SUPPLY CHAIN SOCIAL RESPONSIBILITY: ITS APPROACHES AND THEIR SYSTEMIC NATURE

by

Mohamed BASTA

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RESPONSABILITÉ SOCIALE DE LA CHAÎNE D'APPROVISIONNEMENT: SES APPROCHES ET LEUR NATURE SYSTÉMIQUE

Mohamed BASTA

RÉSUMÉ

Afin d'aider les chaînes d'approvisionnement à mieux gérer la problématique concernant la responsabilité sociale et de fournir une base robuste pour de prochaines études, cette recherche vise à découvrir à travers les publications pertinentes de la littérature les biais sous-jacents, les points forts et les points faibles des approches développés et appliquées en termes responsabilité sociale. La contribution scientifique de cette étude est d'apporter de nouvelles idées sur la recherche et la pratique actuelles à partir des concepts de résolution de problèmes, suivant une perspective systémique.

La problématique concernant la responsabilité sociale provient de la vulnérabilité des chaînes d'approvisionnement qui provoque des réactions chez les parties prenantes qui obligent l'apport des modifications dans les méthodes de gestion. Ces vulnérabilités comprennent entre autres les dommages environnementaux, l'embauche de mineurs, les conditions de travail de mauvaise qualité, l'indifférence envers les traditions de la communauté, la préférence de travailleurs étrangers, etc. Tandis que les réactions sont manifestées sous différentes formes, dont : la perception négative de la société, les mauvaises publicités, le boycott des consommateurs, l'activisme des parties prenantes, les pressions provenant des groupes de défense des droits des travailleurs, l'atteinte aux marques commerciales et à la réputation, les pressions engendrées par la règlementation, les actions portées en justice, l'interruption de travail, la perte de valeur des parties prenantes, la perte des avantages de coût, la perte de confiance de la clientèle, la perte de valeur de produits, etc.

Cette étude est subdivisée en trois parties qui se concentrent chacun sur un aspect de son objectif général. Les résultats de chacune de ces parties représentent respectivement des données d'entrées pour la partie suivante, tout en lui fournissant la direction à prendre.

La première partie réalise une étude de cartographie de la littérature afin de collecter et de classifier des informations manifestes concernant les approches les plus répandues concernant la responsabilité sociale au sein des chaînes d'approvisionnement. L'objectif était de comprendre comment les problèmes d'intérêt opèrent actuellement. Les informations manifestes recueillies ont permis de porter attention à des groupes de connaissance, des lacunes et des opportunités ratées. Les résultats indiquent que la responsabilité sociale des entreprises, les comptes rendus durables et l'évaluation du cycle de vie social font partis des approches les plus utilisées tandis que les approches de la pensée systémique sont grandement inutilisées.

La deuxième partie investigue en profondeur le peu d'utilisation d'approches de la pensée systémique au sein de la littérature. L'objectif est de comprendre, suivant une approche de pensée systémique, combien la littérature est en mesure d'offrir des solutions viables qui peuvent traiter la nature complexe des problèmes d'intérêt. Les résultats indiquent que la littérature ne contient pas suffisamment de publications qui traitent du pluralisme dans les perspectives.

La dernière partie se penche sur le développement d'une meilleure approche alternative pour aborder la problématique concernant la responsabilité sociale au sein des chaînes d'approvisionnement en atteignant deux objectifs qui visent : d'abord à comprendre combien les mesures plus populaires peuvent être erronée suivant une perspective de pensée systémique, aussi bien qu'à déterminer leurs paradigmes systémiques sous-jacents; et ensuite, à comprendre combien les approches de pensées systémiques critiques peuvent être utilisées pour concevoir des interventions supérieures qui identifient et adressent mieux les problèmes d'intérêt à la place des outils et méthodes existants. Le développement d'un cadre a été possible après avoir analysé les points forts et les points faibles des trois approches les plus répandues et la pertinence de leur paradigme.

Mots clés: Gestion de chaines d'approvisionnement, responsabilité sociale des entreprises, pensée systémique, pratique de systèmes critique, durabilité sociale, risque social

SUPPLY CHAIN SOCIAL RESPONSIBILITY: ITS APPROACHES AND THEIR SYSTEMIC NATURE

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ABSTRACT

To help supply chains better manage their social responsibility messes, this research set out to uncover the underlying biases, strengths and weaknesses of the relevant literature and the approaches it developed and employed in order to offer a solid foundation for future research. The scientific contribution of this body of research is to offer new insights about current research and practices with regard to their problem-solving bases from a systemic perspective.

Social responsibility messes are due to supply chain vulnerabilities instigating reactions from stakeholders forcing the former to change its conduct. Such vulnerabilities include: environmental damage; child labor; poor working conditions; indifference toward community traditions; favouring foreign workers; etc. Moreover, reactions manifest in many forms including: negative societal perception; bad press; consumer boycotts; shareholder activism; pressure from worker rights groups; brand and reputation damage; regulation pressure; legal action; operational disruptions; lost shareholder value; lost cost advantage; lost customer loyalty; lost product status; etc.

This research is organized into three phases, each resolving part of its overall objective, and the findings of which served as input to the next phase and inspired its direction.

Phase one mapped the supply chain social responsibility literature in order to collect and classify evidence on the most prolific supply chain social responsibility approaches. The goal was to understand how the messes of interest are actually handled. Such evidence highlighted knowledge clusters, knowledge gaps, and missed opportunities. The findings revealed that Corporate Social Responsibility, Sustainable Reporting, and Social Life Cycle Assessment are amongst the most employed approaches whereas systems thinking is highly underused.

The second phase further investigated the scarce use of systems thinking in the literature. The goal was to understand, from systems thinking perspective, how capable the literature is in offering viable solutions that can handle the complex nature of the messes of interest. The findings revealed that the literature is insufficient with regard to pluralism in perspective while being distributed over a number of paradigms to various degrees, therefore confined within these paradigms' constraints.

The third phase set out to develop a better alternative approach to the messes of supply chain social responsibility by accomplishing two goals: firstly, understanding how the most prolific

measures are fallible from a systems thinking perspective as well as determining their underlying systemic paradigms; and secondly, how Critical Systems Thinking can be used to design superior interventions that better identify and address the messes of interest while using the tools and methods from the already existing approaches. The development of the framework was only possible after the analyses of the strengths and weakness of three of the most prevalent approaches and their paradigm pertinences.

Keywords: supply chain management, corporate social responsibility, systems thinking, critical systems practice, social sustainability, social risk

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LIST OF ABREVIATIONS

ABM	Agent Based Modelling
AC	Analytical Construct
CSH	Critical Systems Heuristics
CSP	Critical Systems Practice
CSPSR	CSP for Social Responsibility
CSR	Corporate Social Responsibility
CST	Critical Systems Thinking
DES	Discrete Event Simulation
DT	Decision Theory
ESG	Environmental Social and Governance
GRI	Global Reporting Initiative
HST	Hard Systems Thinking
IISD	International Institute for Sustainable Development
KALPHA	Krippendorff's Alpha
LCA	Life Cycle Assessment
OC	Organizational Cybernetics
PDF	Portable Document Format
QFDE	Quality Function Deployment for the Environment
RDT	Resource-Dependence Theory
SAM	SOSM Approaches Map
SA8000	Social Accountability 8000
SCM	Supply Chain Management

SCRM	Supply Chain Risk Management
SD	System Dynamics
SETAC	Society of Environmental Toxicology and Chemistry
SCOR	Supply Chain Operations Reference
SIA	Social Impact Assessment
SLCA	Social Life Cycle Assessment
SLR	Systematic Literature Review
SMS	Strong Model of Sustainability
SoS	Systems of Systems
SOSM	System of Systems methodology
SST	Soft Systems Thinking
TBL	Triple Bottom Line
UNEP	United Nations Environment Program
UTL	Urban Transition Labs
VSM	Viable System Model
WCED	World Commission on Environment and Development
WMS	Weak Model of Sustainability

INTRODUCTION

0.1 General background

There are many factors that affect the overall performance of a supply chain, such factors involve complex economical, environmental and societal considerations (Veldhuizen et al., 2015). Therefore, to maintain and improve performance, supply chains have to develop appropriate plans and integrate them in their overall strategies. Such plans are not one-size-fits-all, but rather sensitive to local and regional settings, such as environmental constraints, political realities, and societal norms and expectations (Khomba, 2012).

A system is a complex whole the functioning of which depends on its parts and the interactions between those parts (Jackson, 2003). Moreover, complexity stems form the number or parts in a system, the nature of their interactions, and their relation with the surrounding environment. Complexity causes system-wide behavior to emerge that otherwise would not be recognized when inspecting the parts. As such, given the high number of its member firms and the intertwined interactions between them, supply chains are highly complex systems particularly efficient in handling materials, information and finances to yield a product or service in response to market demand, the core objective of which is profit maximization (Omar et al., 2012).

Moreover, Martel et al. (2016) defined a supply chain as the set of stages required to transform raw materials into consumer products requiring subsequent shipment to markets. These stages can occur in different companies and involve many different design, procurement, production, distribution, and sales activities. The authors added that the goal of a supply chain is not just to ensure that the products purchased, manufactured, distributed, and sold are available at the right place at the right time in the right quantity and quality at the lowest possible cost; but rather, the goal of a supply chain extends to create value for its member firms and their stakeholders. The authors explained that value in this case means the sustainable improvement of a supply chain's market value. The authors added that market

value provides a suitable mechanism for arbitrating between the conflicting objectives of a supply chain's various stakeholders, and is equal to the sum of all of its member firms' future residual cash flows (RCF), discounted at the firms weighted average cost of capital (WACC).

It follows that the aforementioned definitions are reasonable from an economic sustainability perspective, making Walmart's sourcing from sweatshops for example seem justifiable, especially given the latter's low cost incentive. However, from a social and environmental sustainability point of view, the definitions have profound flaws, bringing the question of supply chain continuity and growth prospects to the spotlight (Hutchins, 2010).

According to the weak model of sustainability (WMS), see Figure 0.1, the three pillars of sustainability are considered independent with some overlap. Arguably, as long as supply chains abide by the laws and regulations concerning social and environmental sustainability, they can surely continue their economic activities (Hediger, 1999).

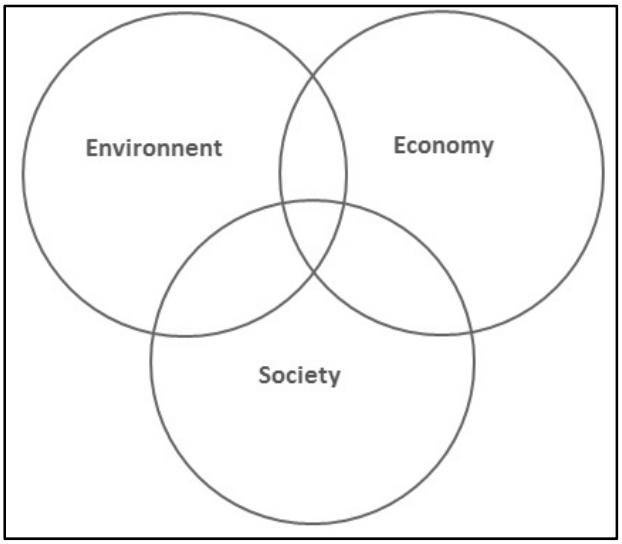

Figure 0.1 Weak model of sustainability

Nevertheless, considering the strong model of sustainability (SMS), see Figure 0.2, reveals an alternative reality; the three pillars are nested. Economies exist only within societies

which in turn are surrounded by the environment. This interconnectedness necessitates a balanced approach while making it clear that economic activity will be obstructed when crossing the limits set by the social and environmental pillars (Hediger, 1999). Supply chains that recognize this know that depleting water in drought prone areas, for instance, will likely intensify its social risk in probability of occurrence and magnitude of impact, such as instigating protests causing disruptions at large costs; Nestlé on the other hand does not (Fombrun et al., 2000).

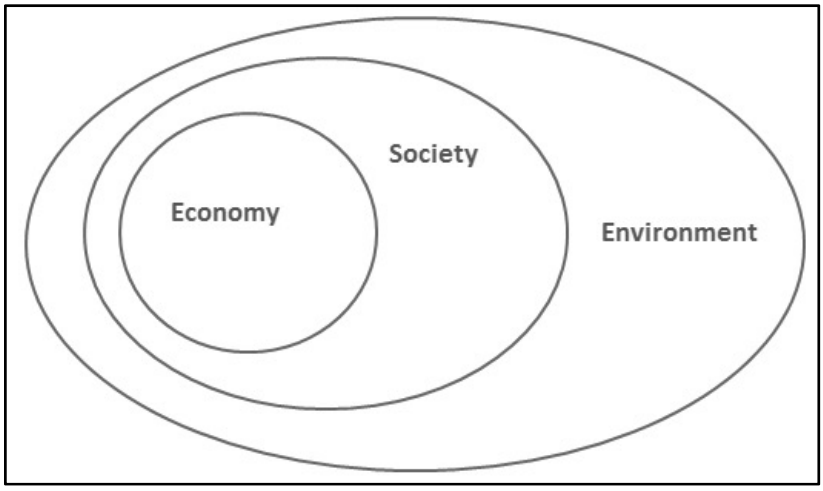

Figure 0.2 Strong model of sustainability

Supply chains are susceptible to a whole spectrum of social risks, which include stakeholder activism, negative social perception, change of purchasing patterns, boycotts, brand and reputation damage, regulation pressure, legal action, operational disruptions and lost shareholder value (Hutchins, 2010).

It follows that the economic and environmental pillars of sustainability have been the focus of much study and research over the past several decades (Hofmann et al., 2014), this is mainly due to their validated and inevitable impacts on bottom-lines when not adequately managed (Sheffi, 2005). Moreover, it is much simpler to get an objective account of economic and environmental risks given the available operational and financial models

(Hofmann et al., 2014). Conversely, much less interest was devoted to social sustainability, and when addressed, it was limited to legislative issues and working conditions (Linton et al., 2007). According to Hutchins (2010), social sustainability covers Lower Order Needs such as labor justice, working conditions, safety, poverty and ecosystem protection; and Higher Order Needs such as education, quality of life, equity, esteem, sense of belonging and self-actualization.

The relatively reserved interest in social sustainability within supply chain management comes as a surprize, especially when considering its high frequency of occurrence and magnitude of impacts. Time and again, social responsibility messes have demonstrated their serious impacts on targeted supply chains, affecting revenues and diminishing growth prospects. Therefore, the need for solutions to prevent and manage such messes is pressing, and justifiable (Hutchins, 2010).

The term "Mess" was coined by Russ Ackoff to denote complex problem situations that are characterized by their interdependent and ill-structured nature. Messes occur when rational actors exhibit behavior of collective self-damage. Resolving messes requires collective action following a systemic approach, i.e., addressing the whole system instead of one or more of its parts.

Take for instance the United Airlines violent treatment of passengers whose seats were intentionally overbooked costing the company around one billion dollars in value. Another example is the Foxconn suicide waves leading to a drop of around five billion dollars in Apple's market value, and more recently Facebook's user data mishandling wiping out 100 billion dollars of its market value in a few weeks. Such recurring incidents could be due to improper stakeholder management, which is further conflated by the unyielding nature of social sustainability to measurement, monitoring and prediction processes; making it hard to integrate into strategic plans (Kates et al., 2005).

