proportionate Share of Rate of Required Production of Anthro Capital Carrying Capacity}}$$

Figure 8. Sustainability Quotients for Social Impacts (McElroy et al., 2008)

In sum, the Social Footprint method: 1) quantifies the anthro capitals in study using the social quotients; 2) the results are plotted in a sustainability binary scale that has two possible outcome: sustainable or non-sustainable organisation.

2.3.5. General Approaches for Social Sustainability Indicators

Clift (2003, p. 241) defined indicators as follows: "*specific measurements of an individual aspect that can be used to track and demonstrate performance.*" Sustainability indicators "aim to translate the key sustainable development issues for the industry into the relevant measures of sustainability performance" (Azapagic, 2004, p. 640).

Beamon (1999) stated that the supply chains' complexity makes hard the choice of suitable performance metrics. According to Warhurst (2002, p. 6) "some claim to be Sustainability Indicators but are often little more than combined sets of environmental, economic and social performance indicators". Chee Tahir and Darton (2010) and Jain (2005) stated that for the time being indicators still fail to provide good insight on the state of sustainability in companies and business operations because there is no defined standard yet.

Most of the reviewed literature discussed social indicators within the GRI framework (e.g. Labuschagne and Brent (2006); Roca and Searcy (2012); Zhao *et al.* (2012)), but the underlying problem concerning the social indicators is that their information is dispersed and scattered in the literature. Despite the fact that the evaluation of sustainable supply chain management must go through the establishment of key performance indicators and metrics (Hassini *et al.*, 2012), much has yet to be done concerning the identification of a set of social indicators leading to a proper assessment of the social performance in supply chains (Carvalho and Barbosa-Póvoa, 2011). In particular, the literature stressed the pressing need of establishing, standardising and selecting appropriate social KPIs and measures of performance in view of bridging this gap and enhancing the quality of decision-making (Azapagic and Perdan, 2000; Hutchins and Sutherland, 2008).

Since there is no standardised approach to evaluate the social dimension in supply chains, it is not only very hard to achieve proper benchmarking between them but also it is difficult to identify potential areas of improvement in order to minimise the impacts. Hence, the next chapters attempt bridge this void by introducing two distinct frameworks for the purpose of improving and systematising the existing indicators and putting them in a global context. In the next section, the major conclusions of the state of the art are drawn and the problem in study is clearly stated.

2.4. State of the Art Conclusions and Problem Statement

This chapter presented relevant theory related to sustainability and its concepts, the relevant models of supply chains and the assessment of the social dimension in supply chains. The Brundtland report marked the start of modern sustainability as it challenged the traditional way to measure sustainability in supply chains by formally introducing the need to incorporate the environmental and social dimensions into the assessment. The 3BL, which emerged to bridge this gap, allowed considering in an equal way economic, environmental and social aspects in decision making. There is a consensus in the literature that sustainability and sustainable development are far from being standardised and therefore a serious effort has still to be made in order to be possible to evaluate, analyse and report effectively sustainability in supply chains. It is also crucial to manage the trade-offs through a strategic approach where the organisations deploy their resources efficiently to reach equilibrium between the three dimensions.

In the past decades, the concept of supply chains has stood out as successful operational structures enabling the production and delivery of products in different worldwide markets at a minimum competitive time and cost, enhancing superior customer value. In this new globalised competitive market paradigm, companies are moving from the traditional supply chain towards a sustainable supply chain as the laws and regulations are tightening.

The concept of CSR strived to pave the way to incorporate social responsibility in business, but companies are persistently perceived to be prospering at the expense of the stakeholders and societies. In fact, the limited impacts of CSR programmes in communities stem from reasons such as: 1) CSR is perceived as being used for brain-washing purposes and not for value creation for stakeholders; 2) CSR viewed as being implemented as a compliance tool; 3) lack of coordination in supply chains and stakeholder consulting; 4) CSR is complex to put into practice.

Although the literature recognised the growing awareness of stakeholders towards social sustainability in businesses, it fails to provide a good operational definition. Several facts have contributed to the slow development of social policies and guidelines for business and supply chains: 1) inconsistent practices regarding the reporting of activities and their impacts in supply chains; 2) different ethics and cultural backgrounds worldwide leading to the set of different objectives and goals; 3) emergence of trade-offs between the social pillar and the other two pillars; 4) existence of trade-offs between stakeholders and the three dimensions; 5) social assessment implies a high degree of complexity and subjectivity, reflected in the nature of the measures. The study of social sustainability theory is lagging in comparison with the other two bottom lines and therefore it is considered the weakest pillar. There is still a lack of consensus on what the best approach to evaluate social sustainability is and what social supply chain indicators to pick.

In order to fill the void concerning social sustainability in supply chains, the scientific community has presented more concrete social sustainability tools such as the SLCA and the GRI Guidelines that help measure the social impacts in supply chains. Despite the fact these innovative solutions are not yet standardised, they provide a first approach on how to evaluate, assess and disclose social issues

in supply chains. A central issue concerning these methodologies is the establishment of meaningful social indicators as well as their metrics, which has not been an easy task. The 3.0 GRI guidelines proposed 40 social sustainability indicators, but their evaluation is not straightforward. Furthermore, the literature stressed the need to find ways to aggregate quantitative and qualitative indicators; to give weights to the indicators; and to construct a performance score.

The precedent literature review and subsequent analysis enabled to identify the following problems:

- No consistent approach or framework to measure social sustainability in supply chains has been adopted yet;
- Social key performance indicators have not been accurately defined so far in terms of issues to monitor and associated metrics meaning that few well defined methodologies were implemented;
- The same indicator may be disclosed in different ways and has very distinct metrics;
- Some social impacts arising from supply chain activities have not properly been accounted, leading to the need of reinforcing the already existent mid-points and end-points categories for SLCA;
- It is possible to observe a conceptual void in the analysis, disclosure and reporting of social sustainability aspects in supply chains leading to report different core activities and impacts;
- Conflicting point of views and interests imposing trade-offs between stakeholders.

These problems will be further analysed in detail in the following chapters and two comprehensive frameworks for the assessment of social sustainability in supply chains will be proposed based on social indicators from the reviewed literature. The next section presents the research process model applied during the study.

2.5. Methodology for Research Development

This section strives to present the conceptual methods and foundations that underpinned the research and the social indicator database construction. It provides a comprehensive overview on each of the 5 steps of Figure 9 and presents the Grounded Theory that was utilised to guide the research. It should be noted that the construction of this social indicator database will largely draw on the Guidelines for Social Life Cycle Assessment of Products (see Section 2.3.2) which are in line with the ISO 14040 and 14044 standards (Benoît et al., 2010; Benoît-Norris *et al.*, 2011; Parent *et al.*, 2010; UNEP, 2009).

The research process model (see Figure 9) is composed of 5 major steps.

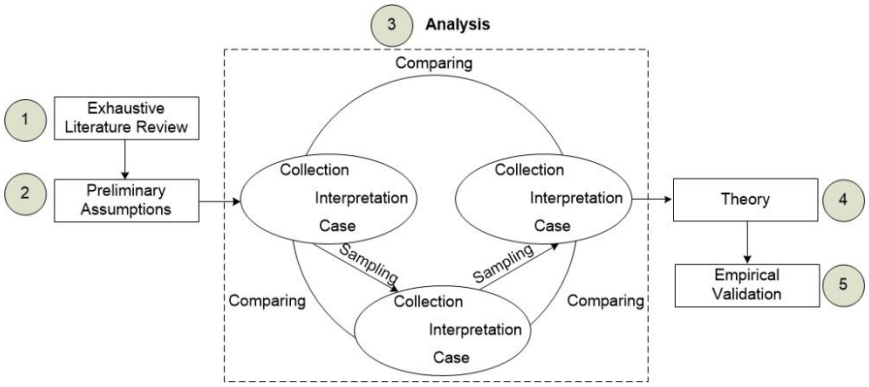

Figure 9. Research Process Model Used (adapted from Flick (2006))

Each of these steps is briefly described as follows:

1. An encompassing literature review conducted on sustainability KPIs, social KPIs, SSCM and other forms of performance measurements for supply chains (chapter 3);
2. Preliminary assumptions made based on the literature review findings before establishing the social indicator database; justification of the choice of the 3.0 GRI Guidelines as the source base for developing the work (chapter 3);
3. Analysis of the empirical material gathered during the literature review. Assessment and interpretation of the collected data and the first inferences towards discovering and developing new theory (chapter 3);
4. Beginning of theory building: the theoretical outputs that stem from step 3 were organised into a relevant and meaningful way that enabled to establish the two distinct frameworks for assessing the social impacts in supply chains (chapter 4);
5. Discussion and validation of both frameworks, and through two complementary approaches: a comprehensive content analysis and a set of face-to-face in-depth interviews with corporate managers (chapter 5).

Charmaz (2000, p. 509) defined Grounded Theory (GT) as *"methods consist of systematic inductive guidelines for collecting data to build middle range theoretical framework that explain the collected data"*. Instead of formulating initial hypotheses prior to the data collection as in the *linear* research process, theory is constructed by the knowledge apprehended in the empirical data collected (Charmaz, 2000; Flick, 2006; Strauss and Corbin, 1998). Corbin and Strauss (1990, p. 5) said that "*the procedures of grounded theory are designed to develop a well integrated set of concepts that provide a thorough theoretical explanation of social phenomena under study".* A major advantage of this research process is its effectiveness when applied to scientific fields in early stages of development (Charmaz, 2000; Glaser and Strauss, 1967), which is the case: the value of using a GT approach is to compare and contrast the empirical data collected in order to obtain robust theory. Fundamentally, the GT methodology for this study may be depicted in the following steps: 1) data collection and theoretical sampling; 2) data coding; 3) memoing; 4) theory writing.

Due to the fact that the GT process is inductive and follows an iterative process for compiling, analysing and evaluating empirical data, the research process model presented in Figure 9 fits perfectly into the GT process, by analysing codes and categories from data, not from pre-preconceived logically-deduced hypotheses. In chapter 3, it will be presented the social indicator database and describe in-depth both the research process model used and the flow-diagram (see Figure 11) summarising the main steps of the employed procedure.

3. Social Indicator Database

An extensive literature review resulted in a collection of papers and other relevant scientific documents containing relevant empirical material related to social indicators. The huge amount of information led to the need of standardising and systematising the already existing indicators in the literature. Thereby a social indicator database was established in order to bridge this gap enabling to categorise and classify all indicators.

This chapter provides a comprehensive description of the analysis of the indicators and the subsequent creation of a social indicators database. Section 3.1 presents the literature review procedure. Section 3.2 advances the reasons leading to the choice of the GRI Guidelines as the baseline of this study and clarifies further assumptions made prior to analyse the collected data. In Section 3.3 the different steps of the database flow-diagram are thoroughly depicted in view of providing an in-depth explanation of the procedures to analyse, evaluate and aggregate the collected KPIs (see Figure 11). Section 3.4 presents the main conclusions based on the database findings.

3.1. Literature Review

The construction of the social indicators database was underpinned by a comprehensive and thorough literature review aimed at identifying and selecting a collection of relevant data based on the main subjects of sustainability in supply chains, social sustainability in supply chains, social key performance indicators and social responsibility in supply chains.

Since social sustainability issues lacks of clarity the selection of the reviewed topics has to undergo a thorough process where to try and identify the connections with the two neighbouring fields of sustainability and with the social sciences (Flick, 2006; Hart, 1998). Seuring and Müller (2008a) and Hassini *et al.* (2012) were selected as the starting point for the literature review process, which had to begin as wide as possible to be feasible while focusing on the main subjects towards selecting the relevant material.

Papers were selected and collected from the Internet through online libraries such as Wiley, online publishers and databases; namely Emerald, Springer, Elsevier/ScienceDirect, Taylor & Francis, EBSCOhost, Google Scholar and b-on. The keywords used for the search process were the following: “sustainability”; “social sustainability”; “social sustainability indicators”; “social corporate responsibility”; “corporate social responsibility”; “sustainable supply chains”; “social sustainability”; “social responsibility”. All the material collected for the purpose of this research was in English. The search result included journal articles, guidelines and standards that focus on social sustainability; social metrics and sustainability in general. This research returned more than 250 documents that addressed the topics of interest and these were kept for analysis.

As suggested by Corbin and Strauss (1990), it was opted to launch the theoretical data sampling from the very beginning by comparing, interpreting and analysing the empirical material in order to identify the next relevant research issues. This step was critical because: 1) it summarises the information assessed and depicts its content; 2) the extension of the social KPIs’ field was not known in advance;

3) some of the features of the social KPIs' field were not known in advance; 4) the sampling size of the collected data was not defined in advance; 5) since this is an inductive research technique, it should not start with too narrow boundaries or close down avenues of inquiry prematurely as the concepts and dimensions shall derive from the data (Bryman, 2012; Closs et al., 2010).

After this first data treatment only the 51 articles were picked for further investigation. Besides this, this sampling took much effect as it allowed the identification of several relevant secondary sources that fit within our research scope. In the next section the preliminary assumptions made to establish and structure the social indicator database are explained.

3.2. Preliminary Assumptions

Before the systematisation and the aggregation of the collected indicators during the previous step, it is necessary to define some assumptions that will underpin the reasoning behind the analysis and lay the cornerstones for the theory building stage. 3.0 GRI Guidelines have been identified as a cornerstone in this field. These guidelines were selected as the basis to classify, screen and categorise the social indicators gathered.

Figure 10 provides an overview of the structure utilised by the GRI framework to classify the social indicators into four different social categories. These aim at covering the relevant social issues to be assessed within the organisations and supply chains. This framework uses a structure with three different layers of aggregation: 4 social categories, 22 social aspects and 40 social indicators.

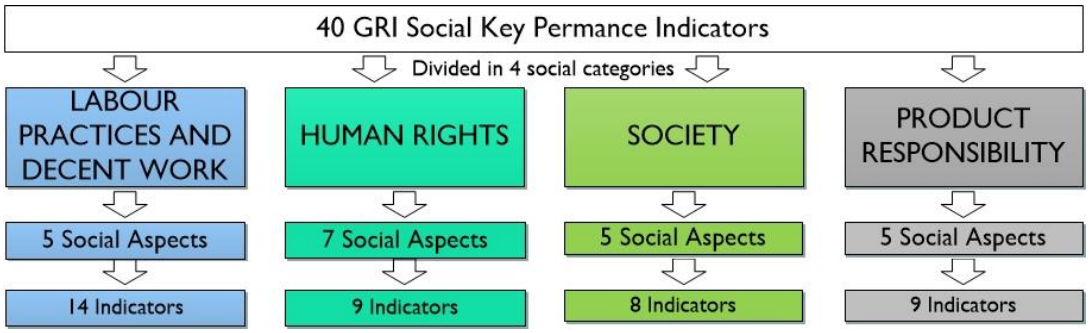

Figure 10. Overview of the GRI structure: Social KPIs

Adding to what has been said in Section 2.3.3, the 3.0 GRI Guidelines were picked for the following reasons:

- They provide a sustainability framework flexible enough to allow it to be adopted by companies with different sizes and from different industries/sectors (Global Reporting Initiative, 2006). This is an important aspect because the papers used to feed the database discussed social sustainability indicators under different contexts, in several different industries and also in different countries;
- The GRI framework spurs the organisations to report sustainability performance in relation to the broader context of sustainability (Global Reporting Initiative, 2006), meaning that it is recommended to include supply chain issues when conducting the analysis. Indeed, the GRI Guidelines stress the importance of defining clear boundaries because the reporting organisation

needs to take into account its ability to influence the supply chain actors both upstream and downstream.

- These Guidelines encourage to provide a full picture of the sustainability performance by including both positive and negative contributions, *i.e.* positive and negative externalities (Global Reporting Initiative, 2006). This extremely relevant characteristic of the GRI Framework is perfectly in tune with the SLCA Life Cycle Impact described in the UNEP/SETAC Guidelines (UNEP, 2009). Similarly to the GRI Guidelines, the UNEP/SETAC guidelines argued that a SLCA of a product or service shall account for both positive and negative social impacts created during that product life cycle.

The next section discourses about each of the steps followed to build and analyse the database.

3.3. Analysis

This section looks more deeply at the collected indicators and start sampling, comparing and interpreting the indicators. This exhaustive analysis stage followed the structure described in Figure 11.

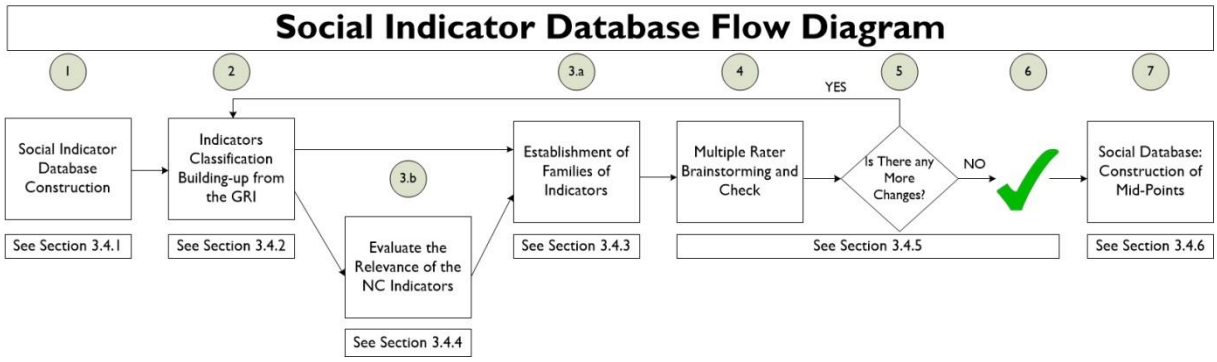

Figure 11. Flow Diagram representing the steps for building the Social Indicator Database

Technically, the construction of the database may be divided in three different stages (see Figure 11):

1. Firstly, the construction of the social indicators database in spreadsheet format (1);
2. Secondly, the assessment and interpretation of the collected data (2 to 6);
3. Thirdly, the theoretical outputs stemming from the analysis were organised in a relevant way (similar subjects) to establish the social impact categories (7).

For achieving the aforementioned goals, it was decided to adopt the following hierarchical model; meaning that the final outcome of the established framework is composed by four different layers: 1) social sustainability indicators; 2) families of indicators; 3) mid-point indicators impact categories and 4) end-point indicators impact categories (see Figure 12).

The reviewed literature presented two distinct approaches to develop social and socio-economic mechanisms (Dreyer et al., 2006; UNEP, 2009): top down *vs.* bottom-up approaches. Since the construction of this social database was underpinned by an extensive literature review, it was decided to implement a bottom-up approach.

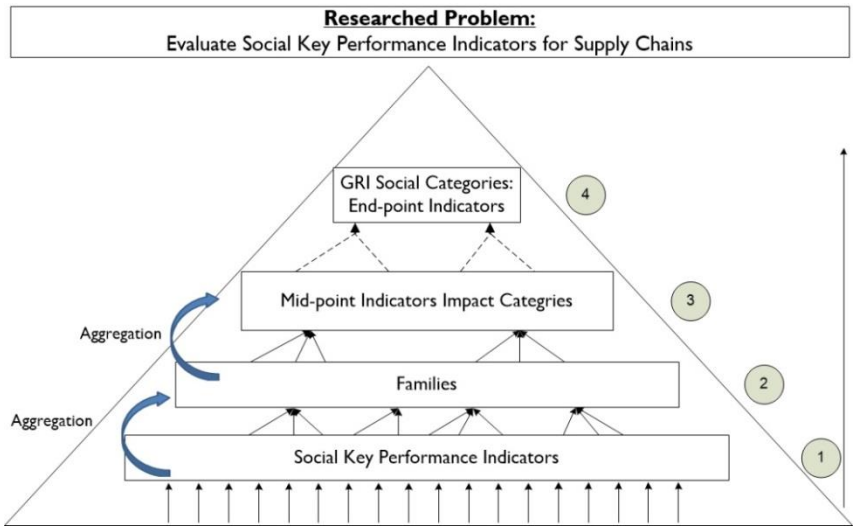

Figure 12. Hierarchical model of the Social Impact Framework

The next sub-sections describe in detail each of the six steps undertaken to accomplish the establishment of the systematised database.

3.3.1. Social Indicators Database Construction (1)

This first stage is the first major content analysis conducted on the 51 documents: each one of those was further submitted to a highly detailed analysis by screening them through the following twelve parameters: 1) list of indicators disclosed; 2) indicator type (e.g. mid-point vs. end-point; objective vs. subjective); 3) indicator measurement type (quantitative ; qualitative ; semi-quantitative (e.g. Likert scale)) ;4) measurement formula (metrics); 5) indicator definition; 6) number of social categories assessed within the paper; 7) industry type/business sectors approached; 8) methodology applied (mathematical models, etc.); 9) company *vs.* supply chains focus; 10) questionnaire/survey/interview based article: the authors used this method to collect data and validate theory; 11) stakeholder consideration; 12) measurement of the triple bottom line (all of the three pillars) (see Figure 13).

Paper	Year	Indicator	Indicator Type	Mensuration	Metrics	Definition	Number of Social Categories Ass
Erol et al.	2011	Average Annual Training Time, h/a	MP	X	h/a		-
		Annual number of applied innvative ideas generated by employees /employee	MP	•	[VL; VH]		
		Annual personnel turnover	MP	X	NE		
		Annual number of recordable incidents with respect to harassment and violence/employee	MP	X	Annual number of recordable incidents with respect to harassment and violence/employee		
		Annual number of recordable accidents/employee	MP	X	Annual number of recordable accidents/employee		
		Average annual areic number of recordable employee complaints/employee	MP	•	[VL; VH]		

Figure 13. Snapshot of the spreadsheet containing the social indicators

In summary, this content analysis enabled building a social indicator database in an Excel spreadsheet composed of almost 1450 entries (organised by author and year of publication) containing for instance: social indicators, CSR indicators, several metrics and formulas for these, and

the industries where they were collected meaning that it is possible to map the different concerns in the different industries across the supply chain.

3.3.2. Indicators Classification Building up from the GRI (2)

This second stage classifies and aggregates the nearly 1450 entries listed in the Excel spreadsheet. The purpose at this stage was to start looking more deeply at the content analysis and making inferences between the data. A combination of two strategies to analyse the indicators was conducted:

1) A qualitative content analysis was performed. This analysis takes a set of categories as a starting point for systematically analysing the messages and the textual material in the indicators (Flick, 2006; Kondracki et al., 2002) in order to identify the most common indicators as well as the main areas assessed by those indicators.

2) And then a theoretical coding (3.b) - defined as "the operations by which data are broken down, conceptualised and put back together in new ways" (Flick, 2006, p. 296) - was used to help build new social impact categories. This starts from the indicator analysis in order to develop a set of new categories. Both of these techniques rely on the so-called *categories* (labelled variables, concepts and properties) which were used as the coding scheme to evaluate the text.

The twenty-two GRI Social Aspects were used as the coding categories for conducting the qualitative content analysis. The social indicators were screened one-by-one several times in an iterative process and categorised into one of the twenty-two GRI Social Aspects (see Table A 1 and Table A 2). Table 1 exemplifies the procedure whereby the indicators were screening and classified based on the GRI. Also, if an indicator did not fit at all into one of the twenty-two coding categories, it was assigned the status of "not classified" (NC) (364 in total) in order to further evaluate them in the next stage (3.b).

Table 1. Example of screening and classification of indicators

Aspect screening[1]	Paper	Year	Indicator	Indicator Type	Mensuration	Metrics
FACB	Beske *et al.*	2008	Rights of union building	Advantage		
TR	Erol et al.	2011	Average Annual Training Time, h/a	MP	Quant.	h/a
HS	Azapagic	2004	Total investment in environment, health and safety as a percentage of profit	MP	Quant.	% profit
HS	Erol *et al.*	2011	Annual number of recordable accidents/employee	MP	Quant.	Annual number of recordable accidents/employee
TR	Azapagic	2003	Percentage of employees that are sponsored by the company for further education	Indicator	Quant.	%
FCL	Zhao *et al.*	2012	Workers are not forced to work beyond what they are legally entitled to do;	CSR indicator	N.A.	

[1] FACB: freedom of association and collective bargaining, TR: training and education, HS: occupational health and safety, FCL: forced and compulsory labour

At the end of this process all the indicators were screened and then classified into the twenty-three coding categories (GRI + NC) and an Excel macro was run on the database spreadsheet in order to sort the screened indicators and put them together according to the coding categories. This enabled to group the social indicators by similar content and provided the opportunity to easily identify relationships between the indicators; compare those indicators, evaluate the relevance of NC indicators further ahead and analyse existent patterns.