Stemming from a particular interest in supply chain social responsibility, a review of the related literature quickly reveals numerous developed and refined approaches each claiming resolutions. Example approaches include Social Life Cycle Assessment (SLCA) [1], Corporate Social Responsibility (CSR) [2], Environmental Social and Corporate Governance (ESG) [3], and the Global Reporting Initiative (GRI) [4]. However, despite their widespread adoption, supply chain social responsibility incidents have not ceased to increase (Skarmeas et al., 2013). Supply chains continue to conduct their activities in ways not considered to be socially responsible by their stakeholders, thereby increasing the likelihood of damaging reactions demanding tough concessions and forced changes in behavior while having social licenses to operate revoked (Kortelainen, 2008). This discrepancy hints to an innate flaw impeding such approaches from offering credible and effective solutions.

Moreover, a preliminary analysis of the aforementioned approaches revealed their limitations and differences regarding worldviews, assumptions, problem definition, and acknowledged stakeholder groups, effectively ensuring that any solutions they offer are divergent and partial (Basta et al., 2018). i.e., from a critical systems thinking (CST) perspective, the approaches belong to distinct paradigms. Therefore, none of them can offer holistic and creative solutions—holistic by accounting for the whole system as opposed to one or more of its parts, and creative by being selective on how to use the many systems thinking methodologies and industry approaches while being aware of their different assumptions—that account for the complexities of supply chain social responsibility messes, a complexity with two dimensions: the supply chain's structure and the nature of its participants (Jackson, 2003). Hence, such approaches can only address the messes of interest from their point of

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[1] www.unep.fr

[2] www.iisd.org

[3] www.cpacanada.ca

[4] www.globalreporting.org

view resolving some of its factors while being completely incognizant of others. This finding is further developed and explained in detail in later chapters.

0.2 Purpose of this study

The goal of the research described herein is to surface the underlying biases and limitations of the supply chain social responsibility literature and the approaches it developed and employed in order to offer a solid foundation for future research. The scientific contribution of this body of research is to offer new insights about current research and practices with regard to their problem-solving bases from a systemic perspective. The following is the main research question of this study:

- What are the systemic underpinnings of the current supply chain social responsibility literature?

In light of the aforementioned, this research was split into three phases, each addressing part of the main research question, and ending with an article that was accepted for publication or was submitted for revision to a journal specializing in the subject matter. The following are the three research sub-questions:

1. How is the scientific literature on supply chain addressing social responsibility challenges?
2. To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?
3. To what extent are key supply chain social responsibility approaches underpinned by systems thinking?

In phase one, the supply chain social responsibility literature was mapped in order to collect evidence on the most prolific remediation approaches that were explicitly used, that is, how the messes of interest are actually handled in the literature. Such evidence highlighted knowledge clusters, missed opportunities and set the stage for the next phase. The findings revealed that CSR, sustainable reporting, and SLCA are amongst the most used methods

whereas systems thinking ranks far behind. The work from this phase was published in the Journal of Corporate Social Responsibility and Environmental Management in an article titled “How are supply chains addressing their social responsibility dilemmas? Review of the last decade and a half”.

The second phase picked up from the finding that systems thinking was rarely used in the literature when compared to mainstream approaches like CSR. This finding from phase one represented an unsettling situation raising doubts about the literature’s aptitude in offering credible solutions, as it could be confined within a restricted set of assumptions and worldviews, limiting it to suboptimizations in the form of localized quick-fixes. The findings revealed the literature’s insufficiency with regard to pluralism in perspective while being distributed to various degrees over interpretivism, functionalism and emancipation, thereby confirming the inherent inability of its majority in offering creative and holistic solutions. The findings from this phase were submitted for publication to the Journal of Management Studies in an article titled “Systems Thinking in the Supply Chain Social Responsibility Literature: A Mapping Study”.

The last phase aimed at developing the case for an alternative approach to the messes of supply chain social responsibility by accomplishing two goals: firstly, how the most prolific approaches are fallible from a systems thinking perspective; and secondly, how CST can be used to deduce better interventions that better identify and address the contextual factors of the messes of interest while leveraging the already existing approaches, therefore providing a solid foundation for future research. As such, a Systematic Literature Review (SLR) involving three of the most prolific approaches was conducted. The goal is to uncover what systems thinking paradigms each embraces, thereby revealing their intrinsic assumptions and worldviews. The results show that each is confined within a distinct and opposing paradigm hence confirming their incapacity to offer solutions accounting for all factors of a problem situation. Nevertheless, from a CST standpoint, the approaches are regarded as complementary rather than contradictory, allowing the design of better and context aware interventions akin to Critical Systems Practices (CSP). Such interventions compensate for the

shortcomings of some of the approaches by the strengths of others. The findings from this phase were submitted for review to the Academy of Management Journal in an article titled "A Systemic Evaluation of the Top Social Responsibility Approaches".

In essence, systems thinking is a holistic analysis approach for managing systems by considering the emergent system as a whole rather than its individual parts, their relations and interactions. This is contrary to reductionism which focuses on the parts rather than the emergent whole, thereby failing to predict and manage higher-level patterns. This leads to localized repairs with negative impacts elsewhere in the same system (Jackson, 2003).

Comparatively, a systems thinking paradigm is a set of ideas, assumptions and beliefs that shape and guide activity (Kuhn, 2012). Each paradigm is based on assumptions not compatible with its counterparts, making them in conflict with one another. Viewing problem situations from various paradigms allows for drastic different perspectives to be considered. This ensures that challenging positions with rigorous alternative theoretical foundations have their fair share of consideration (Jackson, 2003).

The following diagram is a high level view of the overall research design. Next to each phase are the major findings and contributions that will be explained in detail in later chapters.

0.3 Delimitations and limitations of this study

This study is exclusively interested in addressing supply chain social risks, all other types of risk, such as financial and operational risks, are outside the scope of this study. In the same vein, only the social pillar of sustainability is considered. The environmental and economic pillars were only studied from the point of view of their social impacts and consequences, for instance, the effects of a supply chains' polluting actions on instigating protests and legal pressure from civic societies. In the same vein, assessing the influence—on research and practice—of published articles addressing the subject matter is out of scope of this study.

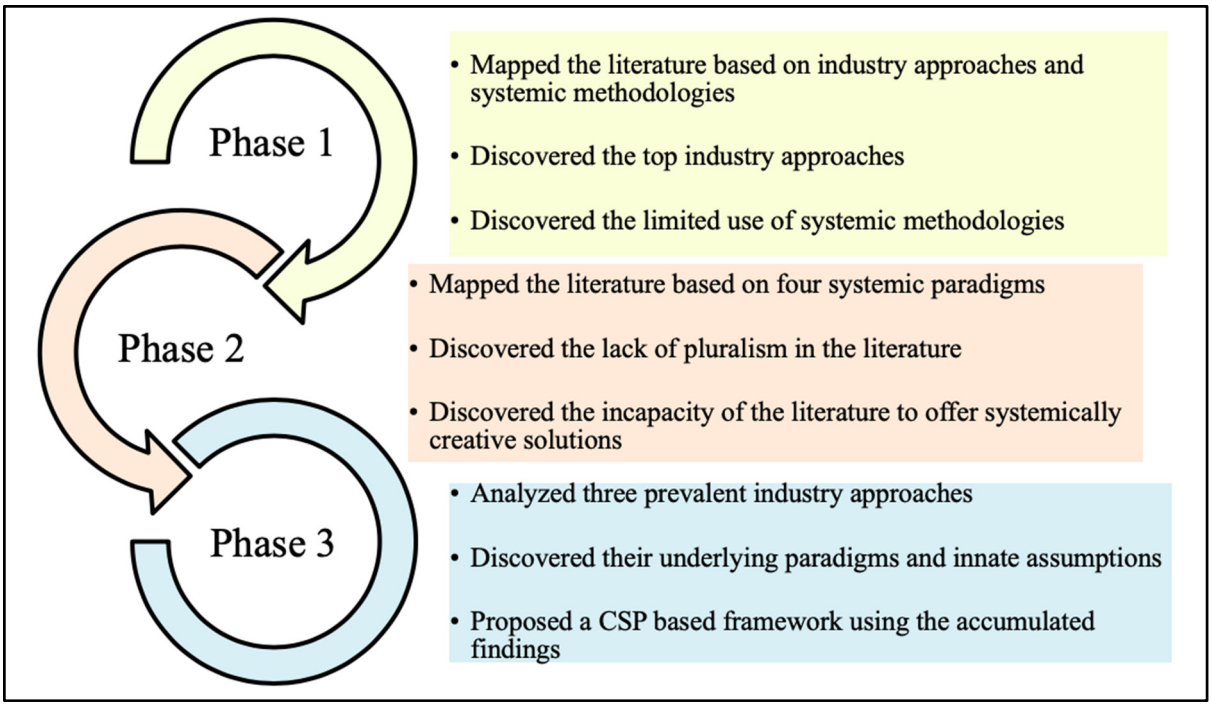

Figure 0.3 Overall research design

This study did not favor any of the social responsibility approaches. Moreover, this study only considered the mostly adopted variety of a certain approach, and opted for the standardized version when available.

Finally, corporate philanthropy and its effects on reducing social risk are out of scope, the reason is that such activities are not related to the core of the businesses that incur them (Hutchins, 2010), do not follow a standardized procedure, and are not usually part of an established plan or strategy. Moreover, it is often not feasible to measure their effects on the receiving stakeholders.

0.4 Significance of this study

The findings from this research are important to academics and practitioners alike. This research enhanced the understanding of supply chains social responsibility and its two constituents: social risks; and social sustainability. It showed the systemic limitations and biases of the supply chain social responsibility literature and the remediation approaches it developed, thereby explaining the seemingly persistent socially irresponsible behavior by supply chains despite their considerable investments in adopting such approaches.

Moreover, a need for holistic and creative solutions was highlighted and justified setting the stage for future research, only such solutions are capable of identifying and accounting for all factors of the messes of interest in a given context. From the contributions described herein, researchers and practitioners alike, can make better decisions and reduce their supply chain's social footprint by keeping in mind the limited nature of mainstream approaches, such as CSR and SLCA.

Moreover, helping supply chains in becoming socially responsible provides it with numerous advantages including cost savings from reduced energy consumption, lessened waste, reduced health and safety bills, shorter lead time, access to information through newly developed networks with various stakeholders in all its spheres of influence, the ability to shape future regulations due to the newly adopted proactive nature in managing social responsibility. All these advantages place the supply chain in a difficult to mimic competitive advantage and enhanced reputation.

CHAPTER 1

LITERATURE REVIEW

Social responsibility continues to gain importance to supply chain sustainability strategists (Veldhuizen et al., 2015). Time and again, social risks like worker abuse, factory collapses, and corporate deception led to backlashes in the form of protests, negative media coverage, and targeted regulations (Hofmann et al., 2014), consequently impacting bottom lines and growth prospects (Yu et al., 2016). This reality made social responsibility a necessity requiring immediate attention (Zdenka et al., 2014).

This chapter presents a review of the literature on supply chain social responsibility, social risk and social sustainability. It also provides a preview of the relevant remediation approaches that were developed, and the role of systems thinking.

1.1 Supply chains

A supply chain is the amplitude of activities performed and resources consumed to yield a product or service from concept to consumption and beyond (Kytle et al., 2005). From a sustainability perspective, there exist two types of supply chain designs: open; and closed loop. Closed loop supply chains are distinguished by having formal procedures for recycling their products back into the system along with raw materials (Kanchan, 2015).

In their never ending pursuit for efficiency, supply chains developed into large and highly complex systems that are global in nature (Fang et al., 2015). Contemporary supply chains comprise numerous companies with complex relations between and within them, where vast amount of information is used for control (Serdarasan, 2012). This came as a result of them being in direct competition with one another for growth and revenue in order to ensure the continuity of their member firms (Soler et al., 2010). Nevertheless, the gains in efficiency

usually came at the expense of the stakeholders in its sphere of influence including employees and surrounding communities (Pullman et al., 2012), consequently leading to rising social responsibility incidents (Sheffi, 2005).

1.2 Supply chain complexity

Supply chains are structured in complex networks of business entities contributing to the flow of material, information and finances upstream and downstream (Beamon, 1999), (Lambert et al., 1997) and (Mentzer et al., 2001).

The literature categorizes supply chain complexity into three groups: dynamic; static; and decision-making. Static complexity is concerned with the structure of the supply chain, the number and variety of its components and the interactions between them. Dynamic complexity focuses on the notions of time and randomness in the supply chain such as its operational behavior and its relationship with the environment. Decision making complexity involves taking into account both the static and the dynamic complexity factors in order to make sound decisions. To adequately manage a supply chain, a management method that can understand and handle such types of complexity is necessary (Serdarasan, 2012).

In discussing the sources of uncertainty in the supply chain, Kytle et al. (2005) emphasized that its complex structure is one of the major drivers making risk management a considerably challenging undertaking. Lambert et al. (1997) described the supply chain as a highly complex system and identified its members, structural dimensions, and the types of process links as causes of this complexity.

Therefore, it is difficult to ensure social and environmental integrity across the supply chain (Pullman et al., 2012). This substantial supply chain complexity in both structure and stakeholder diversity brought forth a new set of challenges, amongst which is the challenge of social responsibility (Kortelainen, 2008).

1.3 Stakeholders

As it transforms from raw material to its intended final form for delivery to end consumers, a product or service travels through numerous regions, countries and continents inhabited by communities with diverse cultures and backgrounds, leaving behind a social performance footprint (Pullman et al., 2012). Supply chains would not have been able to operate in such locations without acquiring an informal yet crucial permission named "the social license to operate" (SLO) (Provasnek, 2017). A SLO is the ongoing and broad stakeholder acceptance of a supply chains' operations, such acceptance is granted when stakeholders approve of how well a supply chain adopted their values, ideals as well as its performance in terms of expected social-activities; such as funding local schools and employing local labour (Provasnek, 2017). This permission is granted by stakeholders affected directly or indirectly by supply chain activities (Prno et al., 2012). Therefore, a supply chain must consider all of its stakeholders, not just the influential; such as its shareholders (Donaldson et al., 1995).

From a social responsibility standpoint, stakeholders are fundamental constituents of the supply chain, they form one of its two dimensions, the other being its structural complexity, and are vital to its success (Sarkis et al., 2010). From a systems thinking perspective, they are considered part of the complex social context, while the supply chain is considered a complex adaptive system (Williams et al., 2017). Stakeholders are the people within and around the supply chain, as well as those affected directly or indirectly by its activities. Essentially, a stakeholder is anyone who has stakes in the issues caused by the supply chain (Jackson, 2003). Kytle et al. (2005) define a stakeholder as "Any person, group or organization that can place a claim on a company's attention, resources or output".