3.3.3. Establishing the Families (3.a)

The indicators were grouped gradually into lower levels of detail in order to establish new meaningful social mid-point impact categories. To that end, the previously classified social indicators (1077 in total) were aggregated into an intermediary level - *families* - in order to overcome the burden of assigning them directly to the mid-point impact categories (see Table 2). *I.E.*, the inclusion of one more layer in the social impact framework constituted a purely intermediary step in the cause-effect chain linking the social KPIs to the mid-point indicators.

It may be argued that it is perfectly plausible that these social KPIs could be directly linked to the mid-points without being preliminary aggregated in families; thus being in line with the type 2 sLCIA model presented in the UNEP/SETAC guidelines (Parent et al., 2010; UNEP, 2009): the establishment of these families sought to provide a parallel and complementary analysis to the UNEP/SETAC Guidelines Put it simple, the framework could be modelled with a “traditional” social impact pathway with three different layers: social indicators, mid- and end-point indicators.

For instance, Table 2 shows that 4 indicators were put together to form the family “Recruitment and Selection Practices” as they strive to monitor similar social issues.

Table 2. Example of the creation of a family

Family Name	Screening Aspect	Paper	Year	Indicator
Recruitment and selection practices	TR	Erol et al.	2011	Effectivness of Personnel Recruitment and Selection
Recruitment and selection practices	TR	Erol et al.	2009	Personnel recruitment and selection
Recruitment and selection practices	TR	Halldórsson et al.	2009	Improved staff recruitment and retention
Recruitment and selection practices	TR	Zhao et al.	2012	Corporation has a human resources policy in place to attract and retain qualified staff

Families may be defined as a set of social KPIs that are related to a specific common theme (e.g. Recruitment and Selection Practices; Health and Safety Hazards). They put together indicators that share several characteristics, namely similar name, similar monitored social incidents/aspects and indicators that measure the social performance within the same stakeholder category. Despite the fact the social indicators within each family are interrelated, they may fairly vary in terms of measurement type (quantitative *vs.* qualitative) and measurement formula. This process enabled to successfully to construct a first tier of indicator aggregation composed by 102 families wherein the indicators were grouped into similar subjects they seek to monitor (see Figure A 1). Additionally, the conducted assessment among the NC indicators in the stage (3.b) allowed to build-up sixteen additional families, meaning that 118 families were set up in total.

Notwithstanding, it was useful to cut down even more the number of families to increase practicality of the process, which was achieved by further decreasing the level of detail, with further aggregation.

3.3.4. Evaluate the Relevance of the NC Indicators (3.b)

As in Section 3.4.2, the 364 social indicators assigned with the label NC (not classified in step 2) were set apart for being re-assessed more in detail as after the first screening, where they did not fit into one of the twenty-two categories: some social indicators of the database were monitoring issues not included and disclosed in the GRI. There were essentially two main objectives associated to this new stage of the analysis. Firstly, it was necessary to evaluate whether or not these indicators would be appropriate and suitable to be integrated into the next steps of the framework construction. Secondly, it was required to develop a theoretical coding scheme in order to develop a set of new categories that would complement and enrich the twenty-two GRI Social Aspects.

For that purpose, the *relevance* of the data was thoroughly assessed, and some of the collected data was considered to be not suitable due to two distinct factors. First of all, some of the empirical material aimed at monitoring highly specific issues that are now outdated (e.g. Northern Ireland concerns between 1991 and 1994) and therefore these indicators are no longer relevant in the present context. Also, other indicators were tailor-made for assessing sustainability performance within a very specific context/case-study (e.g. time needed per kilogram of laundry for the detergent industry), and when put into the broader perspective adopted in this study, it made little sense to incorporate them into the social sustainability framework. Secondly, some data was considered to be too *generic* (e.g. Internal Social Criteria; Social Progress; Freedom; Public Responsibility) to be included in the final social sustainability framework. As a matter of fact, because some of the empirical material was much closer to the so-called Areas of Protection (e.g. Internal Human Resources; External Population) they were put aside and were not integrated in the remaining steps of the methodology. After this careful work, 97 out of the 364 NC indicators were permanently rejected, therefore reducing the number of social indicators of the database.

For the remaining NC indicators a different analytical course was chosen: a theoretical coding process to build-up a set of new categories and to gain a new perspective on the material. By developing a new coding scheme to categorise the indicators, similar properties emerged upon comparison of the data. This ultimately enabled to build-up three more aspects representing the subsumed indicators. This coding step constitutes a significant part of the chain of theory development by enlarging and enriching the 3.0 GRI Guidelines with three new social aspects: 1) Innovation and Competitiveness/R&D (I); 2) Employee Welfare (NEW); 3) Stakeholders (STA). These twenty-five screening aspects (22 from the GRI plus 3 new missing aspects) will allow performing a much more complete analysis of the social impacts in supply chains and subsequently over the product/service life cycle.

3.3.5. Multiple Rater Brainstorming and Validation (4) (5)

Steps (4) and (5) of the diagram aimed at verifying, checking and refining the analysis from stages (2), (3.a) and (3.b), describing the logic and the reasoning behind the categorisation process (see Table 1) of the indicators, and the subsequent establishment of the 118 families. This content analysis process

allowed to iterate multiple times between steps (2), (3.a) and (3.b) towards streamlining the indicator classification and the aggregations. Phase 4 (in Figure 11) involved organising brainstorm meetings, and promote in-depth discussions with sustainability pundits to 1) review and validate the previous work; 2) shorten the extensive list of 118 initial families; 3) provide insights about all the indicators' evaluation and screening by cross-checking its classification.

During the brainstorming sessions one developed *memos*, described by Charmaz as (2000, p. 517): "*the intermediate step between coding and the first draft of the completed analysis. This step helps us spark our thinking and encourages us to look at our data and codes in new ways.*" Writing *memos* contributed to set an analytical course, elaborate more assumptions, refine the families, define and understand possible relationships among them and increase the ability to assess the empirical material.

3.3.6. Social Database Results (6)

Descriptive Analysis of the Literature Review

The data collection and sampling analysis processes selected 51 relevant documents in various industries and subjects between the years 2000 and 2012 (see Figure 14). It should be noted the infancy of this research field since it only began to emerge in the past twelve years in the literature.

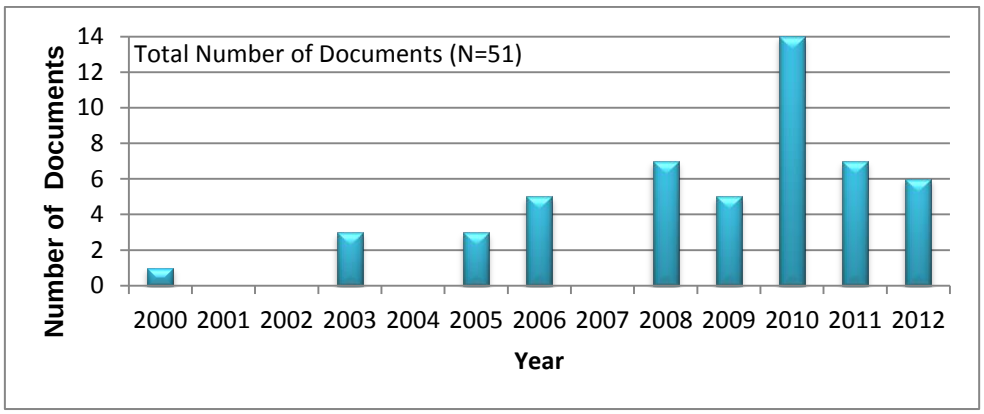

Figure 14. Distribution of the documents presenting social indicators

Figure 14 shows that a high number of publications propose social key performance indicators and metrics since 2008 (76%). In 2010, there is a big spike that may be explained by the publishing of the Guidelines for Social Life Cycle Assessment of Products the year before. The publishing of the UNEP/SETAC guidelines was considered to be a significant milestone as it formally introduced for the first time methodologies and frameworks for conducting a full SLCA from cradle-to-grave, thereby providing a solid theoretical base for conducting case-studies. In brief, there is an increasing trend regarding the publication of documents related to social indictors and metrics which albeit slow ultimately translates the growing interest in this research area.

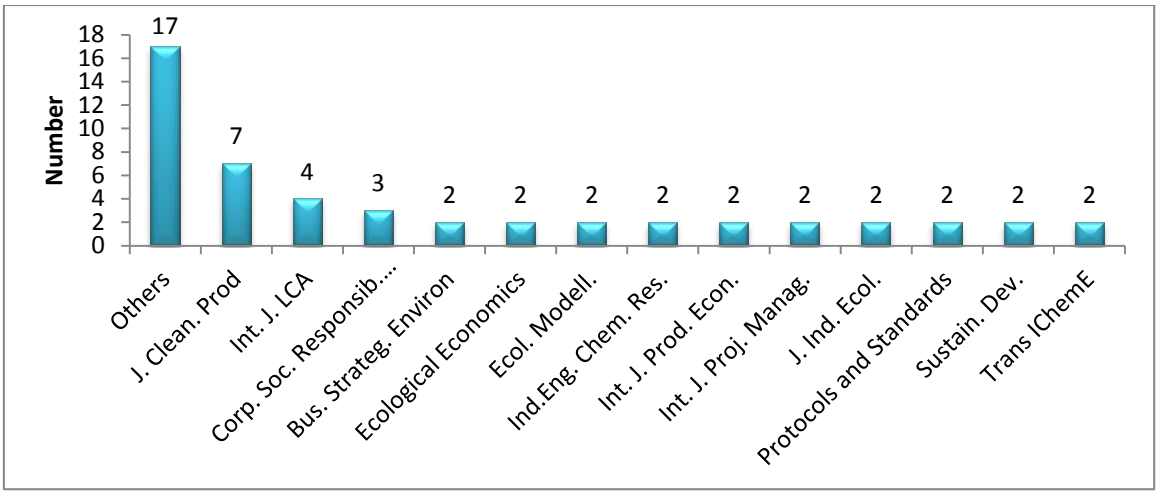

Figure 15. Journal Distribution of the Documents Included in the Database

Figure 15 shows the distribution of the journals where the documents included in the database were published. From this figure it is possible to draw some conclusions about the social indicators research field. Firstly, the forty-nine papers containing social indicators and metrics included in the database were published in twenty-nine different journals. The database contained also two other documents that are not considered to be papers: the GRI guidelines indicators and the KLD STATS indicators.

On the one hand, this distinction reveals that social sustainability and social indicators are a cross-disciplinary issue gaining attention from different sciences since they were discussed in thirty different publications that have distinct aims and scopes, this also signifies that this research topic is widely accepted by the Academia. However, the unequal distribution of papers highlights that social indicators related issues are capturing more attention from some specific journals. The leading journal offering the most papers to the database is the Journal of Cleaner Production (7 papers) followed by the International Journal of Life Cycle Assessment (4 papers).

As can be seen in Figure 16, the fifty-one documents of the database are classified within sixteen different industries and economic sectors. It can be verified that almost 25% of the papers discussed social sustainability/social indicators and metrics within the context of chemical, petrochemical and energy industries (e.g. nuclear power industry). This was not a surprising result because a large number of sustainability issues were historically approached by these industries due to environmental, security and safety reasons. Besides this, the high number of conceptual papers (more than 20%) suggests the pressing need to push forward the social sustainability subjects in order to integrate properly social considerations into the 3BL and the decision-making process.

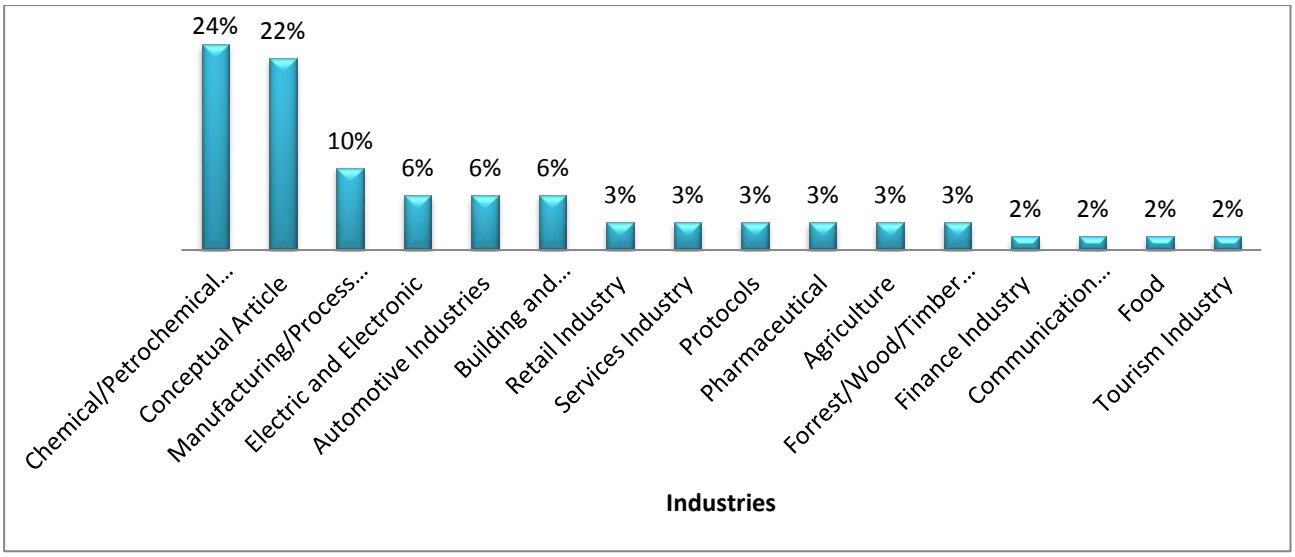

Figure 16. Industries and Economic Sectors Assessed in the Database

Results

After the completions of steps (1) to (5) of the flow diagram (see Figure 11), the following results regarding the analysis, classification and systematisation of the social KPIs into categories were obtained:

1. The final version of the database contained 1348 indicators out of the approximately 1450 initial collected indicators;
2. The database contained 244 quantitative indicators that proposed metrics and mensuration formulas for their assessment (e.g. annual personnel turnover);
3. There were 136 semi-quantitative indicators included in the database. Most of these indicators Likert scales to translate qualitative performances into quantitative performances;
4. There were 131 qualitative indicators (e.g. unions' relations) that must be assessed in a qualitative way;
5. The remaining 837 social indicators did not suggest any metrics or mensuration formula to evaluate the social performance in supply chains.
6. An important number of papers used tailor-made indicators to suit the industry sustainability parameters (e.g. Kruse et al. (2008)).
7. This iterative "back and forth" process enabled reducing the initial number of families firstly from 118 to the final 54 (see Figure A 2). Brainstorming helped confirm and find touch points and common themes between the families which allowed aggregating the empirical material in novel ways;
8. Twenty-five aspects (categories) aggregate these screened indicators. Three missing aspects (Innovation and Competitiveness/R&D (I); Employee Welfare (NEW); Stakeholders (STA)) were created to enrich and complete the aspects of the 3.0 GRI Guidelines. These three missing aspects account for approximately 18% of the total number of indicators (see Table 3), and are described next.

Table 3. Social Performance Indicators Distribution

GRI	Social Performance Indicators Distribution
LA	40%
HR	6%
S	29%
PR	8%
OTHER (NEW+I+STA)	18%
TOTAL	100%

Innovation and Competitiveness/R&D

The database contained several indicators related to 1) innovation potential of the organisation; 2) knowledge management; 3) research and development issues which translate a growing concern among the academia over the companies' engagement in more innovative technological solutions and the efforts they put into creating and protecting knowledge.

Employee Welfare

Some LA indicators (LA2; LA3; LA5; LA11; LA12) monitor social aspects that may indirectly affect employee satisfaction and welfare, others (LA6; LA7; LA8; LA9) cover social aspects concerning the physical protection and well-being of people at work (Global Reporting Initiative, 2006) but there is no direct gauge in the Guidelines for measuring the work-life balance of the employees, the fulfilment of their basic needs and the work satisfaction. The 3.0 GRI Guidelines linked these well-being indicators to the Occupational Health and Safety of the employees, but the reviewed indicators in the database monitored issues other than Health and Safety aspects.

Stakeholders

The stakeholder social aspect was established for similar reasons to the Employee Welfare aspect. The GRI Framework involved a multi-stakeholder approach which enabled to properly account for several stakeholders' concerns in the Guidelines: the four GRI Social Categories (LA; HR; S; PR) are intrinsically linked to stakeholders such as the employees, the suppliers, the community, the customers, etc. The forty 3.0 GRI Social Indicators manage to represent and safeguard these stakeholders' interest but they globally fail to measure specific issues (e.g. number of consultative meetings with stakeholders; information provisioned to stakeholders) which are essential to put into perspective how an organisation manages the relationships within the supply chain and how it relates to their stakeholders. Hence, this social aspect was established to bridge this gap and group the indicators that measure the interaction between companies and their stakeholders.

Social Key Performance Indicators Distribution

Figure 17 presents the final results of the classification of the database indicators based on the GRI Social categories. According to these numbers, the Labour Practices and Decent Work (LA) and Society (S) indicators are the most discussed and reported by the scientific community with 47% and 39% respectively. The remaining two GRI Social Categories, Human Rights (HR) and Product Responsibility (PR), only accounted for 14% of the total number of indicators. This finding might suggest that the Academia is interested in monitoring the internal labour practices and company policies.

These results are in line with those found in the study of Roca and Searcy (2012) based on a content analysis of 94 Canadian CSR reports: both LA and Society categories gathers the highest number of mentions of the GRI indicators. Also, Carvalho and Barbosa-Póvoa (2011) stated that LA indicators are the most reported Portuguese and Forbes 25 top international organisations.

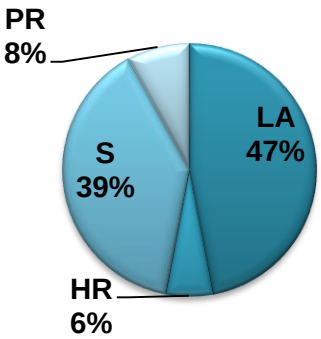

Figure 17. Social Performance Indicators Distribution According to the GRI

The fact that the LA set of indicators are the most quantitative indicators among the four categories allows comparing the social performance in a simpler way:

- Quantitative indicators disclose more transparent and clearer results, which will enable better process comparison in the supply chain and ultimately allows the decision-maker to select the better alternative;
- The use of quantitative indicators makes easier the prioritisation of the sustainability issues in the supply chains as it allows the decision-makers tackling first the most critical aspects. They provide better visibility and awareness in terms of tracking the social performance's improvements within the studied system;

Furthermore, it may be substantially easier to collect and assess the LA data when conducting the case-studies, as generally companies have effective internal performance measurement systems enabling them to be aware of relevant social and employment aspects (e.g. salaries; employee turnover; average hours of training per year). Figure 17 also shows that the Society category (S) has the second highest number of indicators, meaning that the Academia has also paid particular attention to the impacts that supply chains have on the local communities in which they operate as well as to the way these impacts are mitigated.

The remaining two GRI Social categories Human Rights (HR) and Product Responsibility (PR) only accounted for 14% of the total number of indicators (see Figure 17). This fact is justified based on the following arguments:

- Despite the fact that there is very specific of legislation, Conventions and Declarations about Human Rights, the large majority of the collected indicators hold a quite generic name (e.g. respect of indigenous rights; child Labour) which means that these indicators do not assess social issues at high level of detail such as in the LA category;
- Regarding the PR indicators, there are not much legislation and enforcement measures pushing the supply chain companies to disclose all the PR aspects addressed in the GRI. Therefore, it is

plausible to state that the PR indicators may be more used to assess internal social performance rather than expose publicly the supply chain flaws.

- The HR and PR indicators are less susceptible to be tailor-made to a specific industry or local circumstances in comparison to the LA and S indicators. Indeed, most of the HR indicators addressed in the reviewed literature have very similar names, meaning that there is an underlying conformity regarding this category. There is no much room for having unlike interpretation of HR scope and issues. The HR and the PR KPIs are easier to compartmentalise and to put a box around.

Table 4 shows the final categorisation of the social indicators according to the database social aspects and the number of families.

Table 4. Social Indicators Distribution According to the 3.0 GRI Guidelines

GRI Social Categories	Database Social Aspects	Number of Indicators in Each Aspect	Number of Families in Each Aspect
Labour Practices and Decent Work (LA)	Employment (E)	168	8
	Labour and Management Relations (LMR)	19	1
	Occupational Health and Safety (HS)	170	4
	Training and Education (TR)	87	3
	Diversity and Equal Opportunities (DEO)	93	3
	Employee Welfare (NEW)	44	2
	Innovation and Competitiveness (I)	51	3
	TOTAL LA	632	24
Human Rights (HR)	Investment and Procurement Practices (IPP)	12	1
	Security Practices (SP)	4	1
	Non-Discrimination (ND)	17	2
	Freedom of Assoc. Collective Bargaining (FACB)	12	1
	Indigenous Rights (IR)	11	1
	Child Labour (CHLAB)	10	1
	Forced and Compulsory Labour (FCL)	12	1
	TOTAL HR	78	8
Society (S)	Community (COMM)	297	8
	Corruption (C)	33	2
	Public Policy (PP)	11	1
	Anti-competitive behaviour (ACB)	13	1
	Compliance (COMP)	36	1
	Stakeholders (STA)	141	2
	TOTAL S	531	15
Product Responsibility (PR)	Customer Health and Safety (CHS)	44	2
	Product and Service Labelling (PSL)	44	2
	Marketing Communications (MC)	13	1
	Customer Privacy (CP)	3	1
	Compliance (product) (PRC)	3	1
	TOTAL PR	107	7
	TOTAL	1348	54

According to Table 4, the LA category contained most of the families with twenty-four (44%), followed by the Society category with fifteen (28%), the HR category with eight (15%), and finally the PR category was the one containing the least with only seven (13%). Overall, the Society category presented the highest ratio of indicators per family, followed by the LA category, the PR category and finally the HR category.

The aspects “Employment” and “Community” are those containing the higher number of families with eight each. These results can be justified based on the fact these aspects 1) contained many indicators and 2) contained the most diversified social issues resulting in the establishment of quite specific indicators. On the one hand, it shows that each industry has its own specificities and its own needs which explain why there is a very wide variety of indicators. On the other hand, the Academic world is concerned with measuring all kind of the social initiatives implemented to assist the communities and to minimise the negative externalities.

In contrast, the aspect “Stakeholder” (141 indicators) only possessed two families: this is somehow a surprising result because the literature suggests that SC stakeholders have conflicting point-of-views and interests, imposing trade-offs to the decision-makers. Therefore it would be expected that the reviewed papers would propose a panoply of social indicators covering the different stakeholders’ concerns, bringing into the limelight the stakeholders concerns and how the different supply chain tiers are managing them. Instead, these indicators only assess stakeholder issues at a low level of detail which explains the low number of families within this screening aspect. As for the other twenty-two aspects, the large majority of them only contained between one and three families.

3.3.7. Social Database: Construction of Mid-points (7)

The completion of steps (1) to (5) of the flow diagram showed that it exists a lot of information and social KPIs in the literature that need to be systematised and categorised in new relevant ways to be used in a SLCA of products and services by companies to assess their supply chain impacts and ultimately its performance. Hence, the final stage of the process (see Figure 11) sought to bridge this gap by aggregating the 1348 indicators of the database into new mid- and end-point indicators disclosing major social issues impacting in the organisations and their supply chains. The objective was to identify the main issues impacting on the stakeholders and imposing consequences that lead to reformulation of the social processes; providing structured information to the decision-makers (Bare et al., 2000; Dreyer et al., 2006).

<u>Defining the Mid-Point Impact Categories</u>

Bare *et al.* (2000, p. 323) defined a mid-point indicator as follows: “*a parameter in a cause-effect chain or network (environmental mechanism) for a particular impact category that is between the inventory data and the category endpoints.*” Figure 18 shows the created sixteen new mid-point impact categories based on the aggregation of the 1348 social KPIs of the database and the established hierarchical model.