Stakeholder could be classified into risk stakeholders and opportunity stakeholders. It is important for a supply chain to identify them and understand their motivations, expectations, concerns, and objectives. Properly managing stakeholder relationships is beneficial to the supply chain. Benefits include obtaining and maintaining operating licenses, freedom from stakeholder challenges, empowerment and patience from important stakeholders, sensing and

awareness, and most importantly, gaining more information on the surrounding dynamic social context and how to tackle social risks. Moreover, a mature and well established relationship with stakeholders could turn into a collaborative partnership with stakeholders actively helping with mitigating social risks and capturing new opportunities over the long run, e.g. social entrepreneurs giving corporations access to low income markets by designing innovative affordable products such as microloans (Bekefi et al., 2006).

It is essential for supply chains to distinguish between managing stakeholders and managing stakeholder relationships. In managing stakeholders, the supply chain acts as a closed system autonomous and independent of its social context. The goal is to broadcast information to stakeholders through its public relations channels about its operations and procedures. Stakeholders feedback is not requested nor it is considered. On the other hand, in managing stakeholder relationships, feedback is actively sought, in other words, informing stakeholders and having them inform about social issues. This is accomplished by the supply chain establishing mechanisms for listening to its stakeholders and considering their views as well as involving them in developing solutions.

Supply chains have obligations to stakeholders within and outside their systemic boundary. In fact, accounting for stakeholder interest is a stepping stone for serious social responsibility initiatives given their role in identifying and setting priorities (Searcy, 2016).

Supply chains interact with numerous types of stakeholders who are purposeful in their own right including: individuals; shareholders; employees and their families; customers; suppliers; business partners; regulators; governments; non-governmental organizations; international agencies, etc. (Pullman et al., 2012).

More importantly, stakeholders are diverse in their backgrounds, worldviews and perspectives (Jackson, 2003). Stakeholder worldview is formed by various factors and their interconnectedness, the factors include: religion, politics, science and law (Roberts, 2001).

The numerous types of stakeholders and their diverse nature greatly contribute to the complexity of the messes of supply chain social responsibility (Brauner et al., 2013).

Unfortunately, the supply chain's relation with its stakeholders had not always been optimal, to the contrary, it has not ceased to deteriorate over the years, so much so that stakeholders now often operate from a standpoint doubting the supply chain's willingness to fulfill its social responsibility obligations (Kortelainen, 2008).

Stakeholders are constantly monitoring supply chain social performance (Porter et al., 2006), and when not satisfied, they exploit its vulnerabilities through a plethora of means forcing it to change its behavior (Sheffi, 2005). For instance, a supply chain depleting a natural resource such as water, decisive to the livelihood of local communities, is likely to face backlashes causing disruptions at large costs (Fombrun et al., 2000). Moreover, through the use of freely available social media platforms, stakeholders can instantaneously broadcast information about a targeted supply chain's perceived negative social behavior to large numbers of stakeholders worldwide. Through such means, various forms of reactions could be organized, such as protests and boycotts (Farache et al., 2018).

1.4 Social risk and social sustainability

Social risk is the exposure to adverse stakeholder reactions due to perceived vulnerabilities resulting from the supply chain's behavior. Accordingly, social risk management allows a supply chain to find, assess and rectify any vulnerabilities, such as adverse working conditions, that could lead to social incidents like worker strikes and consumer boycotts (Sheffi, 2005) and (Teuscher et al., 2006), whereas social sustainability acts as a strategic plan by which a supply chain guides its activities and operations in a way that ensures a minimal negative social footprint (Sarkis et al., 2010). We think social risk management and social sustainability go hand in hand to properly handle supply chain social responsibility messes, as they defy suboptimization and must be handled at the supply chain level. The following subsections discuss the two concepts in more detail (Basta et al., 2018).

1.4.1 Social risk

Supply chain risks are “an exposure to serious disturbance arising within a supply chain affecting its ability to effectively serve the end customer market”. Three factors define supply chain risks: the threats; the vulnerabilities; and the degree of control and countermeasures available (Ghadge et al., 2010). Bandaly (2012) added that risks have three constructs: the domain, the source and the adverse events. Moreover, Sheffi et al. (2005) explained that there are three classes of risk: random; accidental; and intentional.

Supply chain risks are different from risks in other domains. They must be integrated into the supply chains’ strategic plans to be properly managed. For instance, mitigating certain risks such as the bullwhip effect by sharing information could increase risks of inventory shortage (Bandaly, 2012).

To counter risk, supply chains implemented and employed various risk management strategies. The goal is to identify, assess and handle risk adequately. Brindley (2004) defined supply chain risk management (SCRM) as “The management of supply chain risks through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity”. Furthermore, Manuj et al. (2008a) defined SCRM as “the identification and evaluation of risks and consequent losses in the global supply chain, and implementation of appropriate strategies through a coordinated approach among supply chain members”.

Unfortunately, the relationships within the supply chain and its environment have convoluted, one such example is the relationship with civil societies who fiercely demand changes in the supply chain’s behavior. These sorts of demands or pressures are termed social risk.

Amongst the drivers of social risk are the supply chain’s violation of its own proclaimed standards, breaching international community laws, the incomplete understanding of the

strategic importance of social risk, and failing to accommodate the stakeholders and their expectations (Beth et al., 2005).

Social risks manifest as vulnerabilities inciting adverse stakeholder reactions, consequently impacting the supply chain's bottom line (Sheffi, 2005). Vulnerabilities include: environmental damage; child labor; poor working conditions; indifference toward community traditions; favouring foreign workers; etc. (Weick et al., 2005). Stakeholders react when noticing vulnerabilities and consider them inappropriate (Reimann et al., 2012), thus pressuring the supply chain into concessions, change in behavior or even halting its activities (Foerstl et al., 2010). The reactions include: negative societal perception; bad press; consumer boycotts; shareholder activism; pressure from worker rights groups; brand and reputation damage; regulation pressure; legal action; operational disruptions; lost shareholder value; lost cost advantage; lost customer loyalty; lost product status; etc. (Cousins et al., 2004). The impacts range from reputation damage to considerable loss in revenue (Foerstl et al., 2010). From a tactical position, social risks are what social responsibility is meant to keep under control (Hutchins, 2010).

Social risks have increased both in frequency and impact magnitude (Porter et al., 2006). A leading factor is the access to royalty-free and reliable communication such as social media and texting platforms. More than ever, stakeholders can now rapidly mobilize in large numbers, have a much stronger voice, and appeal to a larger public who they believe could join their cause (Blos et al., 2009).

1.4.2 Social sustainability

Sustainability is the "design of human and industrial systems to ensure that humankind's use of natural resources and cycles do not lead to diminished quality of life due either to losses in future economic opportunities or to adverse impacts on social conditions, human health and the environment" (Mihelcic et al., 2003). The Brundtland Commission Report, a document produced by the World Commission on Environment and Development (WCED) in 1987,

defined sustainable development as “An approach to progress which meets the needs of the present without compromising the ability of future generations to meet their own needs”. This definition was further enriched by the industry and termed as the Triple Bottom Line (TBL). TBL is equally concerned with all three pillars of sustainability and has matured enough to recognize their interconnectedness, it realizes that a change in one pillar will most probably have impacts on the others.

Sustainability in the literature is mainly divided into three constructs or pillars: economic; environmental; and social. These three pillars are strongly interconnected; adjusting factors in one will affect the others. This interconnectedness is still not well understood and is under active study and research (Hutchins, 2010). In aspiring for true sustainability, the three pillars must remain balanced, otherwise one or two would prosper for a while only to later fail due to the unavoidable limits set by the other pillars, e.g. focusing on the economic pillar while discounting the environmental and social pillars may lead to resource scarcity and public protests (Norris, 2006).

Hediger (1999) explained that there are two models for sustainability: WMS; and SMS. WMS models sustainability with each pillar being distinct with some overlap with the others. The model is termed as weak because it does not accurately describe the reality of sustainability, see Figure 0.1. SMS on the other hand acknowledges that economies exist only within societies which in turn are surrounded by the environment. For instance, it becomes very clear from studying SMS that unlimited economic growth is unfeasible, see Figure 0.2.

It is worth noting that there were attempts to reconcile the rigid disconnect between these two models of sustainability by searching for a middle ground. For instance, Davies (2013) highlighted the differences between the two models, and argued for the harmonisation of humankind and nature by moving toward an idealist eco-socio-feminist point of view. The author contended that this perspective enabled achieving full equality and balance between the three pillars of sustainability. Another example is Anderies et al. (2003) where the

authors investigated how social-ecology leads to robust systems involving components such as resources and resource-users. The authors proposed a framework that helps with identifying vulnerabilities to external factors; such as tensions between the aforementioned components.

Sustainability, as a field or an approach, has matured enough to be employed as a means for preventing, avoiding and mitigating social, economic and environmental risks. The concerns about resource scarcity, market tribulations, and environmental and social impacts are amongst the drivers for embracing sustainability. However, the social pillar of sustainability remains the least understood and the least to be researched, this could be due to the slow incremental increase and availability of information to stakeholders about the social impacts of supply chains (Seuring 2004), (Kleindorfer et al., 2005) and (Linton et al., 2007).

Finally, in discussing the constituents of social sustainability Hutchins (2010) divides social sustainability into lower order needs such as safety and higher order needs such as sense of belonging, esteem and self-actualization.

1.5 Supply chain social responsibility industry approaches

Convinced that social responsibility incidents are real threats to its continuity and growth, supply chains turned to various mainstream remediation approaches (Walker et al., 2014). Nevertheless, supply chain social responsibility incidents continue to be on the rise (Skarmeas et al., 2013).

Such approaches stem from different standpoints and can be classified into four groups: 1) Instrumental; where social responsibility is adopted only when it aligns with wealth creation; 2) Political; addressing power use toward societies; 3) Integrative; arguing for the integration of social demands into businesses given that they rely on societies for their existence; and 4) Ethical; seeking to incorporate ethical obligations into businesses toward societies (Garriga et al., 2004).

However, analyzing such approaches showed that none of them is plural in perspective, i.e., each is distinct in its assumptions, worldviews, recognized stakeholder groups, and how it defines the problem of interest. Thus each is confined within a different paradigm confirming its lack of holistic creativity and limited capacity to offer viable solutions. Pluralism requires the use of different methods from different systemic paradigms in combination to account for different worldviews and perspectives.

It follows that such shortcomings are similar to those of previous management fads such as value chain analysis, total quality management, and customer relationship management to name a few; all what they offered were quick-fix solutions. These comparatively simple approaches simply do not work in the face of significant complexity (Hofmann, 2014).

The following subsections, present five supply chain social responsibility approaches. These approaches are amongst the most prolific in the literature and industry circles alike (Basta et al., 2018).

1.5.1 Corporate social responsibility

The Kennedy School of Government defines CSR as an approach to "encompass not only what companies do with their profits, but also how they make them. It goes beyond philanthropy and compliance to address the manner in which companies manage their economic, social and environmental impacts and their stakeholder relationships in all their key spheres of influence: the workplace, the marketplace, the supply chain, the community and the public policy realm" (Hutchins et al., 2008).

CSR advocates an ethical behavior toward the three pillars of sustainability (Hutchins et al., 2008). It incites actions not required by law that enhance social good, the type of actions that go beyond the explicit, transactional, and profit driven interests of an organization (McWilliams et al., 2001). CSR is frequently used to structure organizational attitudes, strategies and relationships with stakeholders (Jenkins, 2004), while accounting for ethical

values, economic well-being, and regulatory compliance (Lehtonen, 2004). Moreover, societies in general have a number of expectations they believe businesses must assume. For instance, worker wellbeing, donations, healthcare, child care, and education (Carroll, 1999).

The most prominent of CSR initiatives is the UN Global Compact, which is also the world's largest, promoting ten principles in the area of human rights, labor standards and environmental sustainability. Porter et al. (2006) identify two types of CSR implementations: responsive CSR; and strategic CSR. The former deals with addressing stakeholder concerns and mitigating social risks, whereas the latter focuses on transforming the supply chain to benefit society by emphasizing on strategy and engaging in philanthropy.

According to Kytle et al. (2005), CSR is effective at managing large and geographically dispersed supply chains, and it can efficiently handle activities such as forming alliances, as well as recruiting and training workers in foreign countries. The benefits from CSR include better financial performance, brand reputation and customer loyalty (Godfrey, 2005) and (Pirsch et al., 2007).

CSR manages social risk on a global scale via two means: it provides information on what social risks are most probable; and offers the tools to tackle them. Such tools include a framework and a set of principles for stakeholder engagement as well as ways to gather information on current and emerging social issues (Kytle et al., 2005).

1.5.2 Social life cycle assessment

SLCA is a variant of Life Cycle Assessment (LCA). Its objective is to provide information for sustainable decision making (Schmidt et al., 2004). It does so by evaluating the actual and potential positive and negative social impacts of a product or process throughout its lifecycle; spanning raw material extraction, manufacturing, distribution, consumption, disposal or recycling. The movement toward SLCA is influenced by the major success of environmental LCA (Hutchins, 2010).

The United Nations Environment Program (UNEP) and The Society of Environmental Toxicology and Chemistry (SETAC) partnered to integrate social impacts into LCA. Other attempts include O'Brien et al. (1996) who supplemented LCA with social and political factors, their framework analyzed the environmental inventory to link environmental impacts with their associated social, cultural and political counterparts. Dreyer et al. (2006) proposed a framework that addressed the impacts of products and services on human health and basic needs fulfillment.

SLCA ensures that socially responsible decisions are made by providing decision-makers with a set of tools that facilitate better understanding of actual and potential social impacts (Moreno et al., 2014). SLCA collects, analyzes and communicates information about the social conditions of production and consumption. Results of an SLCA are used in numerous other ways including policymaking, identifying hotspots, areas of improvement, allocation of resources, and comparison of product social footprint (Benoit et al., 2010).

Another important factor of SLCA is its capacity in identifying areas in the supply chain with significant impacts and problem shifting. Problem shifting occurs when reducing impacts in one particular factor of the product's life cycle causes increased, unanticipated, and hard to detect impacts in other factors (O'Brien et al., 2007).

In a nutshell, SLCA collects inventory data, e.g. percentage of employees with health insurance, that are informative of a selected set of impact subcategory indicators, e.g. social security, which are themselves selected based on their relevance to impact categories, e.g. work conditions, with regards to a stakeholder group of interest, e.g. factory workers, allowing for cause-effect assessment modelling (Bork et al., 2015).

1.5.3 Social accountability 8000

SA8000 is a pioneering third-party auditable standard that urges companies to voluntarily establish, implement, and maintain socially responsible practices in the workplace and its

sphere of influence; including worker rights, community wellbeing, and corresponding management systems for complaints and reporting (Miles et al., 2004).

SA8000 is the most widespread amongst ethical certification standards, and is expected to increase considerably (Llach et al., 2015). The standard stipulates that a certified company complies with a set of requirements including: child and forced labour; workplace health and safety; collective bargaining and freedom of association; employee discrimination; disciplinary actions; remuneration; and working hours (Sartor et al., 2016).

Companies implementing the standard are audited through an evidence-based process regardless of size, geographic location or industry sector (Sartor et al., 2016). The auditing is conducted by recognized independent third parties. Audited companies are required to rectify any resulting discrepancies by course-correcting or introducing new policies.