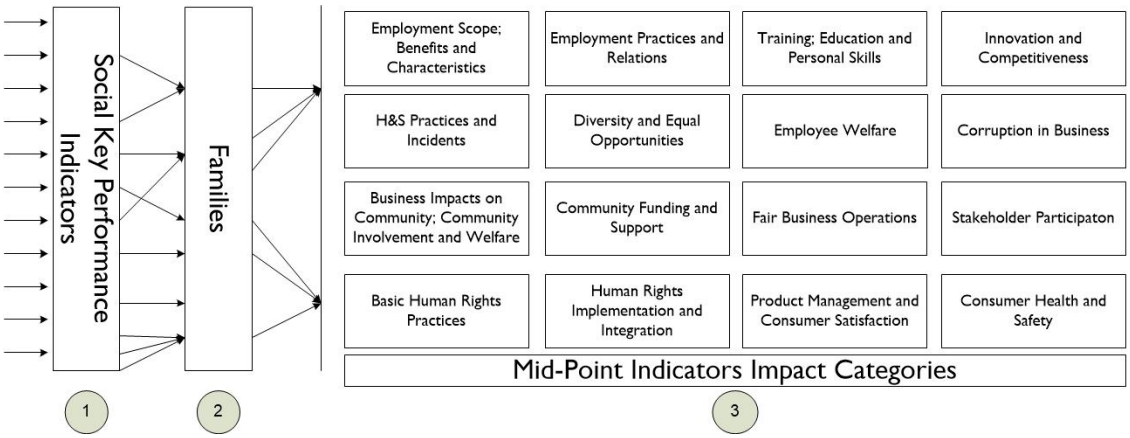

Figure 18. Overview of the Established Mid-Point Impact Categories

Each mid-point is a social impact category grouping a logical wide set of KPIs, related to a social issue of interest to decision-makers and the stakeholders in general. Basically, these mid-points are mapping the "macro social areas" defining the all the relevant aspects and strands of a company and their supply chain.

Table 5 displays an example of the procedure followed from the collection of the indicators in the literature up to the establishment of the mid-points. It is possible to see the aggregation stages described in hierarchical model (see Figure 12): 1) social KPIs; 2) families; 3) mid-point. This bottom-up approach was adopted for the mid-points.

Table 5. Example of the Establishment of a Mid-Point

Mid-Point	Family	Paper	Year	Indicator (social KPIs)
Community Funding and Support	Grants and Donations	Roca and Searcy	2012	Distribution and donations
		Bai and Sarkis	2010	Grants and Donations
		Roca and Searcy	2012	Funding, donations, sponsorship and community investments
		Spangenberg and Omann	2006	Donations for non-profit aims
		Roca and Searcy	2012	Community donations as % of domestic pre-tax profits
		Erol et al.	2011	Fraction of total sales invested for social projects/year
		Kranjc and Glavic	2005	Fraction of societal and community investment in gross profit
		Stamford and Azapagic	2011	Direct investment in local community as proportion of total annual profits
	Housing Support, Infrastructures and Services for Productive Life	KLD Structure	2011	Support for Housing
		Labuschagne and Brent	2006	Availability of acceptable housing
		Labuschagne and Brent	2006	Access to regulatory and public services
		Labuschagne and Brent	2006	Availability of energy services
		Labuschagne and Brent	2006	Availability of waste services
		Labuschagne and Brent	2006	Availability of water services
		Zhao et al.	2012	Build community welfare facilities
	Community support for education purposes	Labuschagne and Brent	2006	Access to education
		KLD Structure	2011	Support for Education
		Sarkis et al.	2010	Supporting Educational Institutions
		Zhao et al.	2012	Corporation engages in public and cultural activities, support public education
	Community support for cultural preservation purposes	Azapagic and Perdan	2000	Preservation of cultural values
		Sarkis et al.	2010	Cultural Properties
		Hassini et al.	2012	Percentage lines on protected environmental or cultural areas
		Sigala	2008	Increasing awareness of natural and cultural assets

In summary, the reviewed literature permitted getting a broader picture of the already proposed mid-points by the scientific community (e.g. Grießhammer *et al.* (2006); Jørgensen et al. (2008);

Labuschagne and Brent (2006); Weidema (2006)). This allowed identifying the theoretical gaps concerning the establishment of social impact categories. After comparing and contrasting the impact categories already proposed in the papers with the issues monitored by social indicators contained in the database, it was possible to create a large number of new mid-points and enriching the social impact assessment.

Also for establishing other mid-points, the major international conventions (e.g. ILO Declaration on Fundamental Principles and Rights at Work, Convention on the Rights of the Child) and standards were used as the baseline. It was sought to aggregate the families into meaningful social subjects addressed in these source documents. In brief, these mid-points map the social impact areas that should be considered for designing and implementing sustainable practices in supply chains and gives a set of KPIs that should be used to assess them.

3.4. Conclusions

This chapter presented the major findings and results concerning the exhaustive literature review conducted on social KPIs and performance measurements: the vast amount of collected information was standardised and systematised in a database in view of establishing new mid-point impact categories. The social indicators database clearly unveiled 1) the most studied social impact areas assessed by the indicators and the Academia; 2) which stakeholders are the most impacted by the social issues. In essence, this database was an essential tool because it provided a broad overview of the current panorama on social assessment as well as it pinpointed the gaps (e.g. lack of standardisation of names) that will be further addressed in the next chapters.

Overall this complex process, which involved three researchers, enabled the identification of global categories aggregating the social KPIs which are essential to understand 1) the relationships between the mid-points and the main areas of social performance and social operations and 2) what are the relationships between these mid-points with the different supply chain echelons.

In view achieving the aforementioned goals, two social sustainability supply chain frameworks for assessing social impacts based on these mid-points will be presented in-depth in the next chapter.

4. Frameworks Development

This chapter presents the two established frameworks for assessing social sustainability in supply chains. Section 4.1 discourses on the new taxonomy for the social impact categories based on the SLCA theory. Section 4.2 presents the SocialSCOR framework which links the supply chain stakeholders to these social categories. Section 4.3 sums up the main findings from both frameowrks.

4.1. Social Life Cycle Assessment Framework

This section presents in detail a new structured framework containing the most common social mid-point impact categories which aim at running a standardised assessment of social sustainability in companies and their SC. As described in the previous chapter, the construction of the social indicator database led to the establishment of sixteen mid-points, through a hierarchical process model building up from establishing relationships between the indicators leading to novel groups of the KPIs. Based on this analysis, the following sub-sections 1) define and support the importance of these indicators for assessing products and services based on the SLCA principles; 2) link the mid-points to the main areas of social assessment using the GRI Guidelines.

4.1.1. Social Mid-Points Impact Categories

Here, each category will be defined and their relevancy within SLCA context will be discussed. rationale explaining the establishment (see Table B 1 to Table B 16 for more detailed information).

Employment Scope; Benefits and Characteristics

Definition

It describes the basic job characteristics, the existing contractual and the compensation policies of the company as well as the benefits provided to the employees. Also, this category seeks to measure the contribution of a company towards creating jobs nationwide.

Relevance

This mid-point impact category provides a comprehensive overview of the scope of the organisation's workforce (e.g. proportion of staff hired from local community relative to total direct employment) (see Table B 1). It evaluates the links between the labour policies' decisions made by the board and the employment characteristics (e.g. number of working hours). It assesses labour practices for preserving job stability, increasing employee retention, enhancing productivity and minimising the disruption of operations. This impact category is particularly important as it constitutes the first yardstick to assess how organisation manages its human resources and employment policies in order to run its operations successfully and implement value-creating business strategies for all the involved stakeholders.

Employment Practices and Relations

Definition

This mid-point addresses the internal disciplinary practices and the existing codes of conduct in a company. Also, it discloses the labour rights' strength and the current relations between the workforce, the unions and the company.

Relevance

This indicator addresses the employment practices of the company, and the relations between the organisation and its workforce (see Table B 2). This category focuses on 1) the compliance of legal aspects concerning hiring and disciplinary practices; 2) the organisation's relationships with the unions and the collective bargaining policies. It enables the stakeholders to monitor the efficiency of the consultative processes with the employees, its institutional efficiency and the labour rights strength. It is particularly important to have good relations with the employees and with the unions as it should ensure good working environment, minimise operational disruptions, and reduce employee turnover.

Health and Safety (H&S) Practices and Incidents

Definition

This mid-point addresses the organisation's duty of care towards its workforce, being its ultimate point to evaluate the success of the implementation of a responsible H&S culture in all business units. This mid-point monitors the quality of working conditions, the potential H&S risks, the prevention initiatives existing in the company, as well as the incidents and accidents occurred (see Table B 3).

Relevance

H&S issues have become a cornerstone issue for firms because it enhances productivity and morale, it may provide an indirect gauge of the workforce well-being and it affects the company image and brand (e.g. France Telecom suicides) in public opinion. On the one hand, the implementation of effective H&S measures is a step towards the achievement of employee satisfaction; on the other hand, some industries (e.g. oil and chemical industries) highly depend on tolerable H&S performance (e.g. low number of work fatalities) as the regulatory bodies may otherwise shut down their operations until the situation is properly fixed. Hence, neglecting to address these subjects within the SC context may not only originate SC disruptions but also affect its economic sustainability in the long term.

Training; Education and Personal Skills

Definition

This mid-point indicator assesses the level of commitment to improve the human capital's skills and attempts to correlate the intellectual development of the human resources and the social sustainability progress achieved by the company (see Table B 4).

Relevance

Career development plans, lifelong learning and job analysis are three paramount issues because they increase employee productivity in the long-term and they hinder the possibilities of career mismatch. In the age of the so-called *knowledge economy*, SCs and their organisations contend for enhancing the human capital knowledge and skills (human and technical capabilities) as it enables the creation of value-adding solutions for the business and for the customers' needs. Therefore this is a key aspect to analyse.

Diversity and Equal Opportunities

Definition

This mid-point aims at assessing all kinds of measures encouraging human capital diversity, equal opportunities and inclusion within the organisations. (see Table B 5). It provides an overview on how

much the workforce and the board are diversified (e.g. gender; age) and the initiatives to foster an inclusive environment in the workplace for diversity of thought, culture and ideas.

Relevance

It is essential for any company to provide equal opportunities and financial equity to their employees since it may especially impact the retention of qualified workforce and the employees' safety needs. Providing equal opportunities to the workforce is a paramount issue because not only it directly impacts the company reputation but it also reduces to likelihood of severe judicial actions. Developing and retaining a diversified workforce may enhance product development and may contribute to connect better to the globalised Marketplace with different types of customers. Moreover, diversity brings richness to the working environments, enhances better problem-solving, creativity, innovation and improves decision-making. In fact, diversity brings different perspectives to the company and helps to change their current *status quo* with new thinking and conflicting opinions.

Employee Welfare

Definition

This mid-point social impact category measures key essential aspects related to employee morale, employee satisfaction, employee wellbeing with the job. It tries to capture the impacts of the business operations into the employees' motivation and it analyses the initiatives aiming at meeting the employee's needs and improving welfare (see Table B 6).

Relevance

Adequate welfare arrangements are important in terms of complying with the law (e.g. COBRA act), keeping the people happy and enhance company's image. It is argued that employee welfare have a direct economic impact in the financial bottom line because people tend to perform better and thus it increases sales and profits. Being able to provide these arrangements is beneficial for the companies in many ways such as recruit and retain skilled and qualified employees, and motivating people to work harder by showing that organisations value their them. Thus it is capital to implement innovative material and non-material programmes aiming at enhancing satisfaction and wellness at work (e.g. Googleplex in California whose facilities include a gym, swimming pools, multiple sports hall, etc.)

Innovation and Competitiveness

Definition

This mid-point attempts to understand the organisation engagement in more innovative technological solutions and puts emphasis on existing incentives that strengthen the innovation ability and optimise Research and Development (R&D) (see Table B 7). It is a proxy for better understanding the organisational culture of the company and the actions promoting sustainability in business.

Relevance

This category indirectly reveals the organisation propensity to encourage its employees to be creative and seek more efficient business solutions to the customers. The fact that the organisation is investing more on R&D shows a strong concern towards delivering high customer value. Innovation and R&D are two major cornerstones that stimulate social progress and drive society change, being a fundamental pre-requisite for improving social conditions and hinder negative externalities. Innovation

and R&D lay not only within the company's boundaries but also take the perspective beyond the individual firm into the SC, thereupon it is important to analyse "innovation/R&D" issues through the perspective of shared responsibility between the organisation, the employees and the society for being more socially sustainable, competitive and innovative.

Human Rights Implementation and Integration

Definition

This mid-point provides evidence about the capacity and effectiveness of the policies aiming at preventing internally and externally (with suppliers) human rights violations regarding child labour, forced labour, and freedom of association and collective bargaining (see Table B 8).

Relevance

As the product value chain is scattered throughout the SC (e.g. outsourcing) it has become substantially important to integrate HR policies into the external business relationships and suppliers' strategies. The continuous violations of HR around the world show that companies have to strengthen their preventive HR measures especially in regions of significant concern (e.g. China; Indonesia). It was opted to merge into the same impact category all these HR issues because internal and external HR procedures go hand in hand. First of all, it is critical to endow companies with proper internal HR policies and preventive measures for eradicating these problems internally; meaning that they shall excel at keeping a strong internal HR performance. Only then will they be able to transpose this knowledge to the other SC actors (e.g. supplier evaluation and screening) and influence them to shape their own internal HR strategies.

Basic Human Rights Practices

Definition

This impact category evaluates how the company manages the issues of non-discrimination and indigenous rights only internally (see Table B 9).

Relevance

This mid-point encompasses key HR requirements disclosed and enshrined in several international conventions and international legislation (e.g. ILO Conventions) especially relevant for the employees, the unions, the NGOs and the society, including racial and sexual harassment and discrimination against the disabled. Contrary to the previous mid-point, this assesses how an organisation treats minorities, and protects distinct social and cultural groups (e.g. different language; different religion; different identity) from prejudice and disadvantageous situations. Also, it monitors the taken considerations to promote solidarity and tolerance for these groups whose culture and political institutions are different. Respecting these HR is a key aspect for the organisation to 1) maintain its reputation; 2) avoid severe litigation processes and 3) keep motivation and commitment at work.

Community Funding and Support

Definition

This mid-point measures the direct and indirect financial support as well as material resources that the impacted communities are benefiting. In particular, it focuses on the cultural and educational

interactions and programmes established with the impacted communities and other stakeholder groups in view of improving the external social environment around the company (see Table B 10).

Relevance

Interacting with the stakeholders' community constitutes a key step to deeply understand their expectations and needs towards implementing social development programmes. Hence this category evaluates the monetary engagement and the willingness of a company in building productive infra-structures for the communities.

Business Impacts; Community Involvement and Welfare

Definition

This category evaluates the positive and negative externalities created by the business that impact on the society social performance, the communities and the delivered social value (e.g. in-kind contributions; nuisances) (see Table B 11).

Relevance

The management of SC's social impacts and their underlying performance are closely related to the interactions with the market structures and the involved social actors. Measuring the externalities may provide an insight about the organisational overall contribution to the improvement/degradation of the economic, environmental and social performances of the impacted communities. It is extremely relevant for the stakeholders to understand the potential and real impacts stemming from SC activities because 1) it helps the organisations to conduct a more complete SLCA on products/services; 2) provides better visibility and awareness allowing implementing better mitigation measures, *i.e.*, knowing and tracking the social harm enables to better frame the contributions to local communities and to achieve more social benefits.

Corruption in Business

Definition

These mid-point strive to evaluate what kind of good business practices the organisation has implemented in order to reduce its exposure to corruption practices both internally (own employees) and externally (business partners) (see Table B 12).

Relevance

It was decided to create a "Corruption" mid-point separated from "Fair Business Operations" because the GRI Guidelines (Global Reporting Initiative, 2006) defined the term corruption as "*the abuse of entrusted power for private gain […]*", meaning that there is a slightly different angle when compared to "Fair Business Operations" which discloses social performance within the organisational scope rather than the personal one. In this sense, corruption comprises aspects such as bribery, fraud, extortion, collusion, conflict of interests resulting in illegal managerial activities concerning business.

Fighting against corruption should be a priority for the companies because there is a risk of criminal prosecution, risk of financial loss and on top of that the moral and ethical arguments. In fact, corruption is a formidable hurdle hindering sustainable development because it is a source of inefficiencies in operations, undermines stakeholders' trust, and therefore affecting prosperity. Overall, corruption may

cause serious damages including the reputation destruction which makes difficult to recruit and retain quality staff and to attract business investment. Moreover, it may have severe consequences on the communities by undermining the rule of law.

Fair Business Operations

Definition

This mid-point addresses the issues of fair competition, lobbying and compliance with legal requirements by the reporting organisation, thus providing a means of measuring accurately the integrity of practices and the potential impacts on stakeholders, especially the employees, the shareholders and the government (see Table B 13).

Relevance

Fair business operations are a vital pre-requisite to good free and functioning marketplaces by promoting and fostering competition and preventing anticompetitive practices. These issues which affect the performance of the entire SC (e.g. dumping; cartels) and the market structure (e.g. monopoly practices), ultimately impact on consumer welfare and consumer surplus. Ensuring a good performance within this category is critical because on-going failure to comply with these subjects leads to reputation damage, disruption of operations, contract ban and ultimately makes the company to go out of business.

Stakeholder Participation

Definition

This mid-point impact category gauges the stakeholder involvement, influence and empowerment in the organisational business initiatives (see Table B 14). It assesses the stakeholders' relationships with the organisation by monitoring the effectiveness of the communications between both parties.

Relevance

Stakeholder participation in the SC's decisions is fundamental to shape strategies and implement better social sustainable practices, thereby forcing SC actors to take into account their expectations, needs, and requirements. Participation by actors in corporate governance not only increases the understanding and the support of the Board's decisions but also reduces the trade-offs and the conflicting points of views. Overall, the companies shall strive to maintain good communication channels because the stakeholders' involvement in business activities is a key aspect that enhances legitimacy. By participating, stakeholders guarantee that companies seek to implement policies embedded across the organisation that enhance its competitiveness while improving socio-economic conditions in the communities in which it operates.

Consumer Health and Safety

Definition

This mid-point focuses on the consumer H&S threats, product quality as well as it tracks the product social and environmental impacts across its life cycle (see Table B 15).

Relevance

Consumer H&S is a paramount issue to companies because it originates breaches of trust that leads to 1) reputational damage; 2) employee demotivation and 3) financial negative impacts (e.g. Toyota).

Failing to score a good performance in this category reveals that the reporting organisation lacks appropriate internal measures aiming at ensuring product quality, end-of-life sustainability and attainment of legal and safety requirements. It was decided to include the "product quality" related indicators in this category because quality goes hand in hand with consumer H&S (e.g. Mattel toys with lead paint) in terms of social sustainability rather than consumer satisfaction.

Product Management and Consumer Satisfaction

Definition

This mid-point enables to understand the interactions between the consumers, the product and the company through the evaluation of the issues related to product commercialisation, brand awareness and legal consumer services procedures (see Table B 16).

Relevance

Companies should have good internal management systems and policies to organise the communications with their customers and to implement appropriate strategies to meet their needs. Nowadays, with the tremendous global competition it is necessary to ensure excellent marketing and brand building actions, deliver high customer value and have good product stewardship. Satisfaction management and feedback capturing are two very important ways to drive product change and further meet customer expectations. It is argued that these matters will be further pursued and investigated, given that failing to comply will damage customer loyalty and company reputation.

4.1.2. Overview of the Social Mid-Points Impact Categories: a Snapshot

According to Figure 19, the mid-points which contain the most indicators are: 1) "Business Impacts; Community Involvement and Welfare" and 2) "H&S Practices and Incidents"; whereas at the other end "Basic Human Rights Practices" and "Corruption in Business" are the ones encompassing the least indicators with 28 and 33 respectively.

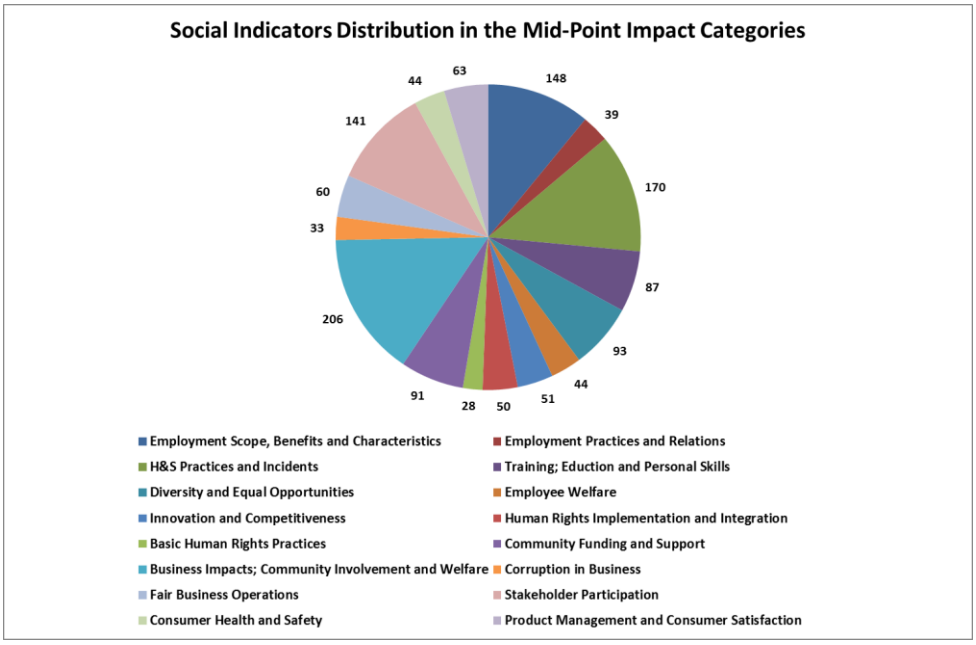

Figure 19. Social Indicators Distribution in the Mid-Point Impact Categories

These findings are justified based on the following advanced arguments:

- The reviewed literature achieved to effectively address and integrate the growing pressures from local communities and societies into their social sustainability assessments across different industries (e.g. land usage and depletion; quality of life in community). There is a growing concern from the Academia to discuss the social impacts affecting the external stakeholders owing to push further the companies to properly take into account their interests in decision-making. Ultimately, this means that companies are committed to shift away from the "business as usual" paradigm;
- The Academia put much emphasis on occupational H&S because not only these matters might result in human losses but also it directly impacts on productivity, on reputation and on the financial bottom line. This finding shows 1) an increasing preoccupation in implementing a preventive H&S culture, leading to the establishment of performance measurements systems and relevant KPIs; 2) willingness of putting a major employee/union concern in the limelight;
- The social impact category "Basic Human Rights Practices" groups in total 28 indicators. Only 25% of the reviewed papers discussed the issues related to this mid-point; and on top of that three sources (Global Reporting Initiative, 2006; KLD, 2008; Zhao et al., 2012) proposed 57% of these KPIs in total. This is a surprising result because it should be expected that the literature addressed these enshrined rights more in depth; rather than overlooking them. The low number of indigenous rights indicators might be related to the fact that indigenous peoples are nowadays very confined to some geographical regions, meaning that the supply chains' social impacts are hardly felt by these.
- The mid-point "Corruption in Business" gathers 33 indicators spread in only in 29% of the reviewed sources. Despite the fact that ethics is a cornerstone issue in business, these numbers reveal the poor interest in studying these issues further. Also, several international institutions (e.g. OECD; United Nations) have encouraged companies by issuing several conventions and business principles. Analogously to Human Rights' violations, corrupt practices cut across all industry sectors so it should be expected that the literature addressed more in depth this theme.

It is argued that the unbalanced categories' numbers are closely linked to the distinct cultural and scientific background of the authors. Since authors are influenced by distinct expectations from society, they may find relevant to propose different social KPIs in view of legitimating their studies (Roca and Searcy, 2012). In short, the wide latitude of Sustainability interpretations is translated into distinct sustainability concerns and different indicators.

Also, it is advocated that stakeholders' pressure may impact the level of detail of analysis within each mid-point: if the stakeholders shifted its priorities and concerns, the scientific community would be *enforced* to provide a more comprehensive analysis on certain social matters. The scientific community assessed what where the different stakeholder expectations and needs, and then proposed social indicators aiming at monitoring those. If a certain stakeholder group (e.g. activists and NGOs) demanded higher detailed analysis concerning corrupt practices, then companies would naturally develop new KPIs aiming at bridging this gap. In brief, the usage of certain social KPIs rather than others is related to stakeholders' expectations.

4.1.3. Linking the Mid-Points to the GRI End-Points

The ultimate objective of this framework is to link the categories to the main social areas of operation. This required following the previously established impact pathway (causal relationships) (see Figure 12). According to Jørgensen *et al.* (2010, p. 6), an impact pathway "*ensures that a certain indicator score has a certain predictable impact on the Area of Protection*". The UNEP/SETAC guidelines (2009, p. 70) argue that an "*end-point category seeks to represent the environmental damage caused to an Area of Protection*".

The best way to justify and group meaningfully these mid-points in broad areas of sustainability subjects is by using the GRI social categories: Labour Practices and Decent Work, Society, Human Rights, Product Responsibility. These aim at covering the most important social areas impacted by the businesses, thereby guiding decisions by the supply chain actors. Figure 20 presents the new taxonomy for the social impact categories (mid- and end-points), which systematises the database indicators. The sixteen mid-points were categorised as follows:

- Labour Practices and Decent Work end-point: six mid-points were allocated to this end-point. They strive to monitor the internal organisation-wide labour aspects mainly related to the employees;
- Society end-point: five mid-points have a cause-effect relationship with this end-point. They address the externalities that companies have on the local communities in which they operate but also to the society at large. Some mid-points disclose the implemented measures owing to minimise the social risks arising from businesses. Others map the risks and the impacts of illicit activities and non-compliance on the society;
- Human Rights end-point: two mid-points are related to this end-point. They assess different issues such as HR violations, HR training and awareness, processes for analysing and understanding HR issues both internally and across the supply chain;
- Product Responsibility end-point: two mid-points were linked to this end-point. The goal is to evaluate the social impacts and risks of products/services on the customers.
- One mid-point is linked to two different end-points: Labour Practices and Decent Work and Society.

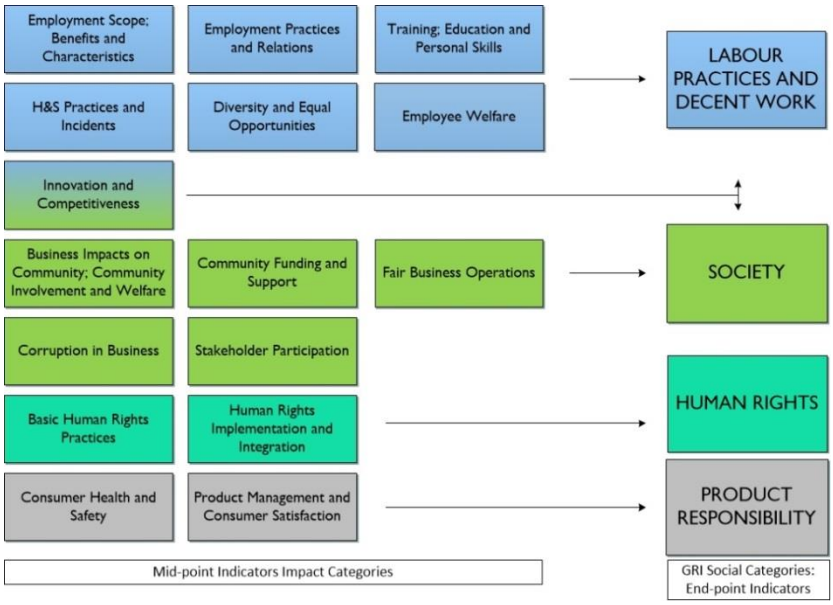

Figure 20. Established Mid-Points for Assessing Social Sustainability in Supply Chains

This comprehensive framework is primarily intended to run a systematised social sustainability assessment in supply chains through the identification of the main areas of social performance and social operations evaluated by these categories. The next section presents a generic framework which links these mid-points to the supply chain stakeholders.

4.2. SocialSCOR model

4.2.1. Scope and Methods

For the scope of the work, stakeholders were defined as “any identifiable group or individual who can affect the achievement of an organisation’s objectives or who is affected by the achievement of an originations’ objectives” (Freeman and Reed, 1983, p. 91). After defining in Section 4.1 the major areas that influence social performance, it is imperative to understand and outline how these mid-points are bound with the different supply chain tiers because all the stakeholders must take concerted actions and act the same way for continuous social improvement. Thus, this generic framework links the social impact categories and the internal and external drivers that influence social responsibility across the supply chain, leading to a roadmap of supply chain’s social impact assessment. The objective is to identify the highest priority relationships between the stakeholders and these mid-points. This approach is a step forward for understanding the possible stakeholder conflicts but foremost to optimise the implementation of sustainable strategies in supply chain management.

Four matrices considering the four end-points and including the correspondent mid-points were built, quantifying the number of indicators which cross-link these social indicators and stakeholders. Each matrix contains:1) the internal and external stakeholders, which influence the social issues in supply chain; 2) the mid-point categories identified from the database as the most relevant issues to assess a given end-point category. The numbers in the matrices represent the number of indicators presented in the database that link the stakeholders with the impact categories. Matrices should be read as a double entry table: both the lines and the columns may affect or are affected by each other and vice-versa.

The internal stakeholders are those who work directly within the business and the company or have shares of the company, whereas the external stakeholders are involved with the company in some form and are affected by its success or failure. The internal stakeholders are the employees and the shareholders/owners of the business. Employees are very important because many benefits can be derived from their engagement and commitment (e.g. higher productivity, loyalty, lower turnover). They possess the skills and know-how constituting the company core competences and they are active change agents responsible for business growth. In fact, the workforce needs to be credible, consistent and share their company’s goals to take the business to the next level. It is important to manage their primary concerns: job security; compensation management; respect and equal opportunities; truthful communication, among others. Shareholders and owners were included because they play also a major role: 1) they are a financing source (e.g. capital increase); 3) they influence and control the organisation’s operations by appointing board members which ultimately implement a strategic plan meeting their expectations; 3) they have a truly impact on corporate governance by voting policies

(e.g. code of conduct) which impact on sustainability. They care about succession planning, profitability, market share, among others. In brief, the internal stakeholders are crucial because they control a set of strategic resources within the company.

However, nowadays social impact assessment of SCs must also integrate the external stakeholders because they can severely affect the course and the success of a business by using their power and influence. In fact, conflicts between internal and external stakeholders may occur because they have different priorities and see the SC activities in different ways. The external stakeholders included were:

- Creditors are those entities which provide funds and liquidity for the SC's operations and growth. They are a major actor since nowadays the access to capital in some countries is very restricted. They expect to have a return on the investment made and their decisions may impact deeply impact sustainability if they refuse to grant credit;
- NGOs are a heterogeneous group of entities engaged with a wide range of activities (e.g. animal protection; human rights) and bringing citizen's concerns to public and private sectors. NGOs are critical because they help businesses to socially innovate and gain a new dynamism. By working collaboratively with organisations, they provide expertise helping them to make huge strides on human rights issues, environmental protection, among others.
- Government (and regulatory bodies) exert authority and supervision over the companies ensuring transparency, occupational safety, fair competition, taxation, among others. They are critical because they have the power to introduce new laws, conceive incentives and shut down operations in case of non-compliance;
- Customers are important because the success of the business relies on them and they are a source of revenue: companies must ensure their loyalty and satisfaction. Overall, the purpose of a company is to fulfil their needs by providing customer care, quality, value and ethical products.
- Competitors are those actors competing for the same resources and operating in the same market. They are relevant in the social sustainability context because their actions may affect the market dynamic as well as the way an organisation positions itself;
- Society is a broad notion describing the communities impacted by the supply chains. Supply chains shall make a notorious contribution to economic and social development of the societies by providing jobs, environmental protection and seeking involvement. They shall create wealth and wellness to the Society and enhance awareness of societal values and concerns.
- Suppliers provide companies with raw materials and services for the organisation to be able to run their operations. Suppliers are very important for different purposes: 1) failing to comply with quality standards affects the product; 2) failing to meet the deadlines may disrupt the operations and put the company at risk; among others.

4.2.2. Results and Discussion

<u>a) Labour Practices and Decent Work (LA) Indicators</u>

From Table 6 it is possible to observe that the most important mid-points for LA are "H&S Practices and Incidents" and "Employment Scope and Diversity; Benefits and Characteristics". The LA KPIs measure mainly labour-related aspects (internal aspects: e.g. health and safety at work; job security)

so, as foreseen, Table 6 indicates that the stakeholder “employees” is one of the most relevant within this end-point due to the fact that indicators mainly disclose labour-related issues (internal issues). It is worth mentioning that the stakeholder category “employees” include the workforce, its representatives and the unions.

Table 6. Labour Practices and Decent Work Matrix

	End-point Category	**Labour Practices and Decent Work**						
	Mid-point Categories / **Stakeholder**	Employment Scope; Benefits and Characteristics	Employment Practices and Relations	H&S Practices and Incidents	Training; Education and Personal Skills	Diversity and Equal Opportunity	Employee Welfare	Innovation and Competitiveness
Internal Stakeholders	Employees	142	39	170	87	93	44	51
	Shareholders/ Owners	62	21	146	87	10		51
External Stakeholders	Customers							
	Creditors							
	Suppliers							1
	Society and Public at Large	59		6				
	Competitors							
	Government and Policy Makers	123	11	55	31	92	21	51
	NGOs					87	44	12

The stakeholder “shareholders/owners” can affect or is affected by the LA issues (e.g. salaries and benefits granted to the employees; legal working hours and rest time). According to Table 6, one observes that “shareholders/owners” concerns mainly relate to the mid-points “Education; Training and Personal Skills” and “Health and Safety Practices and Incidents”. For instance, serious H&S incidents (e.g. fatalities) can severely affect the company reputation, the employee well-being and even shut down operations; meaning that these issues pose a risk to profitability and business continuity which are two major “shareholder/owner” concerns. Likewise, the Foxconn suicides episode in 2010 led both Foxconn and Apple stocks to plunge some sessions as the investors were protesting against poor Labour Practices. Shareholders/owners care also about succession planning in companies and hence they want to ensure that proper recruitment, training and educational programmes are put into practice in view of increasing human capital and knowledge.

“Government and Policy Makers” have the power and the obligation to implement new laws (e.g. health and safety requirements; minimum wage paid; gender financial equity) to better regulate the labour practices and provide a good working environment. Moreover, when supply chains do not account for government laws, their image is damaged and sales might decrease. A strong regulatory backlash may even ensue.

Additionally, 23% of the LA indicators relate to “NGO’s and Social Activists Groups” especially regarding the “Employee Welfare” and “Diversity and Equal Opportunities” categories as they strive to support employees in the quest of better and fairer working conditions. The company labour practices have also impacts on “Society and Public at Large” because the company business strategies may originate for instance 1) layoffs or 2) creation of new jobs in a region, which affect the communities’ prosperity and welfare on the long term.

b) Human Rights Indicators

The Human Rights KPIs focus on the company commitment to respect its workforce and on the internal procedures aiming at screening external business parties: “employees” are directly affected by the company’s conduct and can suffer from HR abuses (Table 7).

Table 7. Human Rights Matrix

	End-point Category	Human Rights	
	Mid-point Categories / Stakeholder	Human Rights Integration and Implementation	Basic Human Rights
Internal Stakeholders	Employees	50	28
	Shareholders/Owners	50	28
External Stakeholders	Customers		
	Creditors		
	Suppliers	41	12
	Society and Public at Large	50	22
	Competitors		
	Government and Policy Makers	35	28
	NGOs	50	28

“Shareholders/Owners”, “NGOs” and the “Society and public at large” (e.g. Human Rights Watch; United Nations; International Amnesty) are three identifiable groups which traditionally draw attention of decision makers to Human Rights because they may affect the company reputation and they are directly impacted by policies aiming at protecting HR.

The stakeholder “government and policy makers” have a paramount twofold purpose: 1) ensure human rights respect through regulatory bodies and agencies; 2) create new policies, regulations and control bodies aiming at protecting workers.

c) Society Indicators

Table 8. Society Matrix

	End-point Category	Society					
	Mid-point Categories / Stakeholder	Community Support and Donations	Business Impacts; Community Involvement and Welfare	Corruption in Business	Fair Business Operations	Stakeholder Participation	Innovation and Competitiveness
Internal Stakeholders	Employees	1	28	33	60	106	
	Shareholders/Owners	85		33	60	98	
External Stakeholders	Customers					80	
	Creditors		1		7	79	
	Suppliers		3	33	14	99	
	Society and Public at Large	91	206		1	77	12
	Competitors		1	16	14	8	
	Government and Policy Makers	68	124	29	57	83	51
	NGOs	86	181	32	24	85	12

From Table 8 it is possible to observe that that all stakeholders monitored in are related to the Society indicators: 1) the social impacts on society are cross-cutting them; 2) this wide latitude of social issues must be thoroughly managed by the supply chains practitioners towards reducing its impact.

“Government and Policy Makers” can induce sustainable changes in the supply chain practices through new regulation. Also they are directly interested in the functioning of supply chains, which influence society (e.g. through the creation of employment in rural areas and infrastructure

development). Government may define policies that may provide incentives and support promoting these actions.

The mid-points “Business Impacts; Community Involvement and Welfare” and “Stakeholder Participation” are the ones with most indicators: these numbers not only reveal a noteworthy engagement of the supply chains owing to improve the community social conditions and welfare but also indicate the growing importance of accounting for stakeholders in the decision-making process. All stakeholders relate to “Stakeholder Participation” because the organisations must maintain broad communication channels in view of understanding their expectations and requirements. It should be noted that the scientific community proposed some indicators that relate to the competitors (e.g. cooperation through cluster management networks).

The NGOs’ role within the society sustainability is very relevant because they actively supports the impacted communities as well as they pressure decision-makers to act. In turn, the “Government and Policy Makers” have the power to monitor the companies (e.g. Fair Business Operations). They can induce sustainable changes in supply chain practices through new regulation. Also, they are directly interested in the functioning of supply chains, which influence society (e.g. through the creation of employment in rural areas and infrastructure development) through the business externalities. Government may define policies that may provide incentives and support promoting these actions.

“Shareholders/owners” were linked to all indicators categorised in the mid-points “Corruption in Business” and “Fair Business Operations” because failing to comply with laws as well as the existence of illegal business practices may affect the 1) company reputation and public opinion; 2) the market share and 3) the profitability of the company. Also, it is argued that “shareholders/owners” are affected by the organisation’s objective to fund and support the impacted communities because it inherently diminishes the company profitability and revenues.

The stakeholder “employees” is mainly affected by the issues disclosed in the mid-points “Corruption in Business” and “Fair Business Operations”: 1) corruption is linked to illicit advantages and employee personal gains; 2) the fact that an organisation perform in an anti-competitive way or fail to comply with laws and regulations can lead to going out of business and consequently job extinction.

The stakeholder “competitors” may also be affected by the internal decisions of an organisation. In fact corrupt and unfair business practices (e.g. price dumping; cartel) may change the market structure, the market competitiveness and the market share. Thus it affects their revenues and economic sustainability.

The stakeholder “creditors” is a group capable of affecting the capacity of a supply chain has to achieve its objectives as it may refuse to grant credit if the company fails to comply with legal and regulatory requirements.

d) Product Responsibility Indicators

Table 9 shows that the stakeholders that most influence the PR indicators are “employees”, “customers”, “suppliers” and “government and policy makers”.

“Customers” impact both PR mid-points indicators because they are the ultimate judges of the product, receiving their positive and negative impacts.

Table 9. Product Responsibility Matrix

	End-point Category	**Product Responsibility**	
	Mid-point Categories / **Stakeholder**	Consumer Health and Safety	Product Management and Consumer Satisfaction
Internal Stakeholders	Employees	44	57
	Shareholders/Owners		1
External Stakeholders	Customers	44	63
	Creditors		1
	Suppliers	37	2
	Society and Public at Large		
	Competitors		
	Government and Policy Makers	10	14
	NGOs		

“Employees” and “Suppliers” hold the responsibility of properly designing and manufacturing products and services, meaning that their decisions affect a wide range of important product sustainability and specification aspects:

- For instance, a poor choice of the materials used to build the product by the engineers will influence the product performance and quality. They must ensure that the product complies with laws and regulations;
- The employees are also responsible for establishing good marketing strategies and good customer service/follow-up care;
- The employees must ensure that customer data is secured.

“Government and Policy Makers” still have an important role in establishing appropriate laws and regulations in order to protect the consumers.

4.3. Conclusions

This chapter presented two frameworks for assessing social sustainability in supply chains. Firstly, the mid-point impact categories were properly defined and their relevance was outlined. Then, relations between these categories and the four GRI end-points were established; thus linking these mid-points to renowned broad areas of social sustainability.

Secondly, in order to achieve social sustainability in supply chains, the strongest relationships between the supply chain stakeholders and these mid-points were mapped. Overall, the SocialSCOR framework made the bridge between the influence of stakeholders and the decisions taken in supply chain planning. Social issues turned to be a complex dimension of sustainability requiring practitioners to have a broader perspective to proper consider sustainability when designing supply chains. The framework suggests that social impact assessment of supply chains must incorporate an integrated view of internal and external stakeholders and should assess all these issues in a holistic way.

Overall, the goal of this analysis is to foster “win-win” situations and optimise mutual stakeholder benefits. In the next chapter, both frameworks are validated through two different approaches: 1) content analysis done on the sustainability reports of a sample of 142 worldwide sustainability leader organisations in order to test the relevance of the established mid-points and 2) a set of face-to-face in-depth interviews held with EU corporate managers in charge of sustainability. It is sought to understand what differences exist between what companies are reporting *versus* what companies are effectively working on with their partners to improve social sustainability. The main findings are presented and it is brought out the subsequent implications to improve the social impact assessment procedures in supply chains.

5. Validation

This chapter aims at testing and validating the frameworks. Section 5.1 presents the two deployed methods used in the validation processes. Section 5.2 talks about the content analysis performed on the subjects companies are reporting in CSR reports. Also, it explains the differences between the database findings and the software ones by comparing and relating them. Finally, section 5.3 presents case study in-depth interviews on selected companies that assess what they actually do in terms of social sustainability practices.

5.1. Validation Methods

The developed frameworks in the previous chapter were validated with companies on two different levels: what they report *vs.* what they actually do. Hence, the following methodologies were used:

1. Content Analysis performed by computer software on CSR reports will enable to understand what companies are reporting to the stakeholders and the general public in the different SC echelons. This is an excellent method to analyse in which ways companies are making the bridge between their internal policies, their supply chains and their external stakeholders based on the frameworks' validation.
2. Face-to-face in-depth interviews with 7 companies in 7 industries to validate both frameworks and reinforce the testing process. These are essential to get to the bottom of the social sustainability matters by collecting on-site insights about what they do.

5.1.1. Computer-Aided Text Analysis (CATA)

<u>Content Analysis</u>

"*Content Analysis is a process for systematically analysing messages in any of communication*" (Kondracki *et al.*, 2002, p. 224). This scientific method enables developing objective inferences about a subject of interest in any type of communication by deploying a set of quantitative or qualitative research approaches (Kondracki *et al.*, 2002; Seuring and Gold, 2012; Tangpong, 2011). This approach is considered very helpful to empirical research as a mean of analysing large amounts of qualitative content and data found in interviews, reports, etc. (Duriau *et al.*, 2007; Tangpong, 2011), which it is particular good to organise and classify the empirical content in a structured way. The development of computer-aided text analysis (CATA) set a novel way of performing an innovative approach to content analysis by (Duriau *et al.*, 2007; Morris, 1994): 1) enhancing the scalability of the method; 2) increasing the handling of large data content through the organisation and automation of numerous processes within the methodology; 3) gaining access to dictionaries, data storage and word count functions; 4) increase analysis speed, reliability and slashing the costs by saving time.

For the scope of this CATA, it was employed a direct content analysis whose goal is to "validate or extend conceptually the theoretical framework or the theory" (Hsieh and Shannon, 2005, p. 1281). In particular, Hsieh and Shannon (2005) argued that quality of a content analysis and its trustworthiness rely significantelly on the construction of a reliable coding scheme.

Data Sources, Sampling and Description

In order to conduct a CATA, the evaluated content data had to be thoroughly selected owing to avoid unrepresentativeness and biased results (Kondracki *et al.*, 2002). Kondracki *et al.* (2002, p. 227) stated that "the population of the text to be studied must be adequately defined, and sampling must be systematic". Bearing this in mind, a set of sustainability reports were selected based on the following criteria:

1) The assessed companies must report its sustainability performances based on either the version G3.0 or G3.1 of the GRI Guidelines (Global Reporting Initiative, 2006, 2011) because it yields the same reporting processes and principles, which in turn provides a comparable and resembling structure.
2) It was strived to evaluate companies recognised as sustainability leaders in the several industries and organisations that continuously seek to commit to sustainable development principles. To this end, the ranking in The Sustainability Yearbook was used which is listed in the Dow Jones Global Index. Organisations belonging to one of the following twelve industries: (1) Mining, (2) Oil and Gas, (3) Materials, (4) Utilities, (5) Industrials, (6) Consumer Goods, (7) Electronics, (8) Automotive, (9) Transportation and Logistics, (10) Retail, (11) Telecommunications, and (12) Financials were selected. These industries were judged to include all important SC echelon genres and thereby provide a trustworthy picture of a supply chain. Basically, these industries may be divided in three distinct echelons, as follows: (1-4) include raw material extraction at the upstream tiers of the SC; (5-8) the midstream tiers which encompass production and assembly activities; and (9-12) which represent the downstream tiers of SCs such as sales and services.
3) Only stand-alone sustainability reports were picked since it is difficult to compare information integrated in annual reports as they frequently vary in terms of length and content. All the evaluated reports in this content analysis were only written in English.

The sample saturation happened when it was not possible to select sustainability reports which fulfilled the aforementioned criteria. In brief, the sample gathers sustainability reports from 142 companies spread across the twelve industries from 25 distinct countries (see Table C 1): more than 13.000 report pages were analysed in total. Ultimately, the extensive scale of the sample in comparison with other studies is considered to be not only beneficial but also a prerequisite as this work strives to evaluate a generic supply chain from a macro point of view.

Coding and Tools

The established coding scheme used in the CATA lays directly in the newly established mid-points and their related social sustainability subjects. In other words, these subjects disclosed in these impact categories were used to build a good coding scheme which was progressively corrected and fine-tuned throughout the renowned analysis process suggested by the Weber Protocol (Weber, 1990).

For the scope of this CATA, the Word was used as the recording unit for coding the 142 sustainability reports (see Table C 2): instead of performing a simple word count, a semantic analysis on the coded *sustainability-related* words was run, meaning that words were classified according to their meaning and connotation. Then, the sixteen mid-points were used as coding categories to classify each of the

coded words in the ontology. This means that the each word is context-specific and that the categories are mutually exclusive (Tangpong, 2011), which is very important for running a statistical analysis.

The textual content of the reports was then extracted, rearranged and saved in a text file which will serve as an input to the software analysis. For this CATA, the coding software called Tropes V8.4 (Semantic Knowledge, 2011) was used: it enables to describe the textual and structural organisation of the reports as well as it helps to minimise the underlying subjectivity associated to the analysis. This software employs both a complex textual semantic analysis of the input data as well as statistical methods which allow 1) retrieving the major concepts; 2) understanding the semantic relationships between the words; 3) building a semantic network (Semantic Knowledge, 2011). This means that Tropes groups closely related nouns into semantic classes which are in turn categorised in each of the sixteen categories. Basically, a social sustainability *scenario* (ontology) was built by defining and personalising key word classification in each of the mid-points (Semantic Knowledge, 2011). This whole process involved some iterations and rework of the coding scheme. Finally, the output provided the number of relevant word occurrences listed in the ontology for each category according to the 3 SC echelons (see Table C 3). This statistical data was extracted and analysed in Excel.

Validity and Reliability

The literature stressed that is it crucial to ensure validity and reliability when applying a content analysis research method, because the findings stem from highly subjective judgements during the coding process (Duriau *et al.*, 2007; Seuring and Gold, 2012).

a) Validity

Firstly, the developed coding scheme had to be "faithful to the theory in its orienting coders to the focal concepts" (Potter and Levine-Donnerstein, 1999, p. 266). In practice, this means (Duriau *et al.*, 2007; Weber, 1990): 1) testing the preliminary coding scheme in several sustainability reports; 2) assessing the accuracy and the reliability of the coding scheme; 3) revising the coding rules until satisfactory results were obtained.

According to Tangpong (2011), one of the major problems relating to CATA is the fact that computers are not able to make judgements and semantic interpretation on the text. Hence, the involvement of three different researchers enabled 1) increasing the semantic validity of the established code; 2) ensuring a systematic and uniform approach to the process; 3) improving and fine-tuning the coding scheme (Duriau *et al.*, 2007; Flick, 2006; Seuring and Gold, 2012).

b) Reliability

Duriau *et al.* (2007, p. 22) argued that "the use of computers addresses many of the reliability concerns associated with manual coding". Due to the fact that "coding rules are made explicit, […] [it] ensures perfect reliability and comparability of results across texts" (Duriau *et al.*, 2007, p. 22). Also, using several coders is a good way to secure reliability (Duriau *et al.*, 2007; Krippendorff, 2004). CATA simplifies the traditional methods for ensuring reliability: it is only needed to deal with accuracy because both stability and reproducibility of the protocol are guaranteed by the machine (Krippendorff, 2004).

5.1.2. Face-to-Face In-Depth Interviews

Face-to-face verbal in-depth interviews enables testing, validating and getting further feedback from the two frameworks established within this study. Overall, conducting interviews became a popular method to gather and verify data (Fontana and Frey, 2000). The purpose of conducting these in-depth interviews had a twofold goal: 1) assess quantitatively the importance of each of the sustainability pillars; 2) understand and depict the perspectives and opinions that several sustainability experts had about the established mid-points.