Studies have reported that applying the standard increased employee engagement and moral due to continuously improving working conditions, thereby making employees feel protected and valued (Tencati et al., 2009). Benefits also include increasing returns, reduced turnover, less absenteeism, and company increased attractiveness to skilled workforce (Miles et al., 2004).

1.5.4 Sustainable reporting

According to the GRI, a sustainable report is a document published by an organization about the impacts of its economic, environmental and social activities. Moreover, such reports outline the link between the values and strategies of an organization with its commitment to sustainability. In essence, sustainable reporting is an approach based on the idea that disclosing sustainability performance following a standard in a way that is accessible to stakeholders is enough to account for issues such as social responsibility messes. Organizations only adopting sustainable reporting discredit the effectiveness of seeking stakeholder input and including them in decision making.

The main purpose of a sustainable report is to communicate sustainability performance to stakeholders. The report usually follows a pre-established template the purpose of which is to help organizations report in a standardized way understood by a wide variety of stakeholders and interested parties. Companies engaged in sustainable reporting follow a reporting cycle, which includes activities such as data collections.

1.5.5 Quality function deployment for the environment

Quality Function Deployment for the Environment (QFDE) is an effective tool for capturing stakeholder requirements, including supply chain social responsibility requirements, early during a product's design process. In a differentiation driven supply chain, this is a crucial step to make sure new products match customer requirements and expectations in terms of sustainability, hence insuring profits and a continuous value cycle.

QFDE is also effective in defining sustainability metrics at the very start of product design, this is important as it provides a means of measuring whether a product, and the supply chain, are conforming to established social sustainability requirements identified earlier with the stakeholders. Such metrics are more than likely to be independently measured by socially active stakeholders, such as nongovernmental organizations (NGO), as a way of validating sustainability claims

1.6 Systems thinking in the supply chain social responsibility literature

In light of this research, this section outlines previous work that used systems thinking to address the messes of social responsibility in the context of the supply chain.

1.6.1 Systems thinking's relevance to supply chain social responsibility

Supply chains have diverse stakeholders and are characterized as complex systems composed of a high number of subsystems connected through intertwined networks of relations,

therefore, systems thinking methodologies are poised to offer better solutions given their close attention to both characteristics (Jackson, 2003).

Moreover, social responsibility issues are complex. Issues named “Messes” by Russ Ackoff and defined by their interdependent and ill-structured nature, as well as their manifestation for a whole variety of unpredicted reasons (Searcy, 2016). Messes represent situations of collective self-damage where win-win solutions cannot be realized due to rational actors not acting in mutually beneficial ways (Valentinov et al., 2016). Moreover, corrections to messes do not happen unless deliberate efforts are made to address subjectivity and resolve conflict (Valentinov et al., 2016). Messes get more complex and involve a wider range of stakeholder when inspected (Popovic et al., 2015). Therefore, resolving them requires systemic approaches (Williams et al., 2017).

Moreover, messes are also characterized as being understood differently by different stakeholders. Stakeholders tend to hold entirely different views about the nature of a particular problem, and whether it exists in the first place. Therefore, messes are intangible and highly subjective, and are considered problems only if the stakeholders decide they are (Hester et al., 2017). Additionally, understanding how stakeholder mindsets dictate behavior and how they can be influenced toward better behavior is of high importance, and can only be achieved using social responsibility approaches that are based on systems thinking, or share its tenets. For instance, Nevens et al. (2013) developed a sustainability transition management approach where Urban Transition Labs (UTL) are formed. A typical UTL involves a variety of stakeholders including subject matter experts, policy makers, city planners and, most importantly, local community representatives. Through the lifecycle of this approach in a UTL setting, the exchanges between the different stakeholders result in major amounts of learning, agreements on best practices, and plans of action. It is through these exchanges that the collective mindset emerges based on the appreciation by all stakeholders of the various subjective-viewpoints on what a sustainable action plan is and how it should be deployed and monitored.

1.6.2 Functionalist systems thinking in the literature

A number of studies addressed the subject of interest using functionalist systems thinking methodologies; Behdani (2012) described the supply chain as socio-technical systems composed of a social and a technical dimensions. The technical dimension is concerned with the operations and the technology used, whereas the social dimension is concerned with workers, customers and surrounding communities. Both dimensions and their interdependencies must be considered in order to analyze and improve the supply chain. Supply chain performance is dependent on the behavior of both the social and technical networks as well as the interactions and interdependencies between them (Jackson, 2003). With this in mind, Bartlett (2009) applied socio-technical systems to introduce organizational transformation with CSR in its core, thus streamlining practices such as stakeholder engagement.

Additionally, Moon et al. (2005) conducted a study to understand how systems thinking improved supply chain management performance. The authors compared two groups of graduate and undergraduate students, with only one group receiving systems thinking training. They concluded that systems thinking greatly improved decision making abilities resulting in performance enhancements such as limiting the bullwhip effect. In their study, the authors used hard systems thinking (HST) methods such as regression analysis, order rate functions, as well system dynamics (SD). Moreover, Sweeny et al. (2000) stated that systems thinking is fundamental to finance, inventory and order management. Gharajedaghi (2011) added that managers with systems thinking abilities are capable of controlling, appreciating and influencing the variables that are acting on the supply chain.

Moreover, Gracia-Rodriguez et al. (2007) investigated the impacts of CSR efforts by oil multinationals in the countries where they operated, they found a positive correlation between CSR initiatives and social and environmental conservation and development. Furthermore, White et al. (2009) used operational research, a HST methodology, to devise a

model for social sustainability by having stakeholders as the source of input for measuring the current state of social sustainability, as well as setting corresponding target goals.

Also, Behdani (2012) conducted an evaluation of a number of simulation paradigms for modeling supply chains from a systems thinking perspective. Using the complex adaptive systems methodology, the author demonstrated that the supply chain is a complex socio-technical system by mapping its micro-level and macro-level features. Moreover, the author compared three distinct systems thinking methodologies that were used as simulation paradigms for supply chain modeling, specifically: SD; discrete event simulation (DES); and agent based modeling (ABM). The aim of the comparison is to understand how each methodology captures the formerly defined features in order to simplify the decision making process, given the supply chains' complex networks and composing social agents. The author concluded that ABM is the only modeling approach, when compared to SD and DES, capable of capturing the properties of the supply chain as a complex socio-technical system. For instance, ABM is better at modeling change in customers' perceptions of the supply chain, and hence how they attempt to change its behavior by changing their consumption patterns.

By the same token, Zhang et al. (2013) constructed a conceptual model to facilitate supply chain decision making by incorporating SD into the assessment of sustainable manufacturing. The aim was to understand the complex interactions between subsystems from an operational micro scale to an organizational macro scale while taking into account social, environmental, and economic factors. The authors argued that using systems thinking widened the scope of their analyses to include multiple views about complex problems. The authors explained that SD is capable of holistically achieving sustainability goals by resolving conflicts when a sustainability decision may make sense at the micro scale but is in conflict with a sustainability decision at the macro level. This is due to the capacity of SD in modeling supply chain complexity, which in turn enables decision makers to simulate, explore opportunities for improvement and predict sustainability performance. Similarly, Schenkel et

al. (2015) used SD to understand the role of communication in improving the social footprint of supply chains.

Additionally, Starik et al. (2013) used system dynamics and its tools, to model and address the interconnectedness between social sustainability components—people, organizations, society, and environment—across temporal and spatial dimensions. The authors argued that only structural systems thinking, as opposed to traditional management theories, can offer holistic and multifinal solutions appreciated by all the stakeholders involved.

Furthermore, Goh et al. (2012) studied how production pressure and over-protectionism negatively affect the perception of the level of safety in the workplace, ultimately culminating in serious accidents such as rock falls. The authors used system dynamics to model production-pressure, risk-tolerability, perception of safety-margin, and protection-efforts.

Finally, Levy et al. (2016) studied the paradox of the continued dominance multinationals and their practices despite the promotion of sustainable coffee production. The authors studies this phenomenon by addressing the political dimension of CSR. The authors investigated how the dynamics between firms and the civil-society take the form of challenges and adaption.

1.6.3 Interpretive systems thinking in the literature

A number of studies addressed the subject of interest using interpretive systems thinking methodologies; Matten et al. (2003) used an interpretive systems thinking method as a CSR initiative. They argued that systems thinking enabled the consideration of a wide range of matters and the many worldviews associated with such initiatives. Arias (2008) added that using interpretive systems thinking when implementing CSR ensured a fair consideration of the organizational and social dimensions that they considered the most vital, while allowing

the practitioner to be aware of the different political, ethical and cultural impacts incurred by the stakeholders or an organization.

Moreover, Ackoff (1999) portrayed the supply chain as a learning organization as it stores knowledge about all factors of its functioning and procedures, monitors its performance and establishes feedback mechanisms. This acquired information is distributed across the supply chain in various forms fitting the needs of the different stakeholders. Supply chains need to be flexible enough to adapt to the evolving and constantly changing sustainability policies qualifying it as a complex adaptive system.

Furthermore, Ghadge et al. (2010) proposed a framework to manage risks in aerospace supply chains using the Systems of Systems (SoS) concept. SoS portrays the large-scale integration of numerous self-contained, concurrent, complex and independent systems to satisfy a need, or to deliver a product or service. The authors argued that systems thinking is the best approach for managing supply chain risks given that a supply chain is itself a SoS. However, the authors did not emphasise a particular systems thinking approach, but seemed to prefer soft systems thinking (SST). The authors also contended that reductionism is not fit for managing risks nor for optimizing the supply chain; given that optimizing one point of the supply chain to improve risk management could have a negative effect on its totality. The authors also emphasized the social dimension of a SoS by stating that individuals in its various points have varying sensitivities towards risk management, some are risk-neutral, others are risk-averse and a few are risk-takers. Moreover, the individual perspectives and viewpoints affect how the entire SoS behaves. The authors concluded by stating that in order to properly manage supply chain risk, all the entities and their interdependencies have to be considered while taking into account the time dimension to make sure that the flow is not disrupted. Hence, SoS being a systems approach can help with determining the actual impact of risks.

Additionally, Molderez et al. (2018) used rich pictures in the form of art paintings to foster soft systems thinking competences and develop holistic solutions in the context of CSR. The

authors reported that soft systems thinking and its tools allowed a better understanding of CSR related issues, their holistic nature, and interconnectedness.

1.6.4 Emancipatory systems thinking in the literature

A number of studies addressed the subject of interest using emancipatory systems thinking methodologies; Cordoba et al. (2007) used systems thinking to address the challenges and questions related to CSR initiatives. More specifically, its incorporation into the organizational purpose, stakeholder management and supply chain social impact assessment (SIA). The difficulties facing CSR initiatives, according to the authors, lied in the obligation of having to fulfil competing and incompatible demands from shareholders, the general public, and governments. The authors accounted for the aforementioned difficulties using SST and critical systems heuristics (CSH). The authors reasoned that such systems thinking methodologies can also serve as practical guidelines for developing and evaluating CSR initiatives, as they help in identifying and incorporating different stakeholders in a particular context, while helping them explore solutions and reaching accommodations.

Moreover, Belal (2002) evaluated the quality of social responsibility reports published by a number of major firms from a stakeholder inclusiveness perspective, the objective was to ascertain whether such reports are used misleadingly for stakeholder management rather than stakeholder inclusiveness. The author concluded that a fair number of firms are purposively selective when it comes to stakeholder engagement as a means of managing them, putting the respective firms at odds with social risks.

1.6.5 Critical systems thinking in the literature

A number of studies addressed the subject of interest critically by using a number of systems thinking methodologies from opposing systemic paradigms; Reynolds (2008) used a CST approach, adapted from Jackson (2003) and Ulrich (2003), to construct a framework for addressing what they identified as the Three Dilemmas with CSR: the dilemma of addressing

the three issues—economic, social, and environmental—all at once; the dilemma of achieving accommodations among stakeholders with diverse viewpoints; and the dilemma of being honest and ethical about the inevitable incomplete understanding of the situation, as well as the inevitable inadequate practice.

Furthermore, Ortegon (2007) used CSP, in the form of an organization based action research to solve real-world management problem situations, mainly problems of complexity, change and diversity in a target organization that requested their help. The endeavor combined different paradigms, methodologies, methods and tools in the same intervention. The authors evaluated whether it is possible to implement a pluralist intervention while avoiding being setback to a single paradigm or method. The authors concluded that such interventions are possible and very fruitful in terms of the results they bring about. However, the authors emphasized that an intervention that does not take into account the existing political and cultural constraints is almost guaranteed to fail. On the other hand, the study found that pluralism, when properly applied, offered better management practices than would another pragmatist or imperialist management approach would.

Additionally, Shoushtari (2013) used systems thinking to build a model to redesign the managerial structures and processes of a large government-owned supply chain. The aim of the study was to reduce government direct involvement. The author used interactive planning and SST to account for the social dimension of the supply chain, and organizational cybernetics (OC) to account for its functional dimension. The author used the supply chain operations reference (SCOR) model alongside the viable system model (VSM) to model, analyze and propose functional and structural modifications to supply chain managerial processes.

Likewise, Porter (2008) used interpretive systems thinking to address the complexities and the interconnectedness of the various economic, environmental and social factors relevant to implementing CSR. The author also used complex adaptive systems to account for situations

where stakeholders hold different positions and possess coercive viewpoints about how the different details in CSR are to be implemented.

Moreover, Waller et al. (2015) used systems thinking in order to make social responsibility a mainstream supply chain activity instead of being a niche and localized luxury affordable only by big-brand firms. The authors advocated that holistic systems thinking is at the heart of CSR initiatives and crucial to their success. The reason being its ability to enable supply chain collaboration and innovative strategic planning. The authors highlighted the importance of interpretive and emancipatory systems thinking for stakeholder management and conflict resolution in order to minimize the supply chain's total cost of logistics.

1.6.6 Synthesizing the literature from a systems thinking perspective

As a summary, Table 1.1 shows a number of articles from the literature and the systems thinking methodologies they used along with their corresponding systems thinking paradigms. The paradigms are explained in detail in chapter two. Moreover, Table 1.2 maps the aforementioned articles to their respective ideal-types on the System of Systems Methodology (SOSM). This gives insights about their assumptions, paradigmatic pertinences, and systemic creativity in using several systemic tenets from multiple paradigms. Ideal-types and the SOMS are explained in detail in the next chapter.

1.7 Supply chain social responsibility is a complex undertaking

This substantial supply chain complexity in both structure and stakeholder diversity brought forth a new set of social challenges requiring proper management. Social responsibility emerged as the best way to manage such challenges (Williams et al., 2017). Social responsibility is defined as the responsibility of organizations for the impacts of their decisions and activities on society (Zdenka et al., 2014). Such responsibility is maintained through ethical behavior consistent with the well-being of society, accounting for stakeholder expectations (Tjasa et al., 2014), and conforming to applicable laws and international norms

(Moratis et al., 2017). Moreover, any social responsibility approach has to communicate with the various stakeholders with the goal of informing, responding, and engaging (Crane et al., 2016).