Generically, a semi-structured interview may be described by a set of an open question followed by hypothesis-directed and probing ones about several pre-determined topics picked by the interviewer (Flick, 2006). Semi-structured interviews were chosen because they were considered to be the best fit to address subjective theory (such as social sustainability) and to apply grounded theories (Flick, 2006). The purpose of using a semi-structured interview is to let the interviewee answer based on his explicit and implicit assumptions about the theory in study, thus capturing the most of his knowledge about the discussed topics. Put it simple, semi-structured in-depth interviews allow not only to deeply exploring the interview's opinion about the discussed topics, but also to validate the collected empirical material during the research process through the presentation of several figures.

An interview guide composed by open, hypothesis-directed and probing questions was prepared because it enabled "*the researcher to deal more explicitly with the presuppositions they bring to the interview in relation to the aspects of the interviewee*" (Flick, 2006, p. 160). Firstly, open questions attempt to capture the interviewees' knowledge about a specific topic without imposing any *a priori* categorisation that may limit the field of inquiry and the answers (Fontana and Frey, 2000); meaning that the interview may answer on the basis of his immediate knowledge and opinion. Secondly, hypothesis-directed questions strived at "*making the interviewee's implicit knowledge more explicit*" (Flick, 2006, p. 156). These enabled the interviewee to confirm or reject the researcher's theoretical assumptions, making more perceivable the aspects to improve and fine-tune. Thirdly, probing questions responded *"to the theories and relations that the interviewee has presented to that point in order to critically re-examine these notions in the light of competing alternatives*" (Flick, 2006, p. 157); pushing the interviewee to make inferences and deductions about his/her statements along the interview. In the next sub-section, the main findings and major trends stemming from the computer-aided content analysis are comprehensively discussed and put into perspective.

5.2. CATA Results and Discussion

5.2.1. Results

After scanning the three SC echelons separately in Tropes (see Table C 3), the results showed quite homogenous numbers in the three echelons concerning the percentages in each of the four GRI social categories for the three echelons: Society first; LA second; PR third and HR in fourth place. Also, "Stakeholder Participation" had approximately more than 23 percentage points in each of the three echelons in comparison with the second most accounted.

Overall, it was observed that the end-point “Society” had larger percentage than the other end-points. Since there is a certain parameter uncertainty linked to all models, it was decided to 1) test the ontology for validity and accuracy; 2) search for errors in the ontology; 3) simplify the ontology; and 4) calibrate the ontology. A more detailed analysis was conducted in the two most accounted mid-points: 1) the topic “list of stakeholders” which identifies both internal and external stakeholders got 73% in all three echelons within “Stakeholder Participation”; 2) the semantic class related to the words “customer” and “consumer” (e.g. client; etc.) accounted for high percentages in the mid-point “Product Management and Consumer Satisfaction”. As these topic and words are very common, they were clearly biasing the overall results. Thus it was opted to remove them from ontology in view of understanding their impact on the final output, making it more robust.

Hence, a refined analysis (see Table 10) with the GRI end-points and the established sixteen mid-points was obtained; ensuring the trustworthiness of the data. In Table 10 the results present the sixteen mid-points categorised into each of the four GRI end-points, in line with Figure 20 of the SLCA framework. Also, Table 10 discloses the absolute word count for each mid-point and their relative frequencies to the total number.

Table 10. Tropes Social Ontology Results from the Reports (Refined Version)

Synopsis							
		Word Count	**Total %**	**Word Count**	**Total %**	**Word Count**	**Total %**
		DOWNSTREAM		**MIDSTREAM**		**UPSTREAM**	
LA	Employment Scope; Benefits and Characteristics	3899	6,32%	4859	4,85%	3920	5,71%
	Employment Practices and Relations	404	0,65%	564	0,56%	322	0,47%
	H&S Practices and Incidents	5769	9,35%	10805	10,79%	9561	13,93%
	Training; Education and Personal Skills	6506	10,54%	10588	10,58%	6174	8,99%
	Employee Welfare	877	1,42%	996	1,00%	601	0,88%
	Innovation and Competitiveness	5454	8,84%	9260	9,25%	6941	10,11%
	Diversity and Equal Opportunities	1136	1,84%	1072	1,07%	846	1,23%
Total	**LA**		**38,96%**		**38,11%**		**41,31%**
HR	Human Rights Implementation and Integration	1962	3,18%	3496	3,49%	2776	4,04%
	Basic Human Rights and Practices	346	0,56%	552	0,55%	424	0,62%
Total	**HR**		**3,74%**		**4,04%**		**4,66%**
S	Community Support and Funding	3061	4,96%	3657	3,65%	2467	3,59%
	Business Impacts; Community Involvement and Welfare	7077	11,47%	11396	11,38%	7792	11,35%
	Corruption in Business	6302	10,21%	9388	9,38%	6753	9,84%
	Fair Business Operations	4723	7,65%	7904	7,90%	5952	8,67%
	Stakeholder Participation	9122	14,78%	11817	11,81%	8719	12,70%
Total	**Society**		**49,07%**		**44,12%**		**46,15%**
PR	Consumer Health and Safety	1037	1,68%	2901	2,90%	1068	1,56%
	Product Management and Consumer Satisfaction	4038	6,54%	10842	10,83%	4340	6,32%
Total	**PR**		**8,22%**		**13,73%**		**7,88%**
	TOTAL	**61713**	**100%**	**100097**	**100%**	**68656**	**100%**

According to the Table 10, it is possible to observe that:

- Overall, the ontology fully validates the SLCA framework (see Figure 20) because all the established mid-points are described in the CSR reports. Firstly, coded keywords from all the categories are found in all reports and it is possible to ascertain which words and categories were the most relevant for the companies;
- The percentages associated to the four GRI categories are (see Table 10): between 38,11% and 41,31% for the LA; between 3,74% and 4,66% for the HR; between 44,12% and 46,15% for Society and finally between 7,78% and 13,73% for the PR category;

Statistical Analysis

It was sought to further investigate if there was statistical significance between the results from the CATA refined ontology in the three echelons of the SC in relation to the sixteen established mid-points. According to the literature review results (see Section 3.3), almost half of the papers sampled for the database construction were published in UK and US journals. Due to huge data variety and time constraints (individual data treatment of the 142 CSR reports), a sample of 27 different UK/US companies were selected based in the following two criteria: 1) picking the lowest common number of UK and US companies within the echelons, *i.e.*, each of them gathered 9 companies in total; 2) calculation of the mean page value for the reports in each SC echelon and picking those which had a closer value to them. But due to the fact that the whole sample included much more UK/US companies (more than 25% of the total sample), the overall results from Table 10 were included in the sample not to miss important data (n=30), thus constituting a very first numerical approximation towards analysing the differences between the three SC echelons.

A one-way Analysis of Variance (ANOVA) was run on the sample composed by three different groups (the three echelons) in order to analyse whether or not their means were equal. The ANOVA model was used for testing the three SC echelons for statistical significance: it aimed at evaluating if the type of SC echelon influenced the percentages within each of the sixteen mid-points (see Table 11). When the null hypothesis is rejected ($F > F$ critical or *P- value* ≤ 0.05) (see yellow coloured cells) , it is assumed that the means of the sampled populations are not equal (null hypothesis rejection), *i.e.*, they are considerably different to be uniquely due to sampling fluctuations. In this case there is statistical significance between the samples, which means the results are unlikely to have occurred by chance alone: there is evidence that the supply chain echelon influences the percentages in that mid-point.

However, these ANOVA have a limitation: due to the relatively small sample size, it is not possible to ensure that the distributions of the residuals are Normal. Although the literature affirms that “the one-way ANOVA's F-test is robust for validity against non-normality, […] it may not be the most powerful test available for a given non-normal distribution” (PROPHET StatGuide, 1997). Hence, a non-parametric test, which may have greater efficiency on non-normal data samples, was used. The following paragraphs describe the obtained results by applying the Mann Whitney U test (see Appendix C 1 and Appendix C 2).

The Mann Whitney U (MWU) test analyses whether two samples are drawn from the same distribution. The main advantage of the MWU test is that its efficiency is higher in comparison with the t-test on non-normal distributions (Bridge and Sawilowsky, 1999; Easton and McColl, 1997).

Table 11. Results from the statistical analysis performed on the CATA refined ontology results

Statistical Analysis								
	Mid-Points	**ANOVA**	**t-test: P(T<=t) (two-tailed)**			**MWU: Exact Sig. (two-tailed)**		
		P-value	**D *vs.* M**	**D *vs.* U**	**M *vs.* U**	**D *vs.* M**	**D *vs.* U**	**M *vs.* U**
LA	Employment Scope; Benefits and Characteristics	0,016	0,015	0,372	0,014	0,019	0,280	0,023
	Employment Practices and Relations	0,800	-	-	-	0,971	0,684	0,684
	H&S Practices and Incidents	0,003	0,125	0,001	0,057	0,105	0,002	0,075
	Training; Education and Personal Skills	0,901	-	-	-	0,912	0,481	0,971
	Employee Welfare	0,121	-	-	-	0,912	0,165	0,052
	Innovation and Competitiveness	0,121	-	-	-	0,684	0,280	0,052
	Diversity and Equal Opportunities	0,357	-	-	-	0,436	0,393	0,579
HR	Human Rights Implementation and Integration	0,094	-	-	-	0,247	0,029	0,529
	Basic Human Rights and Practices	0,644	-	-	-	0,315	0,315	0,912
S	Community Support and Funding	0,123	-	-	-	0,123	0,165	0,393
	Business Impacts; Community Involvement and Welfare	0,039	0,316	0,022	0,088	0,393	0,015	0,063
	Corruption in Business	0,776	-	-	-	1,000	0,631	0,796
	Fair Business Operations	0,671	-	-	-	0,853	0,315	0,247
	Stakeholder Participation	0,018	0,015	0,009	0,746	0,004	0,011	0,393
PR	Consumer Health and Safety	0,013	0,029	0,706	0,005	0,063	0,912	0,007
	Product Management and Consumer Satisfaction	0,002	0,007	0,477	0,002	0,015	0,353	0,007

5.2.2. Discussion

<u>Refined version of the social ontology (see Table 10, Figure C 1 and Figure C 2)</u>

According to the Table 10, it is possible to observe that:

- The percentages of the "stakeholder participation" mid-point decreased approximately 2,5 times (in comparison with the original scenario) to 14,78% for the downstream, 11.81% for the midstream and 12,70% for the upstream. This mid-point still got the higher relative frequencies in the downstream and midstream echelons, but drops to second place in the upstream echelon. It is concluded that the stakeholder importance stands out in the elaboration of the sustainability reports in comparison with the other fifteen mid-points;
- The four most disclosed mid-points remain the same in the three echelons with the exception from the "product management and consumer satisfaction" which is no longer ranked among the four most disclosed categories in the downstream echelon (see Table C 5);
- The results showed that as it goes upstream in the supply chain, the percentage of occurrences associated to the mid-points "Human Rights Implementation and Integration" increase whereas the "Employment Practices and Relations", "Employee Welfare", "Business Impacts; Community Involvement and Welfare" issues decrease. These are *normal* trends as many upstream industries (e.g. mining; oil and gas) operate in *Third World* countries (e.g. Nigeria; Mozambique) where the

respect and awareness for Human Rights are very poor and not as strong as in the EU or the USA. Holding a poor human rights respect record damages the company reputation and affects the economic sustainability of the supply chain. This reality is inherently linked to contentious relationships with the unions, the loss of employee welfare and the weak labour rights within the supply chain;

- Similarly as it goes upstream in the supply chain the percentage of the social category "Fair Business Operations" increase due to similar reasons: 1) upstream companies tend to lobby and fund political parties especially in Third World countries for gaining business advantages; 2) since a restrict number of companies control most of the worldwide raw materials, there is a higher propensity for these companies to be involved in anti-trust litigations and anti-competitive behaviour (e.g. lysine price-fixing in the mid 1990's); 3) market efficiency reasons make some companies operate in a monopoly (e.g. utilities industry), thus increasing the risk of violating the principals of compliance with laws;
- The percentages of the mid-point "H&S Practices and Incidents" increase from downstream industries to upstream industries. These are considerably more dangerous due to their severe risk exposure and therefore they must comply with a large number of environmental, security and safety regulations (e.g. nuclear power industry; offshore drilling and hydrocarbons extraction; steel plants);
- Table 10 indicates that the upstream and midstream echelons are more interested in "Innovation and Competitiveness" than the Downstream. This shows that upstream companies, which sell homogeneous products, are trying to differentiate from the competition as much as possible;
- The further downstream the supply chain, the higher the percentage of words related to "Community Funding and Support" meaning that these organisations are more philanthropic than the Midstream and Upstream ones. Since the downstream companies are closer to the end-customer and the communities, this may indicate that they might better understand the community needs.

All in all, it was found that stakeholder issues are a matter of the utmost importance within the social sustainability context being the leader mid-point in the original and the refined ontologies (except upstream echelon). Since companies are trying very hard to integrate in their SCs, this shows that organisations are trying to achieve it by establishing a close relationship with their stakeholders. Indeed, they strive to: 1) understand and allocate the necessary resources owing to satisfy the stakeholders' needs; 2) establish the negotiation process in view of stakeholder involvement and conflict management; 3) implement a pro-active culture within the company in order to better manage the impacts; (Freeman and Reed, 1983). This translates the predisposition of the companies in assessing the externalities and communicating them properly.

CSR reports are documents addressed to stakeholders and which aim at putting them in the limelight. The main purpose of these reports is to lay emphasis on the impacts on different stakeholders and to present mitigation actions. CSR reports are rather effective communication channels whereby the companies aim at involving as much as possible the stakeholders; *i.e.*, there is an underlying marketing communication approach directed to them that truly intends to enhance the positive actions in favour of them. Corporations are very keen on gaining exposure to diverse audiences and they use the CSR reports as vehicle to promote themselves to the public and to persuade the stakeholders to build mutually beneficial relationships. Companies can create a *win-win* situation by setting unambiguous social and environmental principles and stick to them: 1) their operations become more

sustainably driven; 2) they might increase trust and reputation in the eyes of the consumers by telling its story. Put simply, organisations use the sustainability reports as a mean of public relations, *i.e.*, it is a strategic communication process for the purpose of making it more alluring to work at.

Overall, this ontology simplification enabled testing the robustness of the results and assessing their validity because there are not significant changes in the four most disclosed mid-points in the three echelons (see Table C 4 and Table C 5): this means that it is possible to clearly identify the priorities of each echelon concerning the social sustainability approach. In the next paragraphs, statistical analyses are depicted in view of gaining a better insight on the CATA results.

Statistical analysis (see Table 11)

ANOVA

According to the ANOVA results (see Table 11), the null hypothesis of equality of means (H_0) was rejected for the following mid-points (see yellow coloured cells): 1) "Business Impacts; Community Involvement and Welfare"; 2) "Consumer Health and Safety"; 3) "Employment Scope and Diversity"; 4) "H&S Practices and Incidents"; 5) "Product Management and Consumer Satisfaction"; 6) "Stakeholder Participation". For these six categories the ANOVA indicated that there are differences between the group means: there is at least one difference between the SC echelons, but at this point it is not possible to know where that was. Therefore, it was necessary to run F-tests and t-tests in each of these to evaluate which populations were different from each other (three pairwise comparisons between the SC echelons were run) (see green coloured cells).

The statistical results enabled to conclude that the percentages stemming from the refined ontology showed indubitably lack of agreement on some information that companies disclose in all three SC echelons which in turn explains the differences in the software results (see Table 11):

- The PR mid-points show statistical significance between the SC echelons: in both case the Midstream industries present significantly different results compared to the Upstream and Downstream ones;
- There are significant differences between the Downstream and the Upstream percentages concerning the mid-point "Business Impacts; Community Involvement and Welfare" which confirm the arguments previously presented in this sub-section;
- There is differences between the Downstream and the Upstream percentages concerning the mid-point "H&S Practices and Incidents" which corroborates the tendency presented in Table 10;
- Downstream companies present differences in the "Stakeholder Participation" mid-point in comparison with the Midstream and Downstream companies;
- The statistical analyses indicated the H_0 was always accepted for the two HR mid-points.

Mann Whitney U test

Overall, the MWU results confirmed the ANOVA and the t-test results:

- The null hypothesis was rejected for those same 6 mid-points, meaning that there is statistical significance between those Tropes percentages (see orange coloured cells). Also, it is possible to point some differences: 1) given that it is a different statistical test, the *P- values* are different than those of t-test; 2) in the "Consumer Health and Safety" mid-point, the MUW test reported that only the

Midstream and Upstream populations were different in contrast to the t-test which indicated that Midstream population is significantly different from the Upstream and the Downstream ones.

- The MWU tests showed that the null hypothesis had to be rejected in “Human Rights Implementation and Integration” mid-point between the Upstream and Downstream samples. This corroborates the arguments presented in sub-section 5.2.1, which claim that the upstream industries have a higher concern to implement proper Human Rights policies.

In essence these comprehensive and robust statistical analyses (ANOVA + MWU) aimed at identifying which mid-points importance were homogeneous and did not vary across the three supply chain echelons because they can be clearly useful in the context of an overall social assessment of the supply chains. Secondly, those mid-points which presented heterogeneity in the percentages between the echelons have to be analysed and assessed in a more detailed way to run a social assessment of a supply chain. In fact, there are several arguments supporting these evidences:

- There may be a lack of communication and integration between the different SC echelons, which is a matter of the utmost importance in SC alignment and design;
- There may be a specific context that justifies the differences in the attached importance to these mid-points, thus explaining their percentages’ heterogeneity (e.g. financial services do not pay much attention to the mid-point “consumer health and safety”).

Hence, this means that for the mid-points presenting statistical significance, it may have to be done a multiple-criteria decision analysis by giving weights (prioritising) to the mid-points in each SC echelon.

Also, these statistical analyses enabled reinforcing the argument that depending on the echelon that each company is operating in the supply chain, they show different social sustainability concerns and different approaches on how to address and tackle social sustainability issues. This finding can be justified based on the following topics:

1. Each company and each industry have their own sustainability agendas and address social sustainability in distinct ways. A significant part of the sustainable development strategies in supply chains depend on the stakeholders’ expectations and pressures which vary considerably from one industry to another. This denotes that it is not possible to rigidly frame sustainability issues and establish a predetermined guidebook for social sustainability measurement. The findings show that there is heterogeneity regarding the subjects that companies are monitoring in their sustainability reports. No two businesses are the same which implies that there is an inherent complexity in sustainable development linked to SSCM design.
2. Sustainable development within the SC is intrinsic 1) to the organisational culture; 2) the country precepts; 3) ability to influence the upstream and downstream tiers. There are distinct perspectives that cannot be overlooked when it comes to social sustainability: this means that there may be a conceptual clash that cannot be disregarded in terms of sustainability vision. Since supply chains operations are scattered worldwide, there is a problem of acting in a coordinated way at the strategic level and often there are decision power asymmetries and differentials in SCs. This reveals the already existing complexity in SCs, which this dissertation demonstrates.

The following section discourses on the relations between the database results and the CATA ones.

5.2.3. Comparison and Relations between the Database and the CATA: Summary

From the previous analysis and discussion it is possible to conclude that:

- First, the established database contains social KPIs from the scientific literature whereas Tropes provides a semantic analysis technique based on occurrences of relevant words (Semantic Knowledge, 2011) from the sustainability reports from several companies. The database only contains a structured list of social KPIs aiming at translating the key sustainable development issues for the Academia. As to what concerns the CATA analysis, it analysed the full sustainability reports of 142 different worldwide companies rather than only assessing the social sustainability indicators proposed by them. Tropes evaluated what organisations state and report to the general public and not only what they measure: the CATA provided a holistic picture of social sustainability based upon the established social ontology. Moreover, Tropes findings were greatly dependent on subjective judgments (word classification) made during the construction of the ontology which creates some uncertainty. This explains some variability in the results between the database percentages and the software percentages regarding both the mid-points and the four GRI social categories (see Table 12).

Table 12. GRI percentages: CATA *vs.* Database

	CATA	Database
LA	[38,96; 41,31]%	47%
S	[44,12; 49,07]%	39%
HR	[3,74; 4,76]%	6%
PR	[7,88; 13,73]%	8%

- Second, there is no wrong or right path to assess social sustainability in supply chains. The GRI percentages from the database and from the software are quite different: Society aspects are ranked first in Tropes and second in the database, while LA aspects have the highest percentage in the database relegating the Society issues to the second place. It underlines 1) that the Academia reports social impacts on different bases; 2) the different approaches that the companies and the scientific community have taken in assessing social sustainability. While the scientific community seeks to evaluate the supply chains social impacts within the employment and labour scope, the companies prefer to discuss sustainability more within the society context (see Table 12). FitzGerald and Cormack (2006) stated that the improvement of the contribution that companies make to the society has to begin internally: this may explain why the scientific community gives priority to the LA category.

  Companies have to *invest* first internally before addressing external sustainability issues: it is important to score a good internal social performance with their own operations, thus demonstrating its engagement in becoming more transparent, more accountable and more sustainable. Looking internally allows the organisations to make the necessary changes in corporate governance in order to set new objectives and new responsibilities aiming at strengthening its duty towards its workforce. Companies have to be equipped with strong internal tools and performance management systems in view of increasing internal process quality (e.g. ISO 14 000). In brief, the scientific community is more concerned how the companies manage the operations and treats its workforce as it provides a strong basis for assessing their commitment towards the improvement of social performance.

These 142 sustainability leader companies put more emphasis on impacts on society in general because the large majority of them have already fairly tackled internal sustainability issues meaning that they are quite at ease with the social practices within the company. Hence, it is expected that they are already managing social impacts in a broader perspective 1) through its value chain with the stakeholders and 2) through philanthropic contributions. In particular, they are eager to demonstrate to the investors/general public that they are an appealing option to consider as they make positive impacts in SCs. Furthermore, if the communities do not perceive the companies to be committed to them and to improve sustainability performance, they will ultimately shift their customer choice to the competitors.

- Third, the social indicator database contains papers addressing social sustainability from all supply chain echelons, whereas in the Tropes it was analysed social sustainability in supply chains with higher degree of detail by clearly dividing them in three echelons. Actually, there are several papers whose findings are based in several industries from multiple echelons (e.g. see Closs et al. (2010)) originating a mismatch of information and lack of distinction between the findings within each echelon.
- Fourth, there are touch points between the social database and the Tropes. Both the social indicator database and Tropes (all three SC echelons) results revealed that LA and Society aspects are the most discussed, whereas PR and HR remain in the background. There is a better theoretical support to approach certain social impacts rather than others. The database and the CATA indicated that the mid-points "business impacts; community involvement and welfare", "H&S practices and incidents" and "stakeholder participation" are on top of the priorities of the scientific community and the companies. Also, HR issues were always the least accounted GRI category in all the analyses. Notwithstanding, since sustainability can be assessed at different levels it is argued that this *status quo* can shift if the stakeholders push the companies to disclose HR performance with more specific KPIs.

5.3. Face-to-Face In-Depth Interviews

In this section, the answers to questions that enabled to validate the mid-point impact categories are presented. Due to space constraints, only the most relevant answers and topics of the seven interviews are herein discussed. In the appendixes, the companies' sampling description, the interview guide and the remaining answers of the interviews are provided (see Appendix D 1, Appendix D 2 and Appendix D 3 respectively).

- <u>Analysis of the social sustainability in the 3BL context (see questions A.1, A.2, A.3)</u>

Overall, all the interviewees stressed the importance of applying the 3BL principle as a whole across all the business initiatives. Tables D.2, D.3, D.4 (see Appendix D 2) show that these companies have realised that integrating the three dimensions altogether in daily management decisions is the only way to achieve truly corporate sustainability, meaning favouring equal treatment between the dimensions. On the one hand, the interviewees 1/2/3/6 underlined the utmost importance of the economic pillar within the business: "we considered that without economic sustainability we cannot do business" (interviewee 6). On the other hand, interviewees 1/2/3/4/6 also acknowledged the growing importance of incorporating the other two pillars in shaping the management decisions and taking the

companies to the next level: 1) “A set of environmental and social actions results in adding value to the value chain but also to people and communities” (interviewee 6); 2) “we work with sustainability because we realised that we are operating in an extremely complex market strategic in the present and the future: our business cannot be run without all three of them” (Interviewee 1). Put it simple, it is not possible to differentiate the importance of the pillars because the systems present nowadays strong interdependencies (“the pillars are equally important and one cannot exist without the latter” (interviewee 4)) that will ultimately influence both sustainability and the operations in all possible strands: it creates imbalances and instability in the long-term in supply chains.

- Companies’ approach to assess sustainability (holistically) (see question A.7)

Based on the respondent answers there are two ways to assess social sustainability at the companies: the strategic approach and the operational approach. On the one hand, the strategic approach has been planned by all seven companies, and deals with managing the sustainable development of the business at a macro level, *i.e.*, the vision, the mission, the board and the top management. Companies 1,3,5 consider that sustainable development must be present in business operations at all levels because “ […] it is all about risk management and perception. Sustainability policies are a way to save money because if we have incidents or accidents we have to pay indemnities for damages.” (interviewee 3). These companies are constantly performing a careful risk management of the potential and real threats to business continuity. On the other hand, businesses have to be successful and show profitability in the short-term because if they do not, then they cannot pay dividends to their shareholders and businesses we’ll go out of business: “[…] it is always a contradiction in the power dogs between the short-term and the long-term” (interviewee 5).

The strategic approach constitutes an essential step to frame the basic key issues of a firm’s performance and to set the rules of the end game. In order to achieve this, companies deploy similar strategies: internal and external stakeholder regular consultation processes. It is a continuous process and where they are all the looking to build knowledge and understand their stakeholders: 1) companies 1,2,7 consult with the stakeholders at the beginning of each fiscal year resulting on the establishment of the materiality matrix priorities for that year; 2) companies 1,5,6 promote workshops and seminars with their suppliers (e.g*. beacon days*). In other words, companies are shifting their way of managing sustainability from a *purely marketing communication approach* directed to captive investors and customers towards a new attitude to “ensure that this is the right way to do things, how we embody our mission of sustainability within our strategic reframing” (interviewee 2).

Also within the strategic level, this is a growing trend for the companies to empower sustainability within the organic company structure, meaning that there are formal committees, departments or bodies in charge of managing sustainable development within the company. Interviewees 1,4,7 mentioned that its organisation had sustainable development committee/department responsible for 1) integrating sustainability in business operations; 2) identify and assess the opportunities and risks related to sustainability; 3) coordinate cooperation with internal and external stakeholders (especially NGOs) ensuring that the sustainability policies are met.

The operational approach aims at translating the goals of sustainable development in the day-to-day business. The companies emphasising this approach are implementing sustainable principles crosswise the company structure, rooted in their culture and in every single employee, through new processes and procedures. Namely, companies 1,3,7 possess strong internal processes and procedures that culminate in specific actions affecting a wide range of employees. Company 1 possess a sustainability department and an autonomous company fully dedicated to innovation and to track what are the worldwide sector best practices. Company 1 sees sustainability "in a very pragmatic way: sustainable practices are everything that contributes to the decrease of the inherent risks in a company in its various strands and that contributes to its ultimate perception and trust among customers".

Company 3 set objectives and KPIs in terms of accident numbers, number of hours worked, number of lost hours, noise levels, number of miles driven… Then it has very structured learning programmes that every employee must receive (e.g. chemical handling; health and safety) anywhere in the world. Furthermore, company 3 makes compulsory for each and every employee working at the shop floor to fill standardised forms on a monthly basis with an underlying risk analysis assessment that are sent to middle and top management for review.

The operationalization strategy of company 7 draws largely on their sustainable committee and on learning seminars provided to the employees. Their sustainable committee composition is innovative as it tries to be all-inclusive encompassing a wide-ranging of business functions and departments: 3 executive directors and the fourteen central departments. It meets at quarterly level, and within the committee, there is a working group devoted to develop products and services in partnership with three external institutions. *I.E.*, five central departments of the committee meet whenever required (usually 2 times a year) three social and environmental NGOs (external institutions) to assess what can be done in terms of products and services abroad to the clients.

- <u>Companies' approach to assess social sustainability (see question A.8)</u>

Based on the interviewees' answers, organisations act strongly on three different fronts: community, employees, and customers but with different priorities associated. Regarding the first issue, five respondents said that they design and implement social responsibility policies aiming at strengthening their relationships with the communities, namely with community support for education purposes, charity and donations and knowledge transfer. Also, two interviewees said that the point is to contribute to the societal development through innovation/research and development owing to improving the quality of life and to create better products. For instance, company 7 has a social protection programme supporting children and young people at risk, or grant scholarships to employees' children. In brief, organisations are fostering social innovation through the investment in research centres and entrepreneurship competitions.

The second social sustainability axis addresses the employees: organisations have realised that securing and providing training to their human resources are two preponderant activities because they are now competing at a world level for highly skilled employees with very multiple valences and competencies. Five companies affirmed that they provide regular education and training to all their

staff. Companies 1,5,7 mentioned that they sponsored post-graduates courses and MBAs for their middle and senior managers. Company 3 invests regularly in staff training and education because their activities pose serious risks of health and safety of the employees and the communities if not well executed and controlled.

The third issue prioritised by companies is the product management and the customer relationships management. Companies have realised that integrating and aligning policies within the supply chain context has significant far-reaching social effects on the long-term. Working closely to their suppliers and customers is a pre-requisite to ensure lower social and environmental impacts over the product life cycle. In this context, as aforementioned several companies audit and certify their suppliers in view of securing quality and safety upstream in the supply chain. Also, another important aspect is the collaboration with the customers and the extended products and services offered to them. Company 5 wanted to decrease the carbon footprint of their shampoos and for that purpose they established a close collaboration with their clients: "the whole idea is that we have to look at the process holistically to learn about things" (interviewee 5).

- Establishment of a new model for assessing social sustainability (see question A.10)

All the companies except company number 2 are working on the establishment of their own social sustainability model: 1) sustainability matrixes; 2) scorecards; 3) strategic pillars; 4) business foundations, etc.

Companies that are reporting under the GRI guidelines are slowly moving away from them. Interviewee 5 said that "[…] what is really good about GRI is that it provides a framework for reporting and what should then happen is that we should report on the things that are fundamental. […] but where it is very useful is to give us a tick box not to forget anything." In this sense, GRI is a tremendous step-by-step methodology to learn how to assess and report the 3BL of all organisations and supply chains, but its major drawback is that "GRI cannot be all things to all people. In other words, it would be impossible to create a scorecard that reflects the needs of a manufacturer business, wholesale business and retail business. It has to make compromises." (interviewee 5). So GRI is a blunt instrument that causes a lot of damages because it is attempting to provide guidelines that cover every single company and the problem is that there is not a typical company: every single business has its own requirements and specificities that shall be met.

Essentially, the GRI guidelines are becoming more and more complex and their user-friendliness is getting substantially reduced because they increasingly trying to cover as much sustainability issues as possible in every business sector: "the more rules they add, the more complex it becomes and the less relevant it becomes: this is the dichotomy" (interviewee 5). Hence, currently the GRI guidelines are not relevant to all industries in exactly the same way: it is very difficult for them to consider the product mix, the type of business, the country, size and scale of the organisation… For instance, GRI cannot address communication issues at this point and distinguish between an organisation with 100 employees and a multi-national company with 100 000 employees. No two businesses are the same and companies claim that it is erroneous and dangerous to put labels because their business units cut across distinct industries; it is very difficult to get suitable and standardised KPIs and metrics.

Moreover, interviewees 5 and 7 stated that the complexity of the new 4.0 GRI guidelines has even increased and that at this point they shall make changes through a spectacular effort to be compliant.

Companies are moving away from GRI because the "guidelines contained many indicators that stakeholders did not judge to be relevant to the business" (interviewee 7). Thus, Global Reporting Initiative is somehow stuck between a rock and a hard place: as they address these issues, the guidelines become 1) more complex; 2) more complicated and 3) less relevant. A business trading in the developing world will have a different set of issues to the ones in developed world. Put it simple, companies have started to use stakeholder panels and consultations processes to determine what are the key concerns and issues to report upon: they started to assess the materiality of the issues through those scorecards and matrixes.

Despite the fact that most of these companies recognised that the GRI fails to address all their requirements, they adopted the GRI for comparability and benchmarking purposes: "GRI is one of the guidelines most commonly accepted and used […] and we to be able to compare ourselves with other organisations and vice-versa, we adopted them" (interviewees 2 and 7). Again, companies value undeniably the power to compare themselves against their peers and to perform sustainability benchmarks. Additionally, interviewee 2 drew attention to the fact they establish their own goals and but it is important to be able to conduct benchmarks.

- <u>Validation of the established social mid-points for assessing social sustainability in supply chains (see question B.1)</u>

All of the respondents said that they would not remove any of these mid-points from the model: "all of these matter for different reasons" (interviewee 5); "we cover all of these and therefore they suit perfectly our business model" (interviewee 6); "we report everything and all of these indicators are our indicators: nothing is missing" (interviewee 1); "overall we monitor everything and this matches the 10 principles of the Global Compact that we commit to" (interviewee 2).

Interviewee 5 stressed the importance of these mid-points and their crucial role in risk management: "we have to assess all the internal and external factors that will suddenly escalate." Sustainability is all about controlling the business, rather the business controlling companies from one crisis to another. Organisations should be aware of all these issues not be in a "*headless chicken mode*" (interviewee 5) without mechanisms and policies to manage them. Fundamentally, organisations have to be aware of risks and plan their supply chains accordingly: the issue is not all about prevention; it has much to do with resilience and mitigation. Companies have to demonstrate to their stakeholders that they have policies in place to meet their expectations and they are doing their best to minimise social impacts.

Two respondents said that their companies are evaluating other issues that are not included in these categories: 1) company 5 evaluate "the role of the business within society and communities that it serves", "environmental leadership"; 2) company 6 monitors "wide mind set". Interviewee 5 highlighted that the societies and the companies have a give-and-take relationship where mutual concessions are made and cooperation is established. The environmental leadership issue relates to programmes that are environmentally-friendly and cost neutral/saving that 1) manage logistics and distribution (e.g. time windows deliveries) and 2) actions that minimise waste and promote recycling. Company 6 is

implementing measures that worry much about employee welfare. The “wide mind set” foundation prepares their employees to new business horizons, situations where they can reach equilibrium in work life balance and meet the company’s goals ahead.

- Relations between the established mid-points and the four GRI end-points (see question B.2)

The interviewees reported commonalities but also different point of views and opinions which stresses the distinct approaches to sustainability management and supply chain management. The majority of the interviewees linked the mid-points to at least two different GRI end-points and many have three links which demonstrate that the reality is much more complex: “my view with a lot of these things is that they are not one dimensional. That is why in our point of view one mid-point relates to several GRI end-points” (interviewee 5); “Globally this is all interlinked: everything relates to everything and it is hard to distinguish what it is not linked one thing to another” (interviewee 3); “If we increase the degrees of freedom, everything connects to everything” (interviewee 1). These quotes reveal that there is an intrinsic domino effect in sustainability; a change in the system causes another change and so on until the company goes out of the business. For instance, if a company invests less in “Innovation and Competitiveness” (R&D), the product quality may be worse which in turns may impact both on the mid-points “customer H&S” and “product management and consumer satisfaction”. These issues cannot be handled in isolation: the impact on one box affects the others. These mid-points cut across a wide variety of departments and business functions of their companies and therefore is it difficult to categorise them into just one end-point. As the companies get bigger and bigger, there are a lot of issues that are more difficult to control. The problem of size and scale is far-reaching because each customer is a harsh ambassador (for the good and for the worst) scrutinising every single aspect.

Regarding the four upstream echelon companies, all of them stressed the major importance of good health and safety practices in their daily business due to higher degree of hazard involved, thus reflecting the SocialSCOR results. Also, they highlighted the crucial role of the topics discussed within the “community support and funding” and the “business impacts on community; community involvement and welfare” because they can create a huge social and environmental burden. Another issue much emphasized is the mid-point “training; education and personal skills” because the better prepared the human capital, the less risks the company will face and the better the product will be. Again, this expresses the numbers in the ScocialSCOR matrixes. Two respondents said that their companies have high focus on product quality: “everything we do is reflected on our products” (interviewee 1). Thus the clients are put at risk if security and safety are not among the primary concerns.

The downstream companies have a huge concern with the heterogeneity of the communities they serve in their stores in different geographical regions because very frequently their stores are very integral to what happens to their communities, especially in small towns. The product mix, the product management and the consumer satisfaction are key variables dependent on the countries and on the type of customer served.

All things considered, there are not clear trends related to each supply chain echelon in linking the mid-points to the GRI end-points. Instead the companies emphasised certain mid-points compared to others due to their business: for instance for company 7 the mid-point "consumer health and safety" does not apply because they sell services and "it does not make sense to monitor it" (interviewee 7).

- Analysis and Validation of the established SLCA framework (see question B.3)

Overall all the seven respondents validated the established classification scheme, *i.e.*, all of them agreed with the established categorisation: "it is good and well structured" (interviewee 4). Interviewee 1 said "there are some interpretative differences between both schemes but this depends a lot on the companies' point of view". For instance, interviewee 1 linked the mid-point "corruption in business" to S; HR and PR: "it depends on how you perceive it; it has an impact on our business but the company is also impacted because we sell fewer products…"

The second relevant finding is that all seven respondents said that the proposed classification resulted in the primary, strongest and most direct relationships between the mid-points and the GRI social categories. All of the managers underlined that the cause-effect chain of the issues is not as linear as those expressed in the scheme: "The relations are not that direct" (interviewee 3 and 5); "the world is not one-dimensional" (interviewee 2). Based on the answers, there are much more links and interdependencies between the mid-points and the four GRI categories. Today there are a set of key decision variables impacting simultaneously on several social sustainability issues thus creating trade-offs. "If the company looks at the issues with a silo thinking mentality, trade-offs will continuously emerge: we cannot in terms of relationships turn on and off like taps. We cannot look at business in isolation because businesses are interconnected: part of the success of the retail business is driven by the role that it plays within society and the communities" (interviewee 5). The issue for companies is how to take the model and describe it, and that is the complexity of big business. The most compelling evidence was provided by interviewee 4 for whom "diversity and equal opportunities" was linked to LA; S; HR and PR.

Hence, some interviewees stressed that every attempt to classify the mid-points into boxes fails to address all the interdependencies and secondary relations that exist between the remaining issues: "we have to be careful not to miss the other less obvious relationships that exist in reality." (interviewee 4). Notwithstanding, two respondents (1,7) asserted that things have to be classified and categorised for practicality purposes and that under this circumstance the scheme is very well structured: "it is a fair attempt to systematise the information, but there are much more relationships" (interviewee 2).

The third evidence is that there are much more links between HR and PR than the ones presented in the classification scheme. The quality of the product and its transaction further downstream the supply chain translates the ultimate success of a company by keeping their customers satisfied. Generically, the product is the material good sold to the end-customer representing a series of coordinated processes from raw material extraction up to sale. This means that the concept of product responsibility is broader than ensuring its quality and safety, it is all about ensuring that supply chains are well managed and work properly. There is a direct backlash between its internal practices and the

products. For instance, company 1 focuses largely on product responsibility: “we pay much attention to all the risks that may affect our products and thereby our brand image”.

Concerning HR, based on the answers provided it is possible to affirm that companies and their stakeholders approach HR differently nowadays: it is not just about abiding by the Law, it is also about the stakeholders’ opinion and its increasing influence in decision-making. Put it differently, the weight of regulation is decreasing compared to the stakeholders’ influence: 1) companies 5 and 6 linked the mid-point “employee welfare” to the HR category; 2) company 5 linked the mid-point stakeholder participation to the HR category as well because in their opinion the stakeholder involvement is important to avoid HR violations.

- Analysis of the major importance of the LA and Society end-points (see question B.4)

Five companies linked most of the mid-points to the LA and Society end-points, thus validating the framework (see Figure 20), while two companies present an even distribution of the links between the mid-points and the four end-points. There are several reasons explaining this outcome:

- Three respondents (2,3,5) affirmed that the HR are very well protected by the “legal states” in the developed world and therefore is it easier to establish what they mean to the businesses and to supply chains at various levels. On the contrary the HR are a pressing issue in Third World countries and this fact may threaten worldwide companies such as Coca-Cola because they are trading virtually in every country in the World.
- The PR issues are easier to compartmentalise and there has been much discussion on how to track the impacts of products and services (e.g. LCA), meaning that is already a broad understanding and a solid basis on how to handle these problems. Typically, when impacts of products and services are analysed it is necessary to take into consideration two perspectives: on the one hand we have the impacts stemming from the product manufacturing and distribution; on the other hand there are impacts to consider during its use. Put it simply, there is no room for having “risks of error” with today’s global competition, otherwise the companies will rapidly go out of the business if they cannot measure or control the key parameters influencing quality in their products.
- The LA end-point has many mid-point connections because most of its issues address fundamental matters and therefore their proper functioning shall be ensured (e.g. strike avoidance; working accidents). Failing to manage these subjects not only undermines the credibility of the company but also its long-term economic sustainability. Interviewee 3 stated that “LA issues are important because they interact with the base structure of the company”. Moreover, interviewee 7 pointed that LA matters are of most importance for its company because “they monitor issues concerning one of the strongest forces within the company: its employees. Organisations do not exist without them; hence they must pay much attention to all the issues affecting them.”
- The Society end-point is also linked to many mid-points. It represents the overall system wherein the companies and supply chains lay and therefore “all the activities have impact on Society” (interviewee 4). The fact that interviewees linked all the sixteen mid-points to this end-point shows that society is a common denominator to all categories. All the stakeholders interact with Society one way or another,

and trade-offs will always have to be managed. Interviewee 7 stated that the notion of Society is vague, thus theoretically everything could be included in it. For instance, product responsibility has a close relationship with society, because the ultimate goal of product responsibility is to improve quality of life and impact positively on society. Put it another way, technically all the other three GRI end-point indicators come from a sub-division of Society issues. The GRI divided Society into other smaller matters because it enables to better systematise and categorise the indicators owing to achieve more clarity and easiness of use of the guidelines.

Companies 1 and 6 allocated almost the same number of indicators to each one of the four GRI end-points. Interviewee 5 underlined that the categorisation of the mid-points is not that easy and the classification scheme is not as linear as GRI advocate; there are underlying complex relationships that must be taken into account. In the opinion of interviewee 5, since everything is interlinked, the company runs risk analyses which encompass all business variables in every single strand. The objective is getting the most accurate picture possible even if this implies a big burden: “we cannot afford to neglect any single issue” (interviewee 5).

- Analysis of the inclusion of the mid-points (Innovation and Competitiveness; Employee Welfare and Stakeholder Participation) in the established SLCA framework (see question B.5)

All the respondents stressed the materiality of these three mid-points and the growing importance of these themes for the companies: “the themes are important enough to stand alone in three different categories” (interviewee 1 to 7). Interviewee 4 said that “all of three are central areas in our company. Innovation is the reason why we exist, it is part of our DNA and it is a cornerstone in our strategy”. Company 4 sees innovation as the required mean to deliver valuable benefits to the employees, society and other stakeholders. Companies 1 and 3 said that innovation is essential to manufacture better product and services at a lower cost in comparison with the competitors: “if we do not innovate, there are no improvements in our products, nor intelligent solutions and so we will lose him” (interviewee 3). Company 1 created an affiliated company that is in charge of designing innovative processes and solutions as well as benchmark the best worldwide practices in the sector. Without innovation companies cannot produce differentiated products and adapt to the high-evolving market conditions; on the long-term this may imply the company going out of business. Innovation is not an intermediary step but rather a *compulsory* long-term on-going investment that companies must commit. It is a continuous journey aiming at bridging the gaps and the customer needs.

Employee Welfare is much addressed by all seven companies: leisure activities, credit lines to the employees, off-site working possibilities, and monthly questionnaires evaluating employee initiatives. Organisations have become aware that they are competing on the international stage for the most skilled and competent human resources. Moreover, it has been demonstrated that the productivity can be improved if better work-life balance is achieved.

Stakeholder participation is a paramount theme universally recognised by all the interviewees. Company 1 has a specific department empowered to deal with all kinds of stakeholders’ issues and stakeholders’ relationships. Nowadays with the advent of IT, companies have multiple touch points and channels of communication with their stakeholders: they truly want to get their opinion and most of

all to learn with them. That is why they ensure a continuous sounding of their concerns and align their strategies accordingly. Additionally, interviewee 7 stated GRI changed its approach with the brand new 4.0 Guidelines: “the previous GRI guidelines did not take into account the stakeholder inclusion in prioritising and assessing the materiality of the indicators. Many companies were not reporting many indicators because they were not relevant to their business. GRI changed its approach from the overall importance of sustainability towards the issues that stakeholders really care about”. This important paradigm change is a first step towards the recognition that “GRI cannot be all things to all people” (interviewee 5) and that organisation have to focus on what is really valuable to the stakeholders. Table 13 sums up the main conclusions drawn from these answers.

Table 13. Summary Table Including the Major Conclusions from the Interviews

Major Conclusions from the Interviews
Sustainability is about the journey towards the defined goals, as opposed as how companies are going to achieve this end-game
The SLCA and SocialSCOR frameworks were validated, but they are not yet sufficient to provide a full social sustainability assessment
The GRI Guidelines are becoming more and more complex and less user-friendly: organisations are diverging from it
The industries have different priorities and different point of views depending on the SC echelon
Both social performances and social impacts measurement matters
Stakeholders are very important for companies

5.4. Conclusions

This chapter enabled to validate both frameworks by interconnecting them using: 1) a content analysis and 2) face-to face in-depth interviews. Firstly, it is concluded that Sustainability is a web of links and complex issues that affect each other mutually. There is no single pathway to achieve the sustainability targets defined before the “starting line”. Sustainability is a concept under continuous evolution in companies: the reports and the respondents recognised a multiplicity of strategies and configurations of key parameters leading to the projected end-result. The most compelling evidence is the results from the SocialSCOR model which were fully validated by all the interviewees. They acknowledge the various interdependencies and links between the mid-point impact categories and the stakeholders, but they disagreed partially on the importance conceded to some of them.

Secondly, there is no chance currently to achieve a satisfactory standardised classification framework: different priorities and concerns were clearly underlined in both analyses. The upstream, midstream and downstream companies present different sustainability priorities even at an internal level in their own business units. At this point, organisations are diverging from GRI because it is getting extremely complicated and less user-friendly. They are assessing the materiality of their sustainability issues directly with their stakeholders.

Thirdly, all the organisations recognised that stakeholders are very important to them. Essentially, they are paramount in helping sketch the strategic sustainability goals. They are increasingly becoming *critical friends* because their power and influence is tremendous for the good and for the worst. Both validation methods highlighted their importance within the companies, meaning they these perceive them as key business partners rather than opponents.

Fourthly, the four GRI end-points are very broad parameters worthy of protection. It is a tremendous mistake overlooking one of them because it leads to negative repercussions in the long-term. Overall, the analyses enabled to conclude that the companies are very interested in assessing the following mid-points: “stakeholder participation”; “H&S practices and incidents”; “business impacts; community involvement and welfare”. Nonetheless, both the content analysis and the interviews outlined that depending on the supply chain echelon, slightly different priorities and concerns emerge. While upstream echelon companies showed huge concerns with health and safety practices, the downstream companies care much about product management and community issues which are very store-dependent. Again, this was also verified in the SocialSCOR framework when some interviewees stated that the link between the categories and the stakeholders is context-dependent.

Both methods validated the established mid-point impact categories but the interviewees emphasised that Reality is much more complex and thereby the model only fits their primary concerns. These frameworks are a solid step forward towards assessing social sustainability in supply chains, notwithstanding their interdependencies are necessary but not yet sufficient to provide a full social sustainability assessment of a supply chain due to the inherent complexity associated. There are much more links between the mid-points and the GRI end-points and there is also much less blank cells in the SocialSCOR tables. The SocialSCOR tables are *dynamic* because they depend on the industry and supply chain echelons.

In line with this, is the fact that GRI cannot be relevant exactly the same way for all industries and companies even with sector specific supplements. All in all, it has to make compromises because it is impossible to create a scorecard that reflects the needs of all companies: the world is a black path and sustainability issues are interdependent. Hence, companies have started to use other tools than GRI (e.g. stakeholder panels) to determine what are the key things to report upon.

6. Final Conclusions and Future Work

The shift in consumption patterns led to the emergence of globalised markets and forced organisations to achieve competitive advantages, their ultimate goal being the creation of superior value to not only shareholders but in general to stakeholders. The concept of SCM has proved to be an efficient structure allowing bridging this gap by minimising the lead times and the operational costs overall. However this new business paradigm has borne hard on the natural resource depletion and the societies' well-being leading to the growing awareness of sustainability. Indeed, the businesses and industries have to face these new challenges and manage the novel economic, environmental and social impacts.

This literature review highlighted that the supply chains must incorporate the operations' externalities into the decision making process in order to achieve full sustainability in the three dimensions. The creation of alternative models of supply chains (e.g. Green SC; Sustainable Supply Chain) have made up for meeting the new stakeholder requirements.

Also, the social pillar has not been properly accounted because the organisations perceive social programmes as a burden rather than a source of value creation strategies for the stakeholders. It was strived to emphasise the growing importance of social sustainability in businesses and academia by presenting several innovative methodologies and tools such as the Social Footprint or the Social LCA which aim at accounting and mitigating the supply chains' social impacts on societies. Another relevant key aspect in study was the assessment of social key performance indicators and metrics for supply chains. The literature stresses the lack of consensus and inconsistency on what to measure and how to measure the social impacts meaning that they are neither systematised nor fully structured.