Table 1.1 Systems thinking in the literature

Article	**Functionalism**	**Interpretivism**	**Emancipatory**
(Molderez et al., 2018)		SST	
(Aguilar et al., 2015)	HST		
(Popovic et al., 2015)	SD		
(Thöni et al., 2014)	HST		
(MoosaviRad et al., 2014)	SD		
(Doloi, 2012)	HST		
(Starik et al., 2013)	SD		
(Waller et al., 2015)			
(Touboulic et al., 2014)			RDT
(Goh et al., 2012)	SD		
(Matten et al., 2003)		SST	
(Moon et al., 2005)	HST, SD		
(Brent et al., 2006)	HST		
(Norris, 2006)	HST		
(Tsuda et al., 2006)	HST		
(Cordoba et al., 2007)		SST	CSH
(Arias, 2008)		SST	
(Hutchins et al., 2008)	HST		
(Hutchins et al., 2010)	HST		
(Ghadge, et al., 2010)		SST	
(Shoushtari, 2013)	OC	SST	
(Behdani, 2012)	SD, ABM, DES		
(Zhang et al., 2013)	SD		

Table 1.2 Literature's coverage of the SOSM

		Participants		
		Unitary	Pluralist	Coercive
Systems	Simple	(Aguilar et al., 2015) (Thöni et al., 2014) (Doloi, 2012) (Pentland et al., 2012) (Hutchins et al., 2010) (Brent et al., 2006) (Norris, 2006) (Tsuda et al., 2006) (Moon et al., 2005)	(Molderez et al., 2018) (Milfelner et al., 2015) (Waller et al., 2015) (Shoushtari, 2013) (Zenko et al., 2012) (Ghadge, et al., 2010) (Arias, 2008) (Cordoba et al., 2007) (Matten et al., 2003)	(Panapanaan et al., 2016) (Levy et al., 2016) (Waller et al., 2015) (Milfelner et al., 2015) (Touboulic et al., 2014) (Deutz et al., 2014) (Cordoba et al., 2007)
	Complex	(Popovic et al., 2015) (MoosaviRad et al., 2014) (Shoushtari, 2013) (Zhang et al., 2013) (Starik et al., 2013) (Nguyen et al., 2013) (Behdani, 2012) (Besiou et al., 2012) (Goh et al., 2012) (Bell et al., 2006) (Moon et al., 2005)		N/A

Legend:

Functionalism Interpretivism Emancipatory Postmodernism

Furthermore, tackling supply chain social responsibility is a complex undertaking due to its distinctive characteristics. For one thing, it is bipolar as it relates to both individual and collective levels, what this means is that the individual's benefit must not be overlooked, even in situations when what is good for an individual is not necessarily good for the entire social system. Moreover, it is reflexive as personal perceptions and interpretations of social conditions alter the social behavior of individuals and collectives. For instance, a 10% unemployment rate might be considered a disaster in one country, but a celebrated success in another. Finally, it is immaterial as social phenomena are difficult to understand and analyze quantitatively (Bork et al. 2015).

Moreover, social responsibility also involves interdependence (Mulej et al., 2015) and holism (Tjasa et al., 2014). Therefore, a mature understanding of social responsibility requires the adoption of solutions that are systemic in nature. Such solutions are equipped to appreciate the interconnectedness of social, political, economical, and ecological issues across temporal and spatial boundaries (Williams et al., 2017). Systems thinking can navigate the complexity and chaos inherent in social responsibility initiatives, where lack of clarity on stakeholder roles and responsibilities is the norm (Dzombak et al., 2013).

Practically, social responsibility is a means of understanding of the relationship between business and society (Dankova et al., 2015). From a systems thinking perspective, social responsibility is a state of being where supply chains can flourish within the social systems in which they are embedded. Moreover, social responsibility is not a final state, but instead a moving target that is constantly changing. When a supply chain is said to be socially responsible, this means that it is capable of persisting, adapting, transforming, and transitioning in the face of constantly changing social conditions and worldviews (Williams et al., 2017).

1.8 The importance of this study

From the previous sections, it is evident that there exists a fairly sized literature on supply chain social responsibility. Moreover, this literature developed various approaches that were widely adopted in practice. It is worth noting that numerous articles from this literature used systems thinking methodologies; which were occasionally used along one or more industry approaches in order to account for more factors of the messes of interest (Basta et al., 2016).

However, despite the aforementioned, supply chain social responsibility messes are on the rise (Rajeev et al., 2017); a phenomenon that was neither investigated nor addressed, and if it remains overlooked, supply chains will continue to endure diminished returns and growth prospects, and more importantly, the quality of life of its stakeholders will continue to deteriorate (Hutchins, 2010). Correspondingly, this exploratory study set out to understand this phenomenon from a systems thinking perspective, by answering the following research question:

- What are the systemic underpinnings of the current supply chain social responsibility literature?

To answer this problem, this exploratory study set out to surface the underlying biases, strengths and weaknesses of the supply chain social responsibility literature and the approaches it developed in order to provide insights with regard to their problem-solving bases from a systemic perspective. Such insights offer a solid foundation for future research.

To provide such insights, four systems thinking paradigms were used as lens or frames to understand how the research and practice addressed the messes of social responsibility, the supply chain, and the social context. For instance, part of the research and practice, might define the messes of interest as optimization issues, whereas some other part might define it as power-struggles. These distinct understandings inform different actions and yield different results. Therefore, it is important to be aware of the frame of reference when addressing supply chain social responsibility messes in order to surface any shortcomings in the form of

biases and limitations. Moreover, exploring the research and practice from a systems thinking perspective will uncover how holistic and creative they are, and what role reductionism plays. This understanding is important as it sheds light on the capacity of the research and practice in addressing the emergent behavior of supply chains, and what factors they account for. Moreover, this understanding will highlight whether such research and practice are capable of only offering localized solutions in the form of quick-fixes akin to the bullwhip effect. Holism, creativity and reductionism will be explained in detail in the next chapter.

Regarding research design, this study was organized into three phases, each constituting a separate exploratory study that addressed part of the overall research question by answering a derived research sub-question, and ending with an article that was accepted for publication or was submitted for revision to a journal specializing in the subject matter. It was necessary to conduct this series of exploratory studies to understand what is currently being done in order to uncover gaps in the literature and shortcomings in the approaches it developed. The following are the three research sub-questions:

1. How is the scientific literature on supply chain addressing social responsibility challenges?
2. To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?
3. To what extent are key supply chain social responsibility approaches underpinned by systems thinking perspectives?

CHAPTER 2

BACKGROUND

This chapter discusses the models used throughout this thesis; namely systems thinking, its methodologies, paradigms, metaphors, and critical systems thinking (CST).

2.1 Systems thinking

Systems thinking is a holistic analysis approach for managing systems by considering the whole emergent system rather than its individual parts, their relations and interactions. It acknowledges that a system is more than, and is different from, the mere sum of its parts.

Systems thinking rejects simple solutions to complex problem situations, described as messes by Russ Ackoff, and embraces holism and creativity to handle their complexity, change, and diversity (Searcy, 2016). In this study, the emergent system is the supply chain while the messes of interest are those concerning social responsibility.

In contrast to systems thinking, reductionism focuses on the parts of a system rather than the emergent whole, thereby failing to predict and manage higher-level patterns (Boardman et al., 2013). This method of analysis could be effective with simple systems, but not as much with complex ones; given that the latter takes a form that is not recognizable from its parts. To put it differently, it is the emergent whole that gives meaning to the parts, their relations and their interactions and not vice versa.

Ultimately, reductionism's incapacity to account for the emergent system leads to suboptimizations, meaning that optimizing one part may have negative consequences elsewhere damaging the supply chain as a whole (Boardman et al., 2013). Table 2.1 compares simple and complex systems (Jackson, 2003).

Table 2.1 Difference between simple and complex systems

	Simple System	**Complex System**
Number of Subsystems	Few	Large in number
Subsystem Interactions	Few, well defined and structured	Complex, intertwined and undefined
Behavior	Understandable and predictable	Unknown and impossible to predict
Evolution	Does not change over time	Changes in response to its own purpose, internal and external conditions
Environment	Not affected by its environment or effected slightly in a predictable way	Interacts and responds to changes in its environment

Messes are defined by their interdependent and ill-structured nature, as well as their manifestation for a whole variety of unpredicted reasons (Searcy, 2016). Messes represent situations of collective self-damage where win-win solutions are unattainable due to rational actors not acting in mutually beneficial ways (Valentinov et al., 2016). Moreover, corrections to messes do not happen unless deliberate efforts are made to address subjectivity and resolve conflict (Valentinov et al., 2016). Messes get more complex and involve a wider range of stakeholders when inspected (Popovic et al., 2015). Accordingly, simple solutions to messes fail because they are not holistic and creative enough, they adopt reductionism which limits their capacity to perceive all relevant factors of a problem situation, thereby bounding such solutions to suboptimizations in the form of localized quick-fixes. Therefore, resolving messes requires systemic approaches (Williams et al., 2017). This very much describes the nature of supply chain social responsibility messes and the currently prevalent solutions discussed in the previous sections.

Moreover, stakeholder diversity further exacerbates the complexity of the messes of supply chain social responsibility. Furthermore, messes are also characterized as being understood differently by different stakeholders. Stakeholders tend to hold entirely different views on whether a particular problem exists, and if they agree what the problem is. Therefore, messes are intangible and highly subjective, and are considered problems only if the stakeholders decide they are (Hester et al., 2017).

Systems thinking tackles messes in a more profound way. It does so by taking into account three of their main characteristics: they are complex; constantly changing; and involve a diverse group of stakeholders.

Moreover, systems thinking pays special attention to efficiency, efficacy, effectiveness, elegance, emancipation, empowerment, exception and emotion, consequently leading to overall improvement in system performance (Jackson, 2003).

Systems thinking is also important given its capacity in breaking down any approach, theory, or methodology—promising a solution to a problem of interest—into its fundamental assumptions and worldviews. Therefore, surfacing its viability vis-à-vis two dimensions: the complexity of the system being inspected; and the nature of its human participants. Systems thinking asserts that all complexity stems from these two dimensions and their ensuing reality-types (Jackson, 2003). In like manner, any approach claiming to be viable must account for all distinct realities of the problem of interest, i.e. be of a critical nature.

2.2 Critical systems thinking

The messes of supply chain social responsibility could be viewed along two dimensions: the complexity of the supply chain, i.e., the system; and the nature of its stakeholders, i.e., the participants. Accordingly, supply chains could either be complex or simple whereas its stakeholders could be unitary in their views and goals, plural by possessing different opinions and aims but ready for compromises, or have a coercive relationship where the powerful get away with their intents at the expense of the disadvantaged. As a result, this classification produces six distinct supply chain realities called ideal-types. Ideal-types can be thought of as logical extremes that can be used as abstract models of realities and problem contexts (Jackson, 2003).

Jackson (2003) introduced the SOSM framework as a means for classifying the various systems thinking methodologies or any other management method. it considers that difficulty in managing problem-contexts stems from their increasing complexity, change, and diversity which in turn originate from two sources: the system being dealt with in terms of its size and structure; and the compatibility of the views and interests of the systems' participants. This understanding produced the two dimensions of "systems" and "participants" used to form a grid that constitutes a number of problem-contexts called ideal-types. In this grid, the vertical axes presents a continuum of system types ranging from relatively simple to extremely complex, whereas the horizontal axes presents the types of possible relationships between the systems' participants, which could be either "unitary", "pluralist", or "coercive". Therefore, combining the two dimensions yields six ideal-types: simple-unitary, simple-pluralist, simple-coercive, complex-unitary, complex-pluralist and complex-coercive. To manage messes, different systems thinking methodologies, and management methods, address one or more of the aforementioned ideal-types (Hester et al., 2017).

Table 2.2 presents the SOMS framework while highlighting how the different systems thinking paradigms relate to one another based on the ideal-types they cover. Moreover, Table 2.3 compares the various participant types.

The SOMS makes it clear that the different systems methodologies and their corresponding paradigms are complementary rather than contradicting to one another. Moreover, the SOSM is very effective in highlighting their strengths and weaknesses.

Table 2.2 SOSM grid and its ideal-types

	Participants			
Systems		Unitary	Pluralist	Coercive
	Simple	Simple- Unitary	Simple- Pluralist	Simple- Coercive
	Complex	Complex- Unitary	Complex- Pluralist	Complex- Coercive

Legend:

Functionalism Interpretivism Emancipatory Postmodernism

Jackson (2003) coined the term Creative Holism in solving messes; which is concerned with how to maximize the benefit of the different holistic approaches by using them creatively in combination. For a systems practitioner to be creative, they have to be able to use the different systems approaches according to the problem context and its various perspectives. Such a practitioner must be capable of recognizing the limitations of a given methodology and can understand how problem situations can be framed and reframed. On the other hand, for them to be holistic, requires the use of systems thinking ideas and concepts to understand and intervene in problem situations. Moreover, a practitioner must also be able to recognize that problem situations are interdependent, caused by a variety of reasons, and solving them requires an integrated approach. In short, creative holism is about the creative use in combination of different ways of being holistic.

Table 2.3 Types of participants from a systemic perspective

	Values	**Interests**	**Purpose**	**Decision Making Involvement**	**Consensus Possibility**
Unitary	Similar	Compatible	Similar	Assumed, required	Granted
Pluralist	Different	Compatible	Different	Involved	Small accommodations allowing progress
Coercive	opposing	incompatible	Adherence	Concentrated with the powerful	Ranging from very difficult to impossible

It is the complexity, heterogeneity and turbulence of problem situations that necessitates a pluralism that encourages the use together of different methodologies based on alternative paradigms seeking the benefits each paradigm offers (Jackson, 2003).

Holistic and creative problem solving employs two tools: 1) Metaphors; and 2) Paradigms. Metaphors help with understating how different world views give rise to different actions when dealing with the same messes, they also challenge the taken for granted assumptions about them. Thus, metaphors allow a practitioner to think in different ways when approaching the same messes.

Additionally, metaphors help with clarifying the hidden and unquestioned mental models. They work by helping to understand a subject in terms of a notion that is not applicable to it. The notion is well defined and understood. Hence, describing a subject of interest in terms of a metaphor highlights their commonality and offers a partial representation of certain features

and hides others. Using metaphors quickly reveals the biased preferred ways of viewpoints and give rise to alternative perspectives.

Jackson (2003), Morgan (1997) and Alvesson (1999) list the following nine metaphors of how to view systems: systems as machines; systems as organisms; systems as brains; systems as flux and transformation; systems as cultures; systems as political systems; systems as psychic prisons; systems as instruments of domination; systems as carnivals.

The second tool for solving messes creatively are Paradigms. A paradigm is a set of ideas, assumptions and beliefs that shape and guide activity (Kuhn, 2012). Each paradigm is based on assumptions not compatible with the others, contrary to metaphors which are not in conflict. Viewing a problem situation from various paradigms allows for radical different perspectives to be considered. This ensures that challenging positions with rigorous alternative theoretical foundations are given thought. In other words, studying the supply chain using various paradigms allows for the consideration of all its factors along the two aforementioned dimensions; otherwise, a number of factors would be overlooked if only one paradigm was used.