The social database enabled the identification of global categories aggregating the social KPIs and set the basis for the construction of the two frameworks in chapter 4. At first, almost 1450 indicators were collected from a comprehensive literature review. Then, after analysing, categorising and sorting them, 1348 indicators were kept in the social database. At the end of this iterative process, a set of sixteen social mid-point impact categories were established, thus reinforcing the already existent mid-points social impact categories, for assessing products and services based on the SLCA principles.

Also, two frameworks with slightly different scopes were proposed. First, a new taxonomy with these sixteen mid-points was established to enable the companies to perform a systematised evaluation of the relevant social sustainability issues in their supply chains. Furthermore, since companies seek increasingly to be integrated in their supply chains and aligned with their business partners, the SocialSCOR framework was proposed to understand how these mid-points impact on the internal and external stakeholders.

Additionally, these new frameworks were tested and validated by two different means: 1) a content analysis; 2) in-depth interviews with sustainability pundits in different industries. The results show that both frameworks were validated and therefore all the categories are relevant to assess social sustainability. Also, the different industries have different point of views and slightly different priorities

regarding the social sustainability issues: their different visions, missions and corporate values leads to distinct approaches. At this point there is no chance currently to achieve a satisfactory standardised classification framework, reflecting the needs of all companies. In fact, there are two types of mid-points: 1) those whose importance is uniformly recognised across the three supply chain echelons and 2) those which have to be thoroughly assessed in a more context-specific manner.

Thus, in the context of analysing the whole overall supply chain it would be interesting in the future to define proper end-points common to most of the business sectors. Since the GRI Guidelines cannot address properly every single company's sustainability issues, what has to be done is to: 1) start dividing the supply chain echelons in several industries; 2) further analyse and contextualise the specific industries' specificities through better sector specific supplements; 3) perform a multiple-criteria decision analysis in order to prioritise the mid-points in each SC echelon; 4) empower organisations such as the London Benchmark Group to normalise and standardise the indicators, metrics and performance assessment methods for a proper benchmarking. The achievement of the aforementioned issues makes a step forward for establishing a standardised and universally accepted framework to evaluate social sustainability in companies and supply chains.

In fact, the end-game of "Sustainability" is very important but it is not the same for everyone: 1) some advocate that it is all about risk management, prevention and cost-saving; 2) some seek to capture investors and excel among their peers to gain market visibility and awareness; 3) some say that it is part of their mission and DNA, meaning that the business must restore the "natural equilibrium state" of the societies.

To conclude, though many issues can be explored in the sequence of the present work, it can be said that the developed mid-point categories and their applicability have shown to have their validity and practicality in several supply chain industries and businesses. Their combination with other economic and environmental sustainability frameworks is a powerful tool to achieve a well-designed sustainable supply chain so as to attain the optimum balance between the 3BL pillars.

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Appendixes

Appendix A. Social Indicators Distribution According to GRI

Table A 1. Social Indicators Distribution According to the 3.0 GRI Guidelines

GRI Social Categories	Database Social Aspects	Number of Indicators in Each Aspect
Labour Practices and Decent Work (LA)	Employment	145
	Labour and Management Relations	19
	Occupational Health and Safety	191
	Training and Education	79
	Diversity and Equal Opportunities	94
	TOTAL LA	**528**
Huamn Rights (HR)	Investment and Procurement Practices	12
	Security Practices	4
	Non-Discrimination	14
	Freedom of Association and Collective Bargaining	16
	Indigenous Rights	6
	Child Labour	10
	Forced and Compulsory Labour	9
	TOTAL HR	**71**
Society (S)	Community	278
	Corruption	36
	Public Policy	10
	Anti-competitive Behaviour	13
	Compliance	29
	TOTAL S	**366**
Product Responsibility (PR)	Customer Health and Safety	29
	Product and Service Labelling	52
	Marketing Communications	25
	Customer Privacy	3
	Compliance (product)	3
	TOTAL PR	**112**
	TOTAL NC	**364**
	TOTAL	**1441**

Table A 2. Social Performance Indicators Distribution According to the GRI Social Categories

GRI	Social Performance Indicators Distribution
LA	37%
HR	5%
S	25%
PR	8%
NC	25%

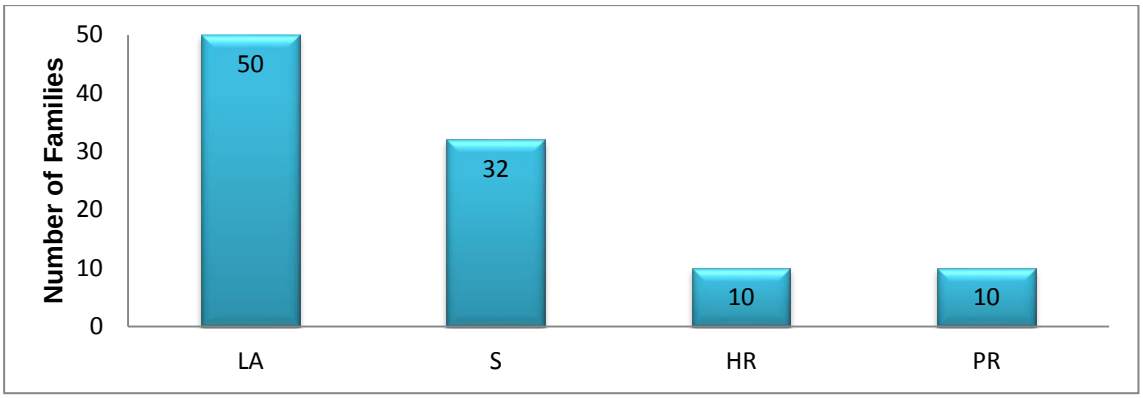

Figure A 1. Initial Number of Families in each GRI Social Category

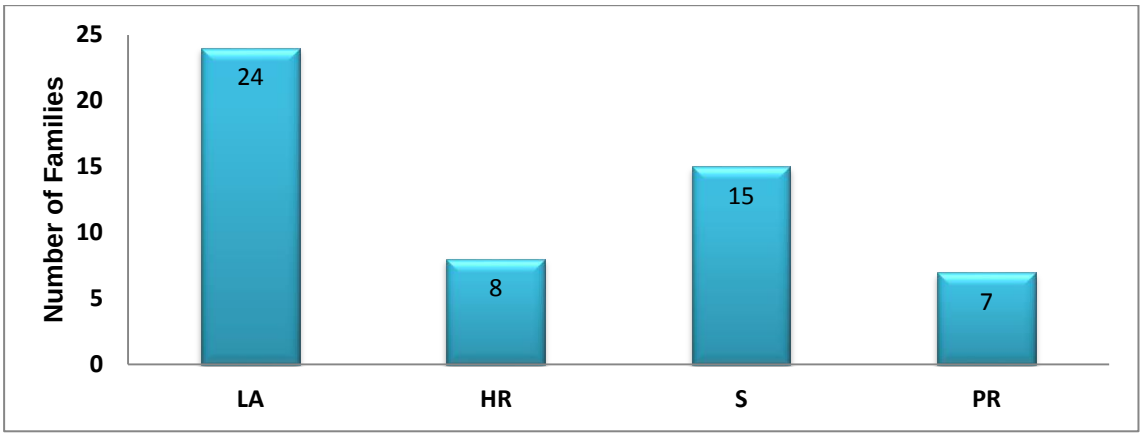

Figure A 2. Final Number of Families in each GRI Social Category

Appendix B. Established Social Mid-Point Categories

Table B 1. List of Families Belonging to the Employment Scope; Benefits and Characteristics Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Employment Scope; Benefits and Characteristics	Employee turnover	E	LA
	Employment Compensation, Wages and Benefits	E	LA
	Number of working hours	E	LA
	Workforce Characteristics	E	LA
	Number of people employed	E	LA
	Employment Stability; Safeguarding of jobs; Net employment creation	E	LA
	Wealth created per employee	E	LA
Total			**148**

Table B 2. List of Families Belonging to the Employment Practices and Relations Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Employment Practices and Relations	Employment Practices	E	LA
	Labour/Management Relations	LMR	LA
Total			**39**

Table B 3. List of Families Belonging to the Health and Safety Practices and Incidents Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
H&S Practices and Incidents	Health and Safety Incidents and Consequences at Workplace	HS	LA
	Health and Safety Hazards	HS	LA
	Health and Safety: Security, Training and Prevention Practices and Policies	HS	LA
	Quality of working conditions	HS	LA
Total			**170**

Table B 4. List of Families Belonging to the Training; Education and Personal Skills Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Training; Education and Personal Skills	Recruitment and selection practices	TR	LA
	Employee Training and Education	TR	LA
	Capacity and Career Development	TR	LA
Total			**87**

Table B 5. List of Families Belonging to the Diversity and Equal Opportunities Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Diversity and Equal Opportunities	Equity and Equal Opportunities in Employment	DEO	LA
	Employee population diversity and minorities	DEO	LA
	Fair Income Distribution and Financial Equity	DEO	LA
Total			**93**

Table B 6. List of Families Belonging to the Employee Welfare Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Employee Welfare	Quality of life and Work life balance	NEW	LA
	Employee satisfied with is job; (Percent of workers who report complete job satisfaction)	NEW	LA
Total			**44**

Table B 7. List of Families Belonging to the Innovation and Competitiveness Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Innovation and Competitiveness	Innovation/R&D	I	LA
	Knowledge Management	I	LA
	Commitment to 3BL practices	I	LA
Total			**51**

Table B 8. List of Families Belonging to the Human Rights Implementation and Integration Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Human Rights Implementation and Integration	Sustainable Procurement Practices	IPP	HR
	Security Practices	SP	HR
	Freedom of association and collective bargaining; (Percentage of employees covered by collective bargaining agreements.; Employees' representation and participation in corporate decision-making;)	FACB	HR
	Child Labour	CHLAB	HR
	Forced and Compulsory Labour	FCL	HR
Total			**50**

Table B 9. List of Families Belonging to the Basic Human Rights Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Basic Human Rights Practices	Discrimination; (total number of incidents of discrimination and actions taken)	ND	HR
	Management of employee complaints	ND	HR
	Indigenous Peoples Relations and Rights respect	IR	HR
Total			**28**

Table B 10. List of Families Belonging to the Community Funding and Support Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Community Funding and Support	Grants and Donations; (Community donations as % of domestic pre-tax profits)	COMM	S
	Housing Support, Infrastructures and Services for Productive Life	COMM	S
	Community support for education purposes	COMM	S
	Community support for cultural preservation purposes	COMM	S
Total			**91**

Table B 11. List of Families Belonging to the Business Impacts; Community Involvement and Welfare Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Business Impacts; Community Involvement and Welfare	Community H&S and Security	COMM	S
	Macro Social Performance	COMM	S
	Negative Externalities and Social Harm From Operations	COMM	S
	Community Involvement of Company; Community Management; Community Relations; Social Value Created	COMM	S
Total			**206**

Table B 12. List of Families Belonging to the Corruption in Business Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Corruption in Business	Corruption (Corruption, including incidents/press reports concerning fraud, corruption and illegal price-fixing, and violation of property rights)	C	S
	Ethical Business Operations	C	S
Total			**33**

Table B 13. List of Families Belonging to the Fair Business Operations Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Fair Business Operations	Pollitical support; (Political funding; active political support)	PP	S
	Antitrust issues and anticompetitive behaviour	ACB	S
	Compliance with legal requirements; Judicial actions; Fines and Litigation	COMP	S
Total			**60**

Table B 14. List of Families Belonging to the Stakeholder Participation Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Stakeholder Participation	Stakeholder Engagement; Influence and Power	STA	S
	Information Provision and Communication	STA	S
Total			**141**

Table B 15. List of Families Belonging to the Consumer Health and Safety Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Consumer Health and Safety	Product Life Cycle Management and Environmental Sustainability	CHS	PR
	Customer H&S and Product Quality	CHS	PR
Total			**44**

Table B 16. List of Families Belonging to the Product Management and Consumer Satisfaction Mid-Point

Mid-Point	Families	Aspect screening	GRI Social Category
Product Management and Consumer Satisfaction	Customer Service and Satisfaction Management	PSL	PR
	Product labelling	PSL	PR
	Marketing Communications	MC	PR
	Customer Privacy	CP	PR
	Compliance	PRC	PR
Total			**63**

Appendix C. On CATA Content-Analysis

Table C 1. Sample Summary of the Companies used in the Tropes Analyses

Industry	Company	Year	Pages	GRI Version	Region	Country	Generic Echelon
Mining	Agnico-Eagle Mines	2011	109	GRI3.1	North America	CA	Upstream
Mining	Anglo Platinum	2011	172	GRI3	Africa	ZA	Upstream
Mining	AngloAmerican	2011	82	GRI3.1	Europe	UK	Upstream
Mining	AngloGold Ashanti	2011	64	GRI3	Africa	ZA	Upstream
Mining	Barric Gold Corporation	2011	144	GRI3	North America	CA	Upstream
Mining	BHP Billiton	2011	54	GRI3	Oceania	AU	Upstream
Mining	Codelco	2011	84	GRI3.1	South and Central America	CL	Upstream
Mining	Freeport-McMoRan	2011	36	GRI3	North America	US	Upstream
Mining	Kinross	2011	133	GRI3	North America	CA	Upstream
Mining	Lonmin	2011	81	GRI3	Europe	UK	Upstream
Mining	Teck	2011	118	GRI3	North America	CA	Upstream
Mining	Xstrata	2011	68	GRI3	Europe	CH	Upstream
Oil and Gas	Amec	2010	53	GRI3	Europe	UK	Upstream
Oil and Gas	BG Group	2010	42	GRI3	Europe	UK	Upstream
Oil and Gas	ENI	2010	36	GRI3	Europe	IT	Upstream
Oil and Gas	Halliburton	2011	60	GRI3	North America	US	Upstream
Oil and Gas	Nexen	2010	28	GRI3	North America	CA	Upstream
Oil and Gas	Repsol	2010	115	GRI3	Europe	ES	Upstream
Oil and Gas	S-OIL	2010	74	GRI3	Asia	KR	Upstream
Oil and Gas	Saipem	2011	84	GRI3	Europe	IT	Upstream
Oil and Gas	Santos	2011	62	GRI3.1	Oceania	AU	Upstream
Oil and Gas	Sasol	2011	69	GRI3.1	Africa	ZA	Upstream
Oil and Gas	SBM Offshore	2010	118	GRI3	Europe	NL	Upstream
Oil and Gas	Suncor	2011	26	GRI3	North America	CA	Upstream
Oil and Gas	Total	2010	80	GRI3	Europe	FR	Upstream
Oil and Gas	Woodside Petroleum	2011	39	GRI3	Oceania	AU	Upstream
Materials	CRH	2010	84	GRI3	Europe	IE	Upstream
Materials	Dow Chemical	2010	94	GRI3	North America	US	Upstream
Materials	Holcim	2009	40	GRI3	Europe	CH	Upstream
Materials	Italcementi Group	2010	72	GRI3	Europe	IT	Upstream
Materials	Lafarge	2010	44	GRI3	Europe	FR	Upstream
Materials	Linde	2010	116	GRI3.1	Europe	DE	Upstream
Materials	Praxair	2010	79	GRI3	North America	US	Upstream
Materials	SCG	2010	108	GRI3	Asia	TH	Upstream
Utilities	AGL Energy	2011	105	GRI3	Oceania	AU	Upstream
Utilities	Duke Energy	2011	36	GRI3	North America	US	Upstream
Utilities	E.ON	2011	129	GRI3	Europe	DE	Upstream
Utilities	Exelon	2011	114	GRI3.1	North America	US	Upstream
Utilities	Fortum	2011	124	GRI3.1	Europe	FI	Upstream
Utilities	Iberdrola	2011	255	GRI3.1	Europe	ES	Upstream
Utilities	PG&E	2011	224	GRI3	North America	US	Upstream
Utilities	Red Electrica	2011	184	GRI3.1	Europe	ES	Upstream
Utilities	RWE	2011	142	GRI3	Europe	DE	Upstream
Utilities	Sempra Energy	2011	70	GRI3.1	North America	US	Upstream
Utilities	Snam	2011	102	GRI3.1	Europe	IT	Upstream
Utilities	Spectra Energy	2011	30	GRI3.1	North America	US	Upstream
Utilities	Terna	2011	220	GRI3.1	Europe	IT	Upstream
Industrials	3M	2011	107	GRI3.1	North America	US	Midstream
Industrials	Atlas Copco	2011	28	GRI3	Europe	SE	Midstream
Industrials	Bombardier	2010	169	GRI3	North America	CA	Midstream

(..continued)

Industrials	Daikin	2011	32	GRI3	Asia	JP	Midstream
Industrials	Finmeccanica	2010	160	GRI3	Europe	IT	Midstream
Industrials	General Electric	2011	42	GRI3	North America	US	Midstream
Industrials	Hyundai Engineering & Construction	2010	75	GRI3.1	Asia	KR	Midstream
Industrials	Ingersoll Rand	2011	75	GRI3.1	North America	US	Midstream
Industrials	Komatsu	2011	52	GRI3.1	Asia	JP	Midstream
Industrials	Metso	2011	57	GRI3.1	Europe	FI	Midstream
Industrials	Sandvik	2011	13	GRI3	Europe	SE	Midstream
Industrials	Siemens	2011	90	GRI3	Europe	DE	Midstream
Industrials	STX Engine	2011	71	GRI3.1	Asia	KR	Midstream
Industrials	Sulzer	2011	16	GRI3	Europe	CH	Midstream
Industrials	Toshiba	2011	60	GRI3	Asia	JP	Midstream
Industrials	Volvo Group	2011	101	GRI3	Europe	SE	Midstream
Consumer Goods	Avon	2011	157	GRI3	North America	US	Midstream
Consumer Goods	Campbell Soup Company	2011	122	GRI3	North America	US	Midstream
Consumer Goods	Coca-Cola Company	2011	95	GRI3.1	North America	US	Midstream
Consumer Goods	Danisco	2011	94	GRI3	Europe	DK	Midstream
Consumer Goods	Diageo	2011	96	GRI3	Europe	UK	Midstream
Consumer Goods	Estée Lauder	2010	54	GRI3	North America	US	Midstream
Consumer Goods	Fujifilm	2011	74	GRI3	Asia	JP	Midstream
Consumer Goods	Henkel	2011	50	GRI3	Europe	DE	Midstream
Consumer Goods	Kao	2011	131	GRI3	Asia	JP	Midstream
Consumer Goods	Kimberly-Clark	2011	141	GRI3	North America	US	Midstream
Consumer Goods	Néstle	2011	295	GRI3.1	Europe	CH	Midstream
Consumer Goods	Procter&Gamble	2011	76	GRI3	North America	US	Midstream
Consumer Goods	Sara Lee	2011	68	GRI3.1	North America	US	Midstream
Consumer Goods	SCA	2011	78	GRI3	Europe	SE	Midstream
Consumer Goods	Unilever	2011	44	GRI3	Europe	NL	Midstream
Electronics	AU Optronics	2011	81	GRI3.1	Asia	TW	Midstream
Electronics	NEC	2011	28	GRI3.1	Asia	JP	Midstream
Electronics	Fujitsu	2010	100	GRI3.1	Asia	JP	Midstream
Electronics	Hewlett Packard	2011	186	GRI3	North America	US	Midstream
Electronics	Epson	2011	70	GRI3.1	Asia	JP	Midstream
Electronics	TDK	2011	29	GRI3	Asia	JP	Midstream
Electronics	Panasonic	2011	84	GRI3.1	Asia	JP	Midstream
Electronics	LG Electronics	2011	90	GRI3.1	Asia	KR	Midstream
Electronics	Intel	2011	133	GRI3.1	North America	US	Midstream
Electronics	SK hynix	2011	102	GRI3.1	Asia	KR	Midstream
Electronics	STMicroelectronics	2011	72	GRI3	Europe	CH	Midstream
Electronics	Konica Minolta	2011	44	GRI3	Asia	JP	Midstream
Automotive	BMW	2010	120	GRI3	Europe	DE	Midstream
Automotive	Daimler	2011	120	GRI3.1	Europe	DE	Midstream
Automotive	Denso	2011	92	GRI3	Asia	JP	Midstream
Automotive	Fiat	2011	268	GRI3.1	Europe	IT	Midstream
Automotive	Hyundai Motor	2010	86	GRI3	Asia	KR	Midstream
Automotive	Johnson Controls	2011	241	GRI3.1	North America	US	Midstream
Automotive	Mazda	2011	139	GRI3.1	Asia	JP	Midstream
Automotive	Nissan	2011	88	GRI3.1	Asia	JP	Midstream
Automotive	Pirelli	2011	161	GRI3.1	Europe	IT	Midstream
Automotive	Volkswagen	2011	104	GRI3	Europe	DE	Midstream
Transport and Logistics	Abertis	2011	105	GRI3.1	Europe	ES	Downstream
Transport and Logistics	Air France-KLM	2011	80	GRI3.1	Europe	FR	Downstream
Transport and Logistics	Ball	2011	30	GRI3.1	North America	US	Downstream

(..continued)

Transport and Logistics	Cathay Pacific Airways	2011	154	GRI3.1	Asia	CN	Downstream
Transport and Logistics	Deutsche Post DHL	2011	88	GRI3	Europe	DE	Downstream
Transport and Logistics	Fraport	2011	49	GRI3.1	Europe	DE	Downstream
Transport and Logistics	Maersk	2011	82	GRI3	Europe	DK	Downstream
Transport and Logistics	Nippon Yusen Kaisha	2011	52	GRI3.1	Asia	JP	Downstream
Transport and Logistics	Transurban	2011	40	GRI3	Oceania	AU	Downstream
Transport and Logistics	United Parcel Service	2011	149	GRI3.1	North America	US	Downstream
Retail	Ahold	2011	76	GRI3	Europe	NL	Downstream
Retail	Hennes & Mauritz	2011	89	GRI3	Europe	SE	Downstream
Retail	Kesko	2010	94	GRI3	Europe	FI	Downstream
Retail	Kingfisher	2010	111	GRI3.1	Europe	UK	Downstream
Retail	Lotte Shopping	2010	120	GRI3	Asia	KR	Downstream
Retail	Marks & Spencer	2010	56	GRI3.1	Europe	UK	Downstream
Retail	Office Depot	2010	24	GRI3	North America	CA	Downstream
Retail	Staples	2010	91	GRI3	North America	US	Downstream
Retail	Wesfarmers	2011	76	GRI3	Oceania	AU	Downstream
Telecommunications	BT Group	2011	255	GRI3.1	Europe	UK	Downstream
Telecommunications	France Telecom-Orange	2011	160	GRI3	Europe	FR	Downstream
Telecommunications	KPN	2011	72	GRI3.1	Europe	NL	Downstream
Telecommunications	KT	2011	54	GRI3.1	Asia	KR	Downstream
Telecommunications	Portugal Telecom	2011	165	GRI3.1	Europe	PT	Downstream
Telecommunications	SK Telecom	2011	64	GRI3.1	Asia	KR	Downstream
Telecommunications	Telecom Italia	2011	144	GRI3.1	Europe	IT	Downstream
Telecommunications	Telefónica	2011	90	GRI3.1	Europe	ES	Downstream
Telecommunications	Telenor	2011	43	GRI3.1	Europe	NO	Downstream
Telecommunications	TeliaSonera	2011	45	GRI3.1	Europe	SE	Downstream
Telecommunications	Telstra	2011	79	GRI3	Oceania	AU	Downstream
Telecommunications	Vodafone Group	2011	24	GRI3	Europe	UK	Downstream
Financials	Banca Monte dei Paschi di Siena	2010	120	GRI3	Europe	IT	Downstream
Financials	Barclays	2010	103	GRI3	Europe	UK	Downstream
Financials	Bradesco	2010	60	GRI3	South and Central America	BR	Downstream
Financials	CIBC	2011	85	GRI3	North America	CA	Downstream
Financials	Dexia	2010	48	GRI3	Europe	BE	Downstream
Financials	DnB NOR	2009	32	GRI3	Europe	NO	Downstream
Financials	Intesa Sanpaolo	2010	120	GRI3	Europe	IT	Downstream
Financials	Nedbank Group	2009	96	GRI3	Africa	ZA	Downstream
Financials	Royal Bank of Canada	2011	131	GRI3	North America	CA	Downstream
Financials	Royal Bank of Scotland	2010	44	GRI3	Europe	UK	Downstream
Financials	Westpac Group	2011	44	GRI3	Oceania	AU	Downstream
TOTAL	**142 Companies**		**13208 Pages**			**25 Countries**	

Table C 2. Example of Keywords used in the Tropes Social Ontology

Words/Semantic Expressions	Count	Level
stakeholder participation	11817	0
stakeholder engagement; influence and power	11808	1
consultation	115	2
cooperation	372	2
dialogue	466	2
relationships with stakeholders	3	3
stakeholder consultation	16	3
stakeholder engagement	155	3
business impacts; community involvement and welfare	11396	0
community h&s and security	644	1
assistance	205	2
childcare	82	2
in-kind	41	2
well-being of people	3	2

Table C 3. CATA Social Ontology Results from the Reports (Original Version)

Synopsis							
		Word Count	Total %	Word Count	Total %	Word Count	Total %
		DOWNSTREAM		MIDSTREAM		UPSTREAM	
LA	Employment Scope; Benefits and Characteristics	3899	4,28%	4859	3,47%	3920	4,08%
	Employment Practices and Relations	404	0,44%	564	0,40%	322	0,34%
	H&S Practices and Incidents	5769	6,33%	10805	7,71%	9561	9,95%
	Training; Education and Personal Skills	6506	7,14%	10588	7,56%	6174	6,42%
	Diversity and Equal Opportunities	1136	1,25%	1072	0,77%	846	0,88%
	Employee Welfare	877	0,96%	996	0,71%	601	0,63%
	Innovation and Competitiveness	5454	5,99%	9260	6,61%	6941	7,22%
Total			**26,40%**		**27,23%**		**29,52%**
HR	Human rights Implementation and Integration	1962	2,15%	3496	2,50%	2776	2,89%
	Basic Human Rights and Practices	346	0,38%	552	0,39%	424	0,44%
Total			**2,53%**		**2,89%**		**3,33%**
S	Community Funding and Support	3061	3,36%	3657	2,61%	2467	2,57%
	Business Impacts; Community Involvement and Welfare	7077	7,77%	11396	8,14%	7792	8,11%
	Corruption in Business	6302	6,92%	9388	6,70%	6753	7,03%
	Fair Business Operations	4723	5,19%	7904	5,64%	5952	6,19%
	Stakeholder Participation	34065	37,40%	47588	33,98%	33989	35,37%
Total			**60,64%**		**57,07%**		**59,26%**
PR	Consumer Health and Safety	1037	1,14%	2901	2,07%	1068	1,11%
	Product Management and Consumer Satisfaction	8464	9,29%	15039	10,74%	6514	6,78%
Total			**10,43%**		**12,81%**		**7,89%**
	TOTAL	**91082**	**100%**	**140065**	**100%**	**96100**	**100%**

Original version of the social ontology

According to Table C 3 and C 4, it is possible to observe that:

- "Stakeholder Participation" accounted the highest percentage of occurrences of relevant words among the sixteen mid-points in all echelons: the social issues associated to this impact category constitute a cross-cutting theme across all the companies;
- "Business Impacts; Community Involvement and Welfare" was the third category with the most occurrences in all three echelons with similar results shows that the companies have a cross-cutting concern with the social impacts on the society at large. There is a noteworthy engagement to improve the communities' welfare but also indicate the importance of the stakeholder "society and public at large" within SC actors;
- "Product Management and Consumer Satisfaction" category is ranked second both for the Downstream and Midstream echelons, translating the higher concern of these companies to take into account the customer needs and requirements: it is normal that the lower supply chain tiers have more interest in customers as they are closer to them.