It is worth noting the these paradigms are sociological in origin. Functionalism is concerned with ensuring that everything in a systems is functioning well while promoting efficiency, adaptation and survival. Functionalism assumes that the innerworkings of a system can be modeled using mathematical techniques to understand the nature of its parts. Conversely, Interpretivism believes that systems result from people with different purposes interpreting the same situations according to their different backgrounds and worldviews. Interpretivism is concerned with finding where such interpretations overlap so that collective purposeful activity becomes possible. In contrast, emancipation seeks to emancipate oppressed individuals and groups who are participants of a given system such as an organization. Emancipation seeks to manage and reveal forms of power that it considers unlawfully used. Finally, postmodernism challenges the idea that systems can be fully understood.

Postmodernism takes a less serious view of systems and stresses having fun, implementing what feels right, embracing conflict, and encouraging verity and diversity (Jackson, 2003).

Alvesson et al. (1999) suggested the following four paradigms and their associated metaphors which are compared in the Table 2.4:

4. The Functionalist paradigm: associated with the machine, organism, brain, and flux and transformation metaphors
5. The Interpretive paradigm: associated with the culture and political systems metaphors
6. The Emancipatory paradigm: associated with the psychic prison and instruments of domination metaphors
7. The postmodern paradigm: associated with the carnival metaphor

Table 2.4 Characteristics of the systems thinking paradigms
Adapted from Jackson (2003, p 38)

	System Complexity	**Participants Background**	**Consensus Possibility**	**Goal**
Functionalism	Simple, Complex	Compatible	Granted	Easily identifiable. Aims for optimization
Interpretivism	Simple, Complex	Varied	Mostly achievable	Difficult to define. Small agreements allowing progress
Emancipation	Simple	Divergent	Difficult	Empower who are affected by decisions they do not make
Postmodernism	Complex	Ranges from compatible to highly divergent	Simple to difficult to reach. Accepts that this not always possible	Surface suppressed viewpoints. Encourage diversity. Achieve small improvements that feel right

Jackson (2003) added that systemic performance—how well the system is behaving when assessed using the measures defined bellow—must be based on the following holistic goals, and their associated systemic methods:

- Improving goal seeking and viability
    - Improves performance by increasing the efficiency and efficacy of how an organization does its tasks and responds to changes in its environment
    - Methods: HST, SD, OC and Complexity Theory
- Exploring purpose
    - Improves performance by acquiring sufficient agreement between stakeholders while taking into account their different aims and objective, endorsing mutual understanding, thereby achieving accommodations and commitments to purpose
    - Methods: Strategic Assumption Surfacing and Testing, Interactive Planning, SST
- Ensuring fairness
    - Seeks to improve performance by eliminating discrimination, enabling stakeholder participation; especially those affected by organizational procedures and policies they did not design or institute
    - Methods: CSH, Team Syntegrity
- Promoting diversity
    - Improves performance by endorsing and encouraging diversity to account for contemporary challenges. Rejects the domination of a specific systems thinking methodology and challenges routine. Moreover, it encourages difference, fun, novelty and engaging people when aiming for change
    - Methods: Postmodern Systems Thinking

It follows that, each systems thinking methodology possesses a set of procedural tools whose purpose is to achieve concrete outcomes. Outcomes are the set of intended changes in behavior a system must acquire in order to be considered in a newly desired state. Such outcomes can be assessed against measures for efficiency (are the minimum resources used

in goal seeking?), efficacy (do the means employed enable us to realize our goals?), effectiveness (are we actually achieving what we want to achieve?), elegance (do the stakeholders find what is proposed tasteful?), emancipation (are disadvantaged groups being assisted to get what they are entitled to?), empowerment (are all individuals and groups able to contribute to decision-making and action?), exception (what otherwise marginalized viewpoints have we managed to bring to the fore?) and emotion (does the action that is now being proposed feel appropriate and good in the local circumstances in which we are acting?).

Jackson (2003) argued that such tools could be detached form their systems methodologies to serve others. This is the bases of the holistic CST. CST offers a commitment to using a plurality of systems methods and their related tools together. CST sees the bigger picture, and allowed systems thinking to mature as a transdiscipline showing how the different approaches, methodologies, methods and tools, can be used in a coordinated way—according to their strengths and weaknesses—allowing for successful interventions in complex organizational and societal problem situations (Jackson, 2003).

Allowing methods, models, tools and techniques to be detached from their usual methodologies and employed flexibly, gives practitioners the maximum freedom to respond to the needs of a problem situation, as well as unanticipated changes and events during an intervention.

CST makes the following three commitments which are discussed in the following paragraph (Jackson, 2003):

1. Critical awareness
2. Improvement
3. Pluralism

Critical awareness has the purpose of critiquing the theoretical underpinnings, strengths and weaknesses of the different systems methodologies and methods, as well as considering the societal and organizational atmosphere within which systems approaches are used.

Improvement ensures practical local emancipation of those affected by decisions and actions but were not part of formulating them. Finally, pluralism is about using different systems theories, methodologies and methods in combination (Jackson, 2003).

The most prominent of CST methods is CSP. CSP promotes the combination of a plurality of systems approaches, their methodologies and methods in solving messes. The combination promotes putting the different systems approaches to work according to their strengths, weaknesses, assumptions and the social conditions prevailing, thereby perceiving and addressing all factors of a problem situation and its context. i.e., CSP manages relationships between paradigms that it knows are complementary.

Moreover, CSP offers novel ways of evaluating success of an intervention based on the paradigms it incorporates and how well their objectives are met. Specifically, functionalism looks for efficiency and efficacy, interpretivism seeks effectiveness and elegance, while emancipation aims for empowerment and emancipation.

Overall, a CSP intervention has the following three steps (Jackson, 2003):

1. Creativity:
    a. Goal: surface ideas about the current problem situation, as well as highlight major concerns, issues and problems
    b. Tool: Creativity enhancing tools ensuring that multi-paradigm perspectives are employed
2. Choice:
    a. Goal: considers alternative ways for addressing important issues, and choose a variety of suitable different methodologies, methods, models and technique

   b. Tool: tools, such the SOSM, that reveal the strengths and weaknesses of the selected methodologies, methods, models, and techniques.
3. Implementation:
   a. Goal: positive change proposals are implemented, and change processes are managed
   b. Tools: the selected methodologies, methods, models and techniques

2.3 The case for systems thinking in the supply chain social responsibility domain

It follows that the subject of supply chain social responsibility was fairly studied producing a good amount of literature and remediation solutions (Basta et al., 2018), the aim of which was to inform and establish more responsible policies, governance, and management practices. However, for this to work, such literature and its ensuing solutions must be holistic and enable the consideration of all stakeholders' viewpoints in order to reach multifinal outcomes (Dyck, 2015). This is necessary to outperform one-sided mono-disciplinary solutions and methods (Dankova et al., 2015). Moreover, it is important for any social responsibility solution to be holistic to ensure long term success (Zdenka et al., 2014). Although all the solutions proposed by the literature claim success, different studies reported different and sometimes contradictory results (Chiarini et al., 2017). Therefore, a scientific exploration of the literature and its solutions is needed to fill in this gap and prove their effectiveness (Basta et al., 2018).

Having established the systemic and complex nature of supply chain social responsibility, understanding and resolving its messes dictates systemic solutions, or solutions that possesses systems thinking tenets (Williams et al., 2017). Therefore, it is necessary to uncover the systemic paradigms used in the literature and how the solutions it proposes differ in their paradigmatic pertinences. Doing so will highlight their assumptions, worldviews, synergies, valued factors, and systemic attributes as allowed by the paradigms they embrace. Understanding how the literature and its solutions reduce the messes of interest to the

paradigms they embrace highlights their oversights, biases, and limitations (Zdenka et al., 2014).

In this research, each systems thinking paradigm represents a lens or frame through which we can understand how the literature and its solutions address the messes of social responsibility, the supply chain, and the social context (Wallis, 2016). For instance, part of the literature, and the solutions it developed, might define the messes of interest as optimization issues, whereas some other part might define it as power-struggles. These distinct understandings inform different actions. Therefore, it is important to be aware of the frame of reference when addressing supply chain social responsibility messes (Wallis, 2016).

In closing, the methods, paradigms, and techniques presented in this chapter formed the theoretical bases on which this research was founded as well as the lens through which it investigated the social responsibility literature and the approaches it developed.

CHAPTER 3

OVERALL RESEARCH METHODOLOGY

3.1 Introduction

The goal of this study is to surface the underlying biases, strengths and weaknesses of the supply chain social responsibility literature and the approaches it developed and employed in order to offer a solid foundation for future research. This study contributed new insights about current research and practices with regard to their problem-solving bases from a systemic perspective. The following is the main problem statement of this study:

- What are the systemic underpinnings of the current supply chain social responsibility literature?

Given the qualitative and exploratory nature of this study, a formal hypothesis cannot be articulated as in an ordinary quantitative study. However, before this study officially commenced, we had the opportunity to conduct a preliminary inspection of the supply chain social responsibility literature, this inspection allowed us to make the assumption that the literature underused systems thinking and its principles explicitly and implicitly; an assumption we set out to verify.

To facilitate this study, three subproblems were devised from the main problem statement, each conducted in a standalone research phase based on a qualitative research methodology, either the mapping study or systematic literature review methodologies. The results of each phase resulted in a journal article that was published or submitted for review. Moreover, the findings from one phase informed the next by refining the latter's goals, methodology, and relevant data. The following are the three subproblems:

1. How is the scientific literature on supply chain addressing social responsibility challenges?
2. To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?
3. To what extent are key supply chain social responsibility approaches underpinned by systems thinking?

In phase one, the supply chain social responsibility literature was mapped in order to gather evidence on the most prolific and explicitly used supply chain social responsibility remediation approaches. The second phase, also a mapping study, explored to what extent the literature is underpinned by systems thinking perspectives. The last phase used the SLR methodology, its goal was to develop the case for an alternative approach to the messes of supply chain social responsibility by accomplishing two objectives: first, how key supply chain social responsibility approaches are underpinned by systems thinking; and second, how CST can be used to tailor superior interventions that better identify and address the contextual factors of the messes of interest while leveraging the already existing approaches. The following subsections outline the methodologies for each of the phases in more detail.

Although the research methodology for each phase was carefully selected to fit the phase's goal, these selected research methodologies do have their limitations. For instance, both mapping studies and systematic literature reviews cannot guarantee the inclusion of all the relevant literature in a given subject matter. For instance, this study excluded conference articles and focused only on journal articles. Moreover, given their reliance on interpretation, the results of these research methodologies are constrained by the authors subjectivity. Nevertheless, there exists a number of well-established research techniques to address these shortcomings—including reliability data, multiple codings, and intercoder-agreement coefficient calculations—thereby ensuring internal and external validity.

3.2 Phase one

Given its effectiveness in qualitative research, the mapping study methodology was selected for conducting this phase. A mapping study is an evidence-based qualitative research methodology. It provides a rigorous and objective procedure for understanding the practice of a certain research domain (Kitchenham et al., 2007). It maps a domain by identifying and classifying all pertinent literature with the aim of uncovering trends (Petticrew et al., 2006).

Unlike a SLR, a mapping study does not aggregate evidence by thoroughly analyzing the primary studies, it instead focuses on publication frequencies and classifications, the result of which is a more coarse-grained overview of a research domain (Petersen et al., 2008). Accordingly, the research questions a mapping study seeks to answer are large in number, broad in scope, and high-level in nature (e.g. what approaches have supply chains used to address their social responsibility dilemmas?) as opposed to those of an SLR which are profound and address the outcomes of the primary studies (e.g. is CSR more effective than SLCA in addressing supply chain social responsibility and why?) (Kitchenham et al., 2010).

Mapping studies are excellent for conducting preliminary PhD research projects: they help establish a baseline for further research activities, save time and effort for other researchers, and more importantly highlight clusters and gaps of knowledge in the existing literature (Budgen et al., 2008). Therefore, mapping studies are well-suited precursors for SLRs making both methodologies complementary (Petersen et al., 2008).

A mapping study has five main stages: 1) Definition of research questions 2) Conducting the search for primary studies 3) Screening papers based on inclusion and exclusion criteria 4) Classifying the papers 5) Data extraction and aggregation (Kitchenham et al., 2007). Figure 3.1 depicts the complete mapping study process. The following subsections outline this phase's mapping study accordingly.

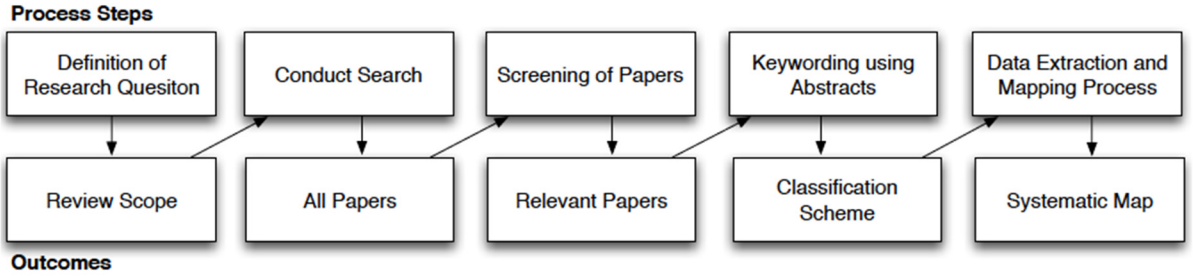

Figure 3.1 Mapping study process
Taken from Petersen et al. (2008, p. 2)

3.2.1 Research questions

The aim of this phase was to provide an overview of the research literature on supply chain social responsibility. The overview allowed us to answer this research's first subproblem:

- How is the scientific literature on supply chain addressing social responsibility challenges?

Given the broad nature of the question, it was divided into the following sub-questions:

RQ1. How active is the research in the subject matter?

RQ2. How many different journals made publications and what are the top ten amongst them?

RQ3. How present is the use of industry approaches?

RQ4. What are the most used industry approaches?

RQ5. How present is the use of systems thinking?

RQ6. What are the most used systems thinking methodologies?

RQ7. Were systems thinking methodologies and industry approaches used in combination?

RQ8. Does the literature demonstrate a bias toward an industry approach?

RQ9. Does the usage of industry approaches change with time?

RQ10. Does the usage of systems thinking methodologies change with time?

RQ11. How common is the use of multiple industry approaches?

RQ12. Does the literature address all stages of the supply chain?

RQ13. Does the literature address all stages of the supply chain equally?

RQ14. Is there evidence of focus by certain industry approaches on specific supply chain stages?

RQ15. Is there evidence of focus by certain systems thinking methodologies on specific supply chain stages?

3.2.2 Finding primary studies

Ten databases were searched for articles that were published between 2004 and 2017 inclusively, this period witnessed an increase of interest in the subject matter. The databases were: American Society of Civil Engineering; Compendex; Emerald; Inspec; Proquest; Science Direct; Scopus; Web of Science; Wiley Online Library; and Worldcat.

The following search string was selected after trying numerous alternatives. Note that using systems thinking related keywords was avoided; this is important to ensure search comprehensibility by not limiting its results to articles only using systems thinking. The search returned a total of 1387 articles, 204 of which were duplicates, which when filtered out left 1183 articles:

(“supply chain" AND “social sustainability") OR (“supply chain" AND “social risk") OR (“value chain" AND “social sustainability") OR (“value chain" AND “social risk") OR (Logistics and “social risk") OR (Logistics AND “social sustain-ability")

3.2.3 Inclusion and exclusion criteria

Mapping studies should be of a high degree in quality (Kitchenham, 2007). To satisfy this requirement, a set of inclusion and exclusion criteria were defined and implemented. The criteria stipulate that: the article is about supply chain social responsibility; is not about philanthropy, charity, or social innovation; is a journal article; is published inclusively between 2004 to 2017; is written in the English language; and is available in the Portable Document Format (PDF).

Applying the inclusion and exclusion criteria excluded 593 inadequate articles, leaving 590 pertinent ones. Figure 3.2 summarizes the search process.

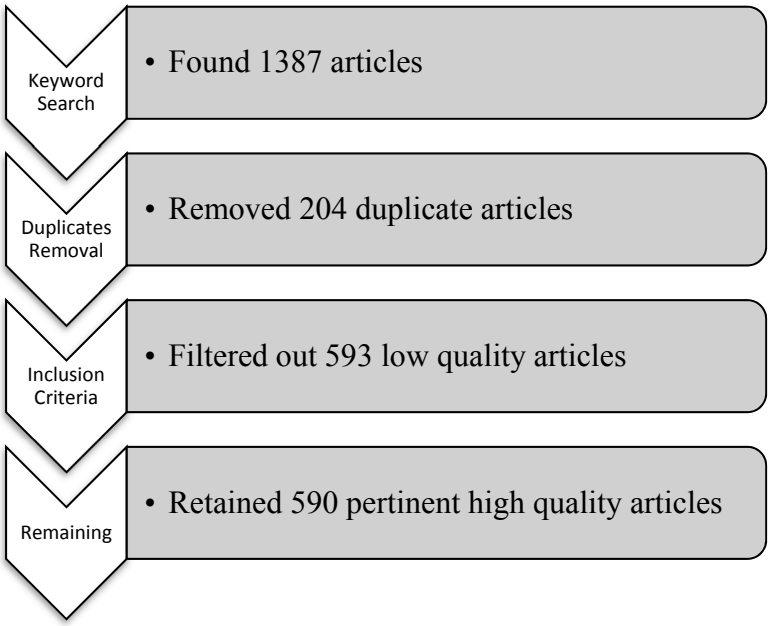

Figure 3.2 Search process of the mapping study of phase one

3.2.4 Data language

To classify the collected primary studies, a well-defined and reliable classification scheme is necessary (Budgen et al., 2008). The classification scheme for this phase was designed in the form of a data-language that is simple, detailed and basic (Krippendorff, 2012). A data language is a descriptive device in the form of a system of categories and their measurements used in classifying and analyzing relevant data which is itself organized into coding units (Krippendorff, 2012). The following is the data language used by the mapping study, it comprises three variables:

1. Industry Approach
    - Definition: contains all articles using any of the supply chain social responsibility industry approaches
    - Values: CSR (including name variations), SLCA (including name variations), ESG (including name variations), Sustainable Design (e.g. QFDE), Industry Standards (e.g. ISO26000), Sustainable Reporting (e.g. GRI)
    - Example: QFDE could prove effective in ameliorating the social responsibility performance of a supply chain, it allows social concerns to be incorporated during the initial design of a product or service
2. Systems Thinking
    - Definition: contains all articles that use one or more systems thinking methodologies
    - Values: Operations Research, SD, Complexity Theory, OC, Chaordic Systems Thinking, Strategic Assumption Surfacing and Testing, Interactive Planning, etc
    - Example: We investigate using OC to include in the decision making process all stakeholders affected by the supply chain's procedures and operations
3. Undefined
    - Definition: the article does not state or use any of the values of the first two variables explicitly and proposes an unknown or new technique
    - Values: any technique that is not enumerated in the first two variables

- Example: In this paper we propose a novel framework using key performance indicators and scorecards to assess the supply chain's social footprint

3.2.5 Data extraction

All articles that passed the inclusion and exclusion criteria were classified as per the data language. In classifying an article, it was investigated in its entirety seeking evidence of any of the industry approaches or systems thinking methodologies.

It is worth noting that the articles are self-contained, i.e., there is no lost information in disregarding the relationships between them. They are also considered equally informative as they had an equal chance of being found during the search step, and that they passed the inclusion and exclusion criteria.

3.2.6 Quality assessment

To prove the external validity of this study, the classification was validated by recoding a calculated reliability data, the recoding was done by five coders following Krippendorff's methodology. The coders were provided with a codebook, given training, then were left to code by themselves. Microsoft R was used to calculate Krippendorff's Alpha (KALPHA) coefficient the result of which was over 0.9, denoting high agreement amongst the coders.

The reason for choosing KALPHA over the other reliability coefficients, over 39 of them, is due to its generality in terms of data sample sizes, its robustness toward common issues like missing values, its applicability to any number of observers and coding variables, as well as its suitability to all scales of measurements: nominal; ordinal; interval; ratio; and circular (Krippendorff, 2012).

The KALPHA coefficient in its most general form can be formulated as:

$$\alpha = 1 - \frac{D_o}{D_e}, \tag{3.1}$$

Taken from (Klaus Krippendorff, 2012, p 278)

Where D_0 is a measure if the observed disagreement and D_e is a measure of the disagreement that can be expected when chance prevails.

The reliability data size was calculated using the following formula:

$$N_{k|not-k} = T(P_k, \alpha_{min}, P) = z_p^2 \left(\frac{(1 + \alpha_{min})(3 - \alpha_{min})}{4(1 - \alpha_{min})P_k\,(1 - P_k)} - \alpha_{min} \right) \tag{3.2}$$

Taken from Krippendorff (2011, p. 10)

Where P_k is the ratio of the total number of paragraphs belonging to the least present paradigm in an examined body of text, α_{min} is the smallest alpha for coding to be considered as reliable, whereas P is the statistical significance. The following table conveniently provides precalculated sample sizes for three acceptable reliabilities α_{min}.

Table 3.1 Precalculated reliability data sizes for three α_{min}
Taken from Krippendorff (2011, p. 10)

Smallest acceptable α_{min} =	.667				.800				.900			
Level of significance p =	.100	.050	.010	.005	.100	.050	.010	.005	.100	.050	.010	.005
P_k = .5 or K = 2 values	36	60	119	146	62	103	206	252	128	211	422	518
= .25 or = 4	49	81	161	198	84	139	277	340	172	283	566	694
= .1 or = 10	104	172	344	421	178	293	587	719	361	595	1190	1459
= .05 or = 20	200	329	657	806	340	560	1119	1372	657	1131	2263	2775
= .025 or = 40	412	679	1358	1665	664	1095	2189	2684	1344	2214	4430	5431
= .01 or =100	966	1591	3182	3901	1640	2701	5403	6624	3307	5447	10896	13359

An Analytical Construct (AC) models and justifies the relationship between the results of the classification of articles and the abductive, i.e., cross disciplinary, inferences made from

them. The AC for this mapping study is the frequencies of each variables' values. This is sufficient to establish which of the social sustainability techniques are the most popular.

3.3 Phase two

Given its effectiveness in understanding the practice of a certain research domain (Kitchenham et al., 2007), the mapping study methodology was selected for this phase. A mapping study is an evidence-based qualitative research methodology. It provides a rigorous and objective procedure for mapping a domain by identifying and classifying all pertinent literature seeking to gather evidences and uncover trends (Petticrew et al., 2006).

Moreover, to overcome the subjectivity of interpretation of qualitative research, specific techniques from the content analysis methodology were incorporated. Firstly, the analysis was guided by a data-language based on four systems thinking paradigms. Secondly, validation was done using a reliability data set recoded by two more independent analysts. Finally, intercoder reliability was calculated to prove this study's generalizability.

In summary, content analysis is a qualitative research methodology for making scientific, objective, systematic and generalizable inferences from text given the context in which they were used. As a research technique, it provides new insights, increases the understanding of a particular phenomenon, and informs actions (Krippendorff, 2012).

The following subsections outline the details of the mapping study as recommended by (Kitchenham et al., 2010).

3.3.1 Research questions

The aim of this mapping study was to aggregate evidence to answer this research's second subproblem:

- To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?

Given the broad nature of the question, it was divided into the following sub-questions:

RQ1. How active is the research in the subject matter?

RQ2. What are the top 10 journals with publications based on systems thinking paradigm principles?

RQ3. Does there seem to be a trend in the use of the systems thinking paradigms amongst the publishers?

RQ4. How common in the literature are the systems thinking paradigm principles?

RQ5. How do the articles cluster around the systems thinking paradigms?

RQ6. Did the use of systems thinking paradigms change with time?

RQ7. How common in the literature is the use of principles from more than one systems thinking paradigm?

RQ8. Does there seem to be a system thinking paradigm bias across the supply chain stages?

RQ9. Does there seem to be a system thinking paradigm bias across industries?

RQ10. What countries made more than 10 publications?

RQ11. Do certain countries exhibit a bias towards one or more systems thinking methodologies?

3.3.2 Finding primary studies

Ten databases were searched for articles. The databases were: American Society of Civil Engineering; Compendex; Emerald; Inspec; Proquest; Science Direct; Scopus; Web of Science; Wiley Online Library; and Worldcat.

The following search string was selected. Note that using systems thinking related keywords was avoided; this is important to ensure search comprehensibility by not limiting its results to articles only using systems thinking. The search returned a total of 1098 articles, 200 of which were duplicates, which when filtered out left 898 articles:

(“supply chain" AND “social sustainability") OR (“supply chain" AND “social risk") OR (“value chain" AND “social sustainability") OR (“value chain" AND “social risk") OR (Logistics and “social risk") OR (Logistics AND “social sustain-ability").

3.3.3 Inclusion and exclusion criteria

To ensure the quality of the analyzed articles, a set of inclusion and exclusion criteria were defined and implemented. The criteria stipulated that: the article is about supply chain social risk and social sustainability; is published between 2004 and 2015; it is not about philanthropy, charity, or social innovation; it is a journal article; it is written in the English language; and is available in the Portable Document Format (PDF). Applying the generic inclusion and exclusion criteria further reduced the number of articles by excluding 462 unsatisfactory ones. Thereby, 436 articles remained.

3.3.4 Data language

To guide the evidence extraction process, a well-defined and reliable analysis scheme must be defined (Budgen et al., 2008b). The scheme for this phase was designed in the form of a data-language based on four systems thinking paradigms. Table 2.4 lists the paradigms and their properties.

The following is the resulting data-language, it has five variables and is simple, detailed and basic (Krippendorff, 2012). Notably, a fifth variable was added to collect evidence on all mainstream social responsibility approaches like CSR. This variable does not represent a

systems thinking paradigm, and the approaches it is concerned with are not systems thinking methodologies:

1. Functionalism
    - Definition: the reference uses principles similar to those of the functionalist paradigm.
    - Example: To reduce the social footprint of transportation activities, we propose a double-goal optimization model using the ideal point method. The model relies on a number of social sustainability factors such as absenteeism, number of work injuries, and employee retention rates.
2. Interpretivism
    - Definition: the reference uses principles similar to those of the interpretive paradigm.
    - Example: In determining which factors affect the organizational social footprint the most, various stakeholders were invited to participate in brain storming sessions. The organization was able to define, prioritize and tackle the three most important factors.
3. Emancipation
    - Definition: the reference uses principles similar to those of the emancipatory paradigm.
    - Example: In order to maintain its social license to operate, the organization involved the surrounding communities in making a decision about whether to expand the mine operations.
4. Postmodernism
    - Definition: the reference uses principles similar to those of the postmodern paradigm.
    - Example: In the case study, given the limited resources, the supply chain managers decided to commit to upgrading half of the emission filters during the next fiscal year. Although the surrounding community members were involved in the decision making process for a complete revamp, management

felt that was the right solution when factoring in the financial circumstances. The effected community was consulted in making this concession.

5. Mainstream:
    - Definition: the article is based on mainstream approaches such as CSR, GRI or SLCA.
    - Example: The authors used CSR for better stakeholder engagement to enhance supply chain social performance.

3.3.5 Data extraction

In coding an article, it was read in its entirety. Every paragraph was analyzed to uncover its innate systems thinking principles in order to associate it with one or more paradigms. To ensure validity, this process was repeated three times independently as will be explained in a later section.

3.3.6 Quality assessment

As already denoted, the goal of this phase is to understand to what extent the scientific literature on supply chain social responsibility is underpinned by systems thinking perspectives. To achieve such an understanding, it was necessary to identify the latent implicit systems thinking biases in the literature as opposed to the explicit ones. However, given the subjective nature of interpretation, proving the validity of both the evidence extraction process and its outcomes became a necessity (Kitchenham et al., 2010).

The population of articles for this phase is the same as the one used in the previous phase with the exception of limiting the articles to only those published between 2004 to 2015 inclusively. The decision was made due to resource constraints. In total, 436 high quality journal articles were included in this phase.

Accordingly, a reliability data set of 89 articles was selected following the content analysis methodology. The selected articles were coded by two more analysts, thus coding was repeated three times by three independent coders. The analysts were provided with a codebook, given training, then were left to code independently (Krippendorff, 2012).

The inter-coder coefficient KALPHA was then calculated using Microsoft R. The agreements were 0.918 for functionalism, 0.888 for interpretivism and 0.835 for emancipation. All three denoting high agreement amongst the coders. Thus, this study not only conforms to mapping study quality criteria but is also of high quality and is internally and externally valid (Kitchenham et al., 2010).

3.4 Phase three

The SLR methodology was selected for this phase. An SLR is a secondary study effective in finding and aggregating evidence from an identified number of primary documents to answer specific and profound research questions. The methodology has a clear process with well-defined steps, a high degree of rigor, and particular emphasis on quality; thereby ensuring internal and external validity.

To overcome the subjective nature of qualitative research, and ensure the validity of this phase, specific techniques from the content analysis methodology were incorporated. Firstly, the analysis was guided by a data-language following four systems thinking paradigms: Functionalism; Interpretivism; Emancipation; and Postmodernism. Secondly, the results were validated by having a calculated reliability data set—from each approach's reference—recoded by an independent analyst who received proper training and a guiding codebook. Finally, the outcomes of the second coding were used to calculate intercoder reliability coefficients to prove this study's generalizability.

To put it briefly, content analysis is a qualitative research methodology for making scientific, objective, systematic and generalizable inferences from text given the context in which they

were used. As a research technique, content analysis provides new insights, increases a researcher's understanding of particular phenomena, or informs practical actions (Krippendorff, 2012).

This phase aims to uncover the systemic pertinences of the top three social responsibility approaches. During this process, the approaches' official references were acquired from their organizational entities, and were analyzed according to a data-language presented in a later section.

The following subsections outline the details of the SLR as recommended by (Kitchenham et al., 2010).

3.4.1 Research questions

The aim of this SLR is to aggregate evidence to answer this research's third subproblem:

- To what extent are key supply chain social responsibility approaches underpinned by systems thinking perspectives?

Given the broad nature of the question, it was divided into the following sub-questions:

RQ1. What are the top supply chain social responsibility approaches?

RQ2. To what extent is Corporate Social Responsibility underpinned by systems thinking perspectives?

RQ3. To what extent is Social Life Cycle Assessment underpinned by systems thinking perspectives?