Appendix C.1. ANOVA Assumptions

The ANOVA encompasses some important assumptions about the analysed sample (PROPHET StatGuide, 1997):

1. Independence of observations;
2. Normality: the sample must be extracted from a Normal population;
3. Equality/homogeneity of variances: the variance of data in groups should be the same.

The ANOVA tests two distinct hypotheses:

1. H_0 (null hypothesis): $\mu_1=\mu_2=\mu_3$ - the differences observed between the sample populations' means are simply random, meaning that there is no relationship between the measured phenomena;
2. $H_{1:}$ $\mu_i \neq \mu_j$; with $i \neq j$.

Appendix C.2. Mann Whitney U Test Assumptions

1. Random samples of population;
2. Independence of the observations;
3. The dependent variable should be measured at the ordinal or the continuous level.

Table C 4. CATA results (original ontology): mid-points sorted by highest number of word occurrences

Mid-Points Impact Categories Sorted by Importance

		Downstream	Midstream	Upstream
1	Employment Scope; Benefits and Characteristics	14	14	14
2	Employment Practices and Relations	16	16	3
3	H&S Practices and Incidents	11	11	11
4	Training; Education and Personal Skills	4	3	7
5	Diversity and Equal Opportunities	12	4	12
6	Employee Welfare	3	12	16
7	Innovation and Competitiveness	7	7	4
8	Human rights Implementation and Integration	13	13	13
9	Basic Human Rights and Practices	1	1	1
10	Community Funding and Support	10	10	8
11	Business Impacts; Community Involvement and Welfare	8	8	10
12	Corruption in Business	5	15	15
13	Fair Business Operations	15	5	5
14	Stakeholder Participation	6	6	6
15	Consumer Health and Safety	2	2	9
16	Product Management and Consumer Satisfaction	9	9	2

Table C 5. CATA results (refined ontology): mid-points sorted by highest number of word occurrences

Mid-Points Impact Categories Sorted by Importance

		Downstream	Midstream	Upstream
1	Employment Scope; Benefits and Characteristics	14	14	3
2	Employment Practices and Relations	11	11	14
3	H&S Practices and Incidents	4	16	11
4	Training; Education and Personal Skills	12	3	7
5	Diversity and Equal Opportunities	3	4	12
6	Employee Welfare	7	12	4
7	Innovation and Competitiveness	13	7	13
8	Human rights Implementation and Integration	16	13	16
9	Basic Human Rights and Practices	1	1	1
10	Community Funding and Support	10	10	8
11	Business Impacts; Community Involvement and Welfare	8	8	10
12	Corruption in Business	5	15	15
13	Fair Business Operations	15	5	5
14	Stakeholder Participation	6	6	6
15	Consumer Health and Safety	2	2	9
16	Product Management and Consumer Satisfaction	9	9	2

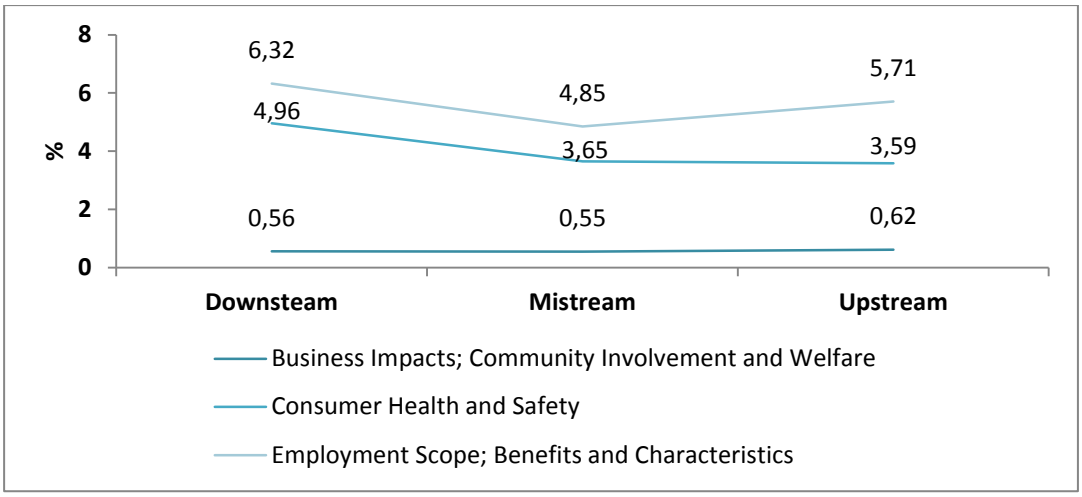

Figure C 1. Refined Social Ontology Results for the Mid-Points with Statistical Significance

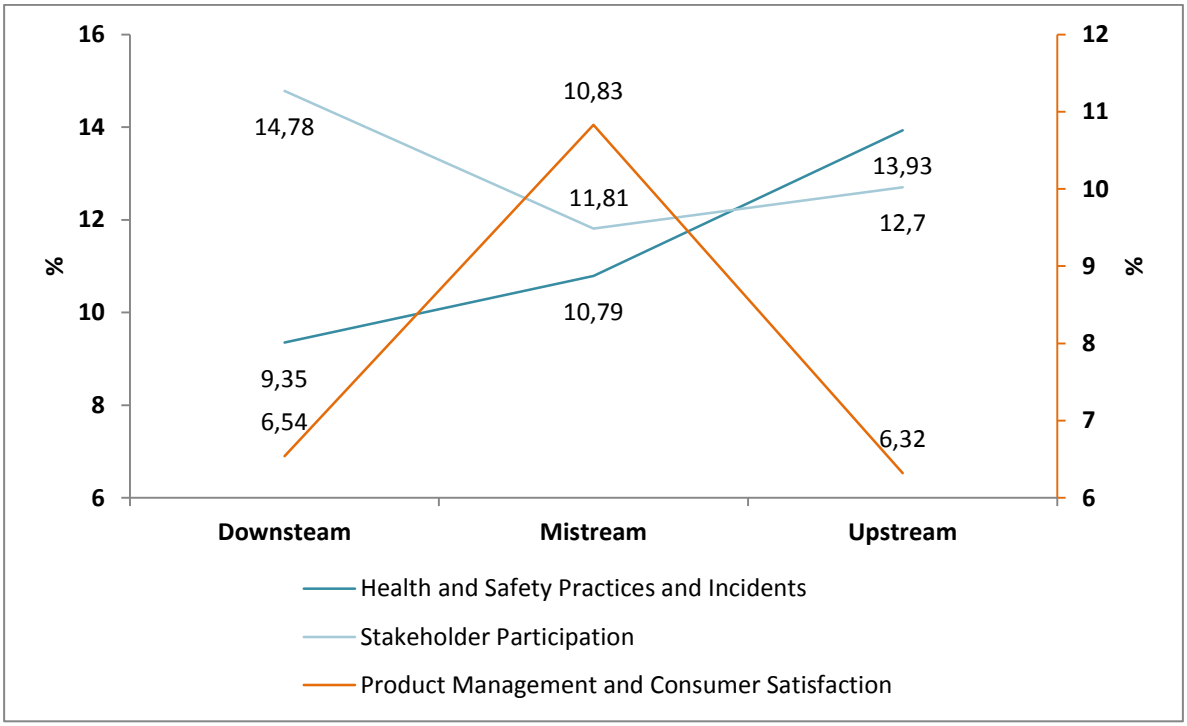

Figure C 2. Refined Social Ontology Results for the Mid-Points with Statistical Significance

Appendix D. On Interview Analysis

Appendix D 1. Sampling Description

One of the most important tasks before conducting the interviews is to decide the companies to include in the study. Similarly to the Tropes content analysis performed in section 5.2, the same nomenclature and structure with the 12 industries was picked as they include all three supply chain echelons and thereafter provide a trustworthy picture of a supply chain. It was aimed at analysing the entire supply chain stages from raw material extraction up to end-customer delivery. Basically, this sample strived to cover different areas in supply chains and enabled getting a broad vision of the product life cycle.

This sample contained both large Portuguese and foreign organisations in order to getter a better understanding the programmes that the companies are implementing. The following arguments explain the rationale behind this decision:

- Large organisations have higher capacity to implement sustainable policies and to continuously commit to sustainable development principles due the possession of more resources and knowledge;
- Since the literature review only contained non-Portuguese papers, it was advisable to include large multinational organisations to compare and contrast the priorities between the Academia and the Business world;
- Since supply chains operations are scattered worldwide, it was imperative to pick multinational companies with worldwide operations: understanding how these companies managed the cultural differences in the distinct markets was a priority;
- Large multinational companies are theoretically more exposed to risk because they may operate in some regions/countries that are much exposed to human rights violations for instance. It was paramount to interview companies that deal on a daily basis with these serious problems. They are confronted to a harsh public opinion which monitored them very closely;
- Picking both Portuguese and foreign companies enables to get a better benchmark of sustainable development policies;
- The scope of this work was to analyse the social impacts through the whole supply chain operations. By picking organisations with different scopes and geographical regions it is easier to understand the power asymmetries underlying the relationships between the different actors as well as to analyse the role of the interveners in the decision-making process. The purpose is to assess the complexity of planning and designing supply chain processes.
- Most of the assessed companies operate in different industries and have different business operations: this allows understanding the internal conflicts arising and the issues that hinder to act in a coordinated way at a strategic level.

The final sample contained seven organisations operating in seven industries from the three supply chain echelons (see Table D 1). Overall, there are four companies which have operations corresponding to the upstream echelon, three companies operating in the midstream industries and three organisations in the downstream echelon. Four of these organisations have headquarters in Portugal, two in Europe and one in Oceania.

Table D 1. Industries where the interviewed companies operate

Upstream	Midstream	Downstream
Utility	Consumer Goods	Financial
Mining	Industrial	Retailing
Materials		

Then, a short description of the companies included in this study is presented:

1. A major European company of the energy sector operating in five continents and twelve different countries (utility industry);
2. A company that manages the transmission of energy infrastructures of both electricity, natural gas and telecom infrastructures. It is charged of planning, constructing and maintaining the grids (utility industry);
3. A worldwide provider of commercial explosives and blasting systems to the mining and infrastructures that operates in six continents and fifty countries. It also supplies chemicals for the agriculture, building and construction sectors (mining and materials industry);
4. A global company operating in the industries of healthcare, agriculture and high-tech materials present in 6 continents and almost every country (materials and industrial industries);
5. A large multinational pharmaceutical wholesaler; distributor and retailer group operating in four continents and 25 countries (industrial, consumer goods and retailing industries);
6. A multinational retailer group; consumer goods manufacturing and food distribution operating in 3 countries (retailing and consumer goods)
7. A large European financial group serving individual, corporate and institutional customer segments operating in 25 countries and 4 continents (financial industry).

Appendix D 2. Interview Guide Used for Validating the Social KPI's Framework

Guidelines Topics

A. Importance of the three sustainability pillars and current company situation

1. Please mark the importance given to the economic pillar of sustainability in this scale;
2. Please mark the importance given to the environmental pillar of sustainability in this scale;
3. Please mark the importance given to the social pillar of sustainability in this scale;
4. How would you describe the capacity/ability that your company has to affect social sustainability policies in your supply chains?
5. How would you describe the sensitivity that your company has to be affected (influenced) by social sustainability policies in your supply chains?
6. How important is for your company the evaluation of social impacts in your supply chains?
7. Please characterise the approach taken by your company to assess sustainability (holistically).
8. Please characterise the approach taken by your company to assess social sustainability.
9. Regarding the analysis of the social pillar, it is evaluated from a perspective of social impact or social performance assessment?
10. Is your company working in the establishment of its own model for assessing social impacts?

B. Validation of the established social impact model for assessing social sustainability in supply chains

1. I would like to ask you to analyse the following social impact categories.
2. Could you link our categories (using arrows) to the four GRI social categories (LA; S; HR; PR)?
3. Could you analyse the classification that I established in our model?
4. How do you analyse the fact that most of the indicators are categorised into the LA and Society categories?
5. Could you please analyse the inclusion of the categories (Innovation and Competitiveness; Employee Welfare and Stakeholder Participation) in our model?

Appendix D 3. Remaining Answers of the Interview

A. Importance of the three sustainability pillars and current company situation

1. Please mark the importance given to the economic pillar of sustainability in this scale;
2. Please mark the importance given to the environmental pillar of sustainability in this scale;
3. Please mark the importance given to the social pillar of sustainability in this scale;

Table D 2. Importance given to the economic pillar by the interviewed companies

	Ecocomic Pillar						
Company	1	2	3	4	5	6	7
1							X
2							X
3							X
4							X
5							X
6							X
7							X

Table D 3. Importance given to the environmental pillar by the interviewed companies

	Environmental Pillar						
Company	1	2	3	4	5	6	7
1						X	
2							X
3							X
4							X
5					X		
6							X
7						X	

Table D 4. Importance given to the social pillar by the interviewed companies

	Social Pillar						
Company	1	2	3	4	5	6	7
1						X	
2							X
3							X
4							X
5					X		
6							X
7							X

4. How would you describe the capacity/ability that your company has to affect social sustainability policies in your supply chains?

Fundamentally, it exists three ways that companies use to affect social sustainability policies in supply chains: 1) companies screen and evaluate their suppliers' practices aiming at sensitizing them to sustainability issues; 2) they strive to be a social active agent by establishing partnerships and associations with all stakeholders; 3) they embed and enshrine sustainability goals into the organisational strategy owing to influence the value chain and to slash impacts. The first method consists in auditing the suppliers and working closer to them in order to ensure product quality and compliance of the contract specifications (e.g. child labour forbiddance): all the respondents asserted that they worked in tight cooperation with their suppliers and five mentioned that they implemented a supplier code of conduct in view of ensuring quality, safety and legal standards agreed in the contract. Interviewees 1/4/5 stated that they had a huge ability to affect social policies in relation to their

suppliers but it is “a matter of combination of scale and size” (interviewee 5). Since their weight is substantial in comparison with most of their suppliers, “the larger the economic relationship will exist between the company and its suppliers and therefore for the more influence will be able to exert” (interviewee 5). Companies stressed the need to foster long-term and trustful relationships with suppliers because it not only enhances cooperation but also it creates a *win-win* situation for both parties: suppliers lacking sustainability practices take advantage of the know-how to drive changes and implement adequate measures in their operations.

Regarding the second method, all respondents highlighted the significance of interacting and consulting with all the stakeholders to understand their needs and concerns: they affirmed that maintained permanent contact with their stakeholders. Respondent 2 said that “we look to influence our stakeholders through initiatives and participation in platforms, and instruct the decision-making processes: the more educated, the better the decisions made”. Currently, doing business is much more than just a pure economic transaction because the actions of a company can create a huge backlash and domino effect in third parties: therefore, stakeholders are valuable actors that help companies to better address some critical issues.

In line with this is the accession by all the companies to renowned international standards and protocols such as UN Global Compact, the OECD guidelines which help them and their suppliers to become more responsible, accountable and sustainable. Through the setting of clear and unambiguous objectives accredited by an external party, companies may influence both upstream and downstream their supply chain partners to be compliant with them and drive changes.

The third way to affect social sustainability policies in supply chains is to formally embed social goals into the long-term strategy of a company. This ensures that the goals must be translated into tactical and operational initiatives implemented on a daily basis by all the employees.

The adoption a top-down approach to sustainability increases the reach of the initiatives impacting transversely the company structure: from the board down to the shop floor. The middle management must ensure that appropriate sustainable actions and metrics are effectively developed and incorporated into processes and procedures. In fact, if companies address sustainability in a holistic way rather than in *insulation mode* in some business units, the subsequent impact of their actions will further effect the structure. As an example, interviewee 4 stated that the vision, mission and top managers of the company were recently restructured to better accommodate sustainability into their business.. Company 6 promotes meetings to characterise and discuss the most pressing sustainability issues affecting the business and to incorporate them in the strategic pillars.

5. <u>How would you describe the sensitivity that your company has to be affected (influenced) by social sustainability policies in your supply chains?</u>

The only way companies are influenced by social sustainability policies is through its stakeholders but its materialisation (output) presents distinct case endings depending on the approach. In other words, all the companies reckoned the importance of stakeholders’ role within the strategy of the company and their vital part in creating value: the sensitivity and the dialogue are necessary to drive changes and to improve. Interviewee 1 said that “the weight of the legislation and regulation is decreasing

compared to the stakeholders' influence". Three interviewees asserted that the relationships with the communities influence their plan of actions and some priorities: creating jobs is a top concern for them in today's context. In particular, it is decisive to address sustainability strategies at concerted level wherein all the stakeholders participate. Organisations have to understand that stakeholders' expectations cannot be managed in insulation because there are conflicting points of views and interests that must be solved; meaning that must turn effective risks into competitive advantages.

In this dynamic context, it requires a continuous sounding of the market and self-actualisation exercise: "a tick box mentality is not enough when it comes to sustainability" (interviewee 5). All seven companies have stakeholders' consultation procedures/partnerships. There is a growing sense by the organisations that engaging relationships with national and international bodies is imperative because they can stay abreast of what is happening in terms of market and global strategy: we cannot meet today's challenges alone" (interviewee 4). This ultimately influences their positioning to such things because sustainability it is not: "pure and simple altruism" (interviewee 7). Interviewee 6 said that company is constantly engaging sustainability measures because "it is paramount and needed, not because it looks pretty". Interviewees 5/7 argued that NGOs are playing a more pedagogic and pragmatic role together with companies by elucidating/educating them in some issues: "there is growing sense, there is not shouting at companies, there is a requirement to work more closely together: the situation changed and now we are having partnerships with NGOs and they are becoming what we call "critical friends"" (interviewee 5).

The underlying idea behind the capacity to be influenced is linked to the way how the company manages successfully those inputs: "[…] people get too hung up the way were you are going. The idea trying that none of the employees is exploited in the World is almost impossible and you can never achieve that. It is the journey towards that, as opposed as how you are going to achieve this end game" (interviewee 5). Interviewee 2 stated that: "we want more than doing interesting things; we want to make the difference". In order to solve this gap, companies have created a set of tools that help them to materialise key concerns into strategic actions: 1) companies 1,2,7 use a sustainability matrix which prioritise issues based on two axes: importance for the business and importance for the stakeholders/society; 2) companies 1,2,7 created incentives and prize-money to promote sustainability ideas in the communities which in turn will improve their businesses.

6. <u>How important is for your company the evaluation of social impacts in your supply chains?</u>

The evaluation of social impacts in supply chains is critical nowadays. Companies reckoned the strong interdependencies between the three dimensions of sustainability and therefore it is argued that an imbalance in one of the pillars has a direct impact on the other two dimensions. Interviewee 1 stated: "the company acquired long ago the notion that one needs to gain the social right to operate", meaning that there is no point in running the business if there is not a widespread acceptance of the stakeholders of what they did and a clear understanding of the benefits that may arise therefrom.

The growing evaluation of social impacts internally is considered a key variable adding to the current context helping companies to improve its performance and become a more attractive to work at. In other words, they have already understood that it is crucial to enhance human capital skills and

welfare owing to maximise the companies' overall performance and create value-adding solutions for the customers. For instance, three respondents answered that the health and safety policies are fundamental for preventing and hold the employees accountable for possible incidents.

On the external side, the evaluation of social impacts within the supply chain is critical because a defective management may affect the companies' image and branding. Companies aim at having a higher power and control on their supplier base through the establishment of strategic collaboration in order to increase the levels of certainty and dependency in their relationships. They also strive to increase trust and minimise risk through the enhancement of skills and competencies of their suppliers. Four respondents said that they had training workshops and other initiatives with their suppliers. Companies are also trying to segment the suppliers and work more closely with those which do not fulfil the minimum required standards: "this is social responsibility" (interviewee 6).

Also, the evaluation of social impacts in supply chains is a marketing strategy which aims at improving the company's image and to capture investors. Companies 4 and 7 expressed that it is important for their companies to be recognised for their sustainability good practices: "we know that these ratings are important for the investors and for their decision-making in where to invest" (interviewee 4); "we do everything because we want to minimise the environmental and social impacts, but we want also to have visibility and a good opinion from those assessing us" (interviewee 7). Becoming greener is a way that companies found to differentiate from the competition because it increases reputation.

- <u>Regarding the analysis of the social pillar, it is evaluated from a perspective of social impact or social performance assessment?</u>

Based on the answers from the respondents, all of them told they both are important but fundamentally they care about social performance assessment because 1) they want to track the evolution of their social performance; 2) they want the investors to be aware of that performance and to compare them in a sectorial peer analysis. Interviewee 4 said that "both dimensions are interdependent and they cannot be separated. We want to understand the social impacts to change the *status quo*, but we want also to be able to measure our social performance". These organisations think that is crucial to implement suitable KPIs and tools enabling to evaluate, systematise and quantify the social impacts over the product life cycle.

Companies have to find ways to measure the impacts form what they do because processes and procedures can only be improved if they can be measured. Interviewee 5 said that "you have to be able to find ways of describing things that show the real benefit to the bottom line of the business as well as the broader economy or the world. […] People will not take you seriously because you cannot quantify what the benefits are to the bottom line of the business." Company 1 wants to assess the social impacts of their actions, but most of all they wish to run cost-benefit analysis in order to prioritise initiatives to create higher impacts. They are members of the London Benchmark Group (NGO) which aims at standardising the criteria assessing the social contributions made by the companies so that it is then possible to compare them at an international level. Put it simple, this NGO has the daunting task of standardising performance measurements so that it is possible to compare "apples and pears"; they try to quantify the return on social investment of the companies in societies.