RQ4. To what extent is Social Accountability 8000 underpinned by systems thinking perspectives?

RQ5. Are any of the top three supply chain social responsibility approaches multi-paradigmatic from a systems thinking perspective?

RQ6. Are the top three supply chain social responsibility approaches capable of addressing all factors of a social responsibility mess from a systems thinking perspective?

RQ7. Can the top three supply chain social responsibility approaches be used in tandem in a CSP like intervention?

3.4.2 Finding primary studies

Ten databases were searched for articles. The databases were: American Society of Civil Engineering; Compendex; Emerald; Inspec; Proquest; Science Direct; Scopus; Web of Science; Wiley Online Library; and Worldcat. The following search string was selected. It returned a total of 1387 articles, 204 of which were duplicates, which when filtered out left 1183 articles:

(“supply chain" AND “social sustainability") OR (“supply chain" AND “social risk") OR (“value chain" AND “social sustainability") OR (“value chain" AND “social risk") OR (Logistics and “social risk") OR (Logistics AND “social sustain-ability").

3.4.3 Inclusion and exclusion criteria

An SLR must be of high quality (Kitchenham, 2010). Therefore, a set of inclusion and exclusion criteria were defined and implemented. The criteria stipulated that: the article is about supply chain social responsibility; is published inclusively between 2004 to 2017; is not about philanthropy, charity, or social innovation; is a journal article; is written in the English language; and is available in the Portable Document Format (PDF). Applying the inclusion and exclusion criteria excluded 593 inadequate articles, leaving 590 pertinent ones.

3.4.4 Data language

To guide the evidence extraction process, a well-defined and reliable analysis scheme must be defined (Budgen et al., 2008b). The scheme for this phase was designed in the form of a data-language. A data-language mediates between unstructured phenomena and the scientific inferences about them. It must be simple, detailed and basic (Krippendorff, 2012).

Accordingly, the following is the paradigm-based data-language designed for this phase. It has four variables, each providing a convenient conceptualization of a given systems thinking paradigm, see Table 2.4. An article must contain fragments of text, of any size and not necessarily contiguous, that denote the presence of principles from one or more of the four paradigms. The variables are mutually exclusive, which is guaranteed by the inherent mutual exclusivity of the paradigms.

1. Functionalism
    - Definition: the reference uses principles similar to those of the functionalist paradigm.
    - Example: To reduce the social footprint of the transportation activities, we propose a double-goal optimization model using the ideal point method. The model relies on a number of social sustainability factors such as absenteeism, number of work injuries, and employee retention rates.
2. Interpretivism
    - Definition: the reference uses principles similar to those of the interpretive paradigm.
    - Example: In determining which factors affect the organization's social footprint the most, various stakeholders were invited to participate in brain storming sessions. The organization was able to define, prioritize and tackle the three most important factors.
3. Emancipation
    - Definition: the reference uses principles similar to those of the emancipatory paradigm.

- Example: In order to maintain its social license to operate, the organization included the surrounding communities in making a decision about whether to expand the mine operations.

4. Postmodernism
    - Definition: the reference uses principles similar to those of the postmodern paradigm.
    - Example: In the case study, given the current limited resources, the supply chain managers decided to commit to upgrading half of the emissions filters during the current fiscal year. Although the surrounding community members were involved in the decision making process for a complete revamp, management felt that was the right solution when factoring in the financial circumstances. The effected community was involved in making this concession.

Another key point is that when coding a reference, it was read in its entirety. Every paragraph was analyzed to uncover its innate systems thinking principles in order to associate it with one or more paradigms.

3.4.5 Data extraction

To find the most adopted social responsibility approaches, all journal articles were searched for keywords denoting them, then the top three approaches were selected for further analyses. The following is the set of keywords used.

CSR (including name variations), SLCA (including name variations), ESG (including name variations), Sustainable Design (e.g. Quality Function Deployment for the Environment), Industry Standards (e.g. SA8000), Sustainable Reporting (e.g. GRI).

To analyze and reveal the assumptions and paradigms of any approach from a creative systems thinking perspective, Jackson (2003) developed the System of Systems Methodology

(SOSM). The SOSM is based on a grid with two dimensions: the system's complexity; and compatibility of its participants. Each cell represents one of the aforementioned reality-types, making the visualization and analysis using the four paradigms much more intuitive and informative. The SOSM relates each social responsibility approach to the reality-types it can address and therefore determining the approaches' paradigms, see Table 2.2.

Using the SOSM allows for a direct and theoretically founded comparison of the top social responsibility approaches. Something that has only been done superficially through surveys and structured interviews (Chiarini et al., 2017). This phase offers a scientific understanding, while explaining the mixed and sometimes contradictory results on the performance of the various approaches.

The data-language for this review is based on four systems thinking paradigms and is presented in the previous section. Table 3.2 presents the details of the references of the top approaches. Moreover, sample coding of the references is provided in the appendix.

The CSR reference is a guideline for implementing and maintaining CSR initiatives as defined and understood by the IISD. The guideline is intended for both small businesses and entire supply chains as the concepts are universal despite the size of the business entity. The document is a step by step manual divided into two activities each composed of a set of tasks.

Similarly, the SLCA reference is a guideline composed of four steps for implementing and maintaining an SLCA undertaking as defined by the UNEP. It is intended for supply chains that wish to assess the potential and actual social impacts of their products and services throughout their life cycle. It proposes a cause-effect model of reasoning by linking collected social responsibility data to impact subcategories that are in turn linked to impact main-categories of interest to a selected stakeholder group.

Comparably, the SA8000 reference provides guidance for implementing and maintaining the standard through explanations, support and interpretations for the organizations, auditors and

interested parties. The document outlines the nine elements of the standard, as well as how they should be implemented and audited.

Table 3.2 Reference details of the top social responsibility approaches

	CSR	SLCA	SA8000
Title	Corporate Social Responsibility an Implementation Guide for Business	Guideline for Social Life Cycle Assessment of Products	Social Accountability 8000
Publisher	IISD	UNEP	Social Accountability International (SAI)
Authors	Paul Hohnen	Andrews et al.	Not applicable
Editors	Jason Potts	Catherine Benoît, and Bernard Mazijn	Not applicable
Identifier	Ref1	Ref2	Ref3
ISBN	978-1-895536-97-3	978-92-807-3021-0	Not applicable
Published on	March 2007	February 2010	June 2014
Website	www.iisd.org	www.unep.fr	www.sa-intl.org

3.4.6 Quality assessment

To establish internal and external validity, SLRs demand high quality of both the evidence extraction process and its outcomes (Kitchenham et al., 2010). This is done by having more analysts recode a sample of coding-units from the original population called a reliability data set. The coding-units for this review represent the population of paragraphs in a given reference.

The size of the reliability data set was calculated as per the content analysis methodology (Krippendorff, 2012). It is worth noting that P_k is the ratio of the total number of paragraphs belonging to the least present paradigm in an examined reference, α_{min} is the smallest alpha for coding to be considered as reliable, whereas P is the statistical significance. The calculations are shown in Table 3.3.

Table 3.3 Number $N_{k\backslash not\text{-}k} = T (P_k, \alpha_{min}, p)$ of values for α_{min} to inform reliability

	Population	**Functionalism %**	**Interpretivism %**	**Emancipation %**	**P_k**	**α_{min}**	**P**	**Sample**
CSR	572	17%	68%	15%	0.167	0.800	0.050	189
SLCA	472	77%	13%	10%	0.100	0.800	0.050	293
SA8000	839	15%	14%	71%	0.143	0.800	0.050	214

Subsequently, reliability data sets for each of the references were sent to an independent analyst. The analyst was provided with a codebook, given training and was left to code independently. The results were used to calculate the inter-coder agreement coefficient KALPHA using Microsoft R. The results are shown in Table 3.4. Note that N/A denotes Not Applicable.

Table 3.4 Intercoder KALPHA agreement coefficients

	Functionalism	**Interpretivism**	**Emancipation**	**Postmodernism**
CSR	0.849	0.814	0.824	N/A
SLCA	0.904	0.931	0.971	N/A
SA8000	0.935	0.861	0.822	N/A

CHAPTER 4

PHASE ONE: HOW IS THE SCIENTIFIC LITERATURE ON SUPPLY CHAIN ADDRESSING SOCIAL RESPONSIBILITY CHALLENGES?

4.1 Introduction

Unsafe working conditions, labour abuse, environmental damage and indifference toward neighbouring communities are a few examples of what goes wrong when social responsibility takes a backseat. More often than not, such behaviors cause backlashes from the part of the stakeholders in the form of protests, targeted governmental regulations, negative press and changes in purchasing patterns, effectively damaging the reputation of the supply chain's member firms, especially big brands, and more importantly impacting its bottom line and continuity drivers (Hutchins, 2010).

When reviewing the supply chain social responsibility literature from a sustainability perspective, it quickly becomes evident that the social pillar of sustainability is much less studied relative to its environmental and economic constituents, and when addressed, it is mostly limited to labor rights and working conditions (Seuring et al., 2008). However, the literature does recognize the importance of all three pillars and the necessity of addressing them impartially (Linton et al., 2007).

Moreover, despite the many supply chain social responsibility methods found in the literature, no evidence exists on what the most used amongst them are. Without such evidence, identifying gaps and future research directions would not be possible, giving way to the continuation of random and hype-driven contributions to the body of literature.

Accordingly, this chapter outlines the details of phase one of this research. The authors conducted a mapping study analyzing 590 articles on the subject matter from 10 different

databases. The methodology for this phase is presented in detail in the Overall Research Methodology chapter. The outcomes from this phase severed as input to phase two and informed its direction[5].

The findings reveal that CSR, sustainable reporting, and SLCA are the most used approaches, whereas systems thinking lags far behind despite being the first to methodologically address social responsibility in various forms from different perspectives.

To the best of our knowledge, no similar work has been done before to scientifically uncover such findings. Nevertheless, a number of mapping studies did address other factors of the subject of interest, namely social sustainability performance measurement (Marshall et al., 2015) and stakeholder pressure effects (Meixell et al., 2015).

The rest of this chapter is organized as follows: section two presents the results; section three is a discussion; and section four concludes the chapter and suggests future research venues.

4.2 Results

The results section relists the questions specific to this phase and their answers in the form of subsections as per the mapping study methodology (Petersen et al., 2008). The questions are quite high level in nature and include, for instance, how active is the research in the subject matter? how many different journals made publication and what are the top ten amongst them? etc. (Budgen et al., 2008). Answering the questions uncovered trends in what supply chains are doing to address their social responsibility dilemmas. Each of the following subsections presents a question with a concise answer along with an explanation and figures when applicable.

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[5] Published in Corporate Social Responsibility and Environmental Management.

The following is the main research question for this phase:

- How is the scientific literature on supply chain addressing social responsibility challenges?

4.2.1 How active is the research in the subject matter?

From 2004 to 2017, a total of 590 articles were published, over this period, the data show a steady increase of interest in the subject matter, the publications count per year started with only four articles in 2004 to 43 articles in 2017 with a peak of 111 articles published in 2016. Note that the sudden drop in 2017 is due to the fact that the search was done midyear. See Figure 4.1.b

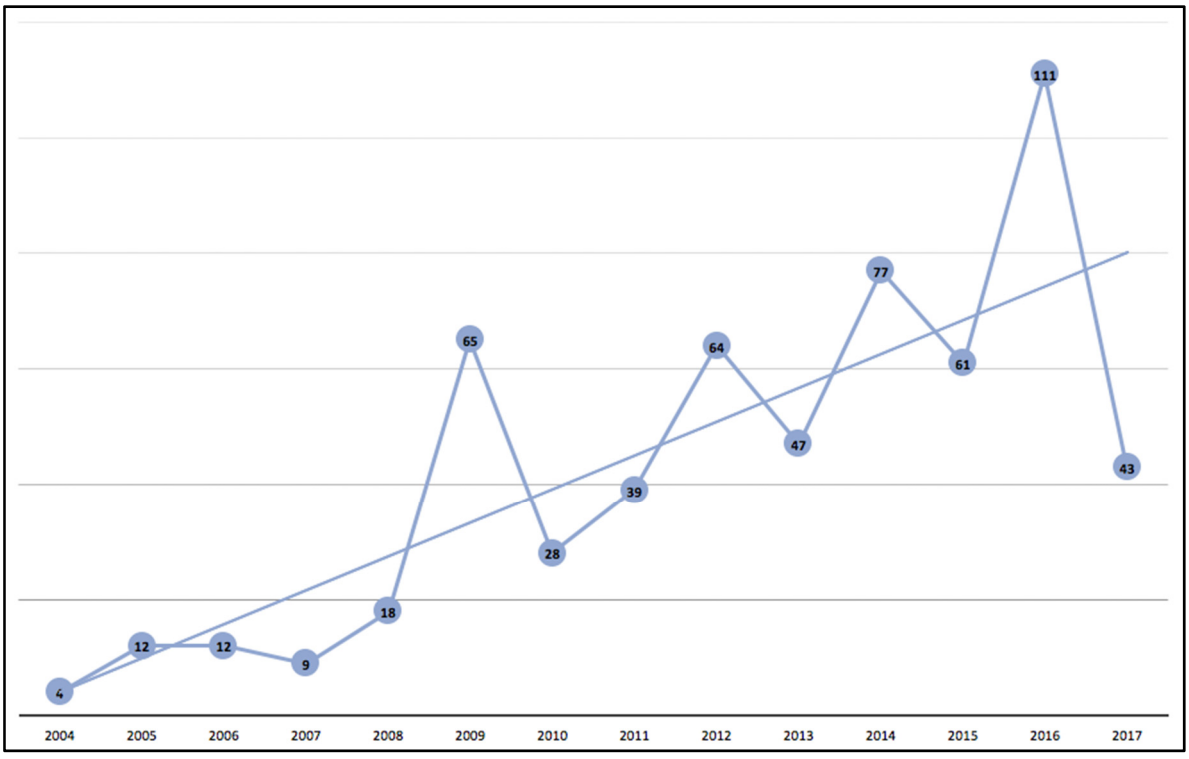

Figure 4.1 Research activity from 2004 to 2017

4.2.2 How many different journals made publications and what are the top ten amongst them?

The articles were published in 242 different journals. Table 4.1 lists the top ten.

Table 4.1 Top publishing journals on supply chain social responsibility

Journal	**Count**	**Percentage**
Journal of Cleaner Production	58	9.83
Corporate Social Responsibility and Environmental Management	23	3.89
Business Strategy and the Environment	20	3.38
Supply Chain Management: An International Journal	16	2.71
British Food Journal	16	2.71
Sustainable Development	9	1.52
Journal of Industrial Ecology	8	1.35
Corporate Governance: The International Journal of Business in Society	8	1.35
Sustainability	8	1.35
Journal of Supply Chain Management	8	1.35

4.2.3 How present is the use of industry approaches?

From the total population of articles, a total of 507 articles, i.e. 85.93%, used one or more industry approaches.

4.2.4 What are the most used industry approaches?

CSR was used in 41.81% of the articles that employed industry approaches, whereas industry standards represent 15.97%. Moreover, sustainable reporting and SLCA occupied 15.38% and 14.49% respectively. See Figure 4.2.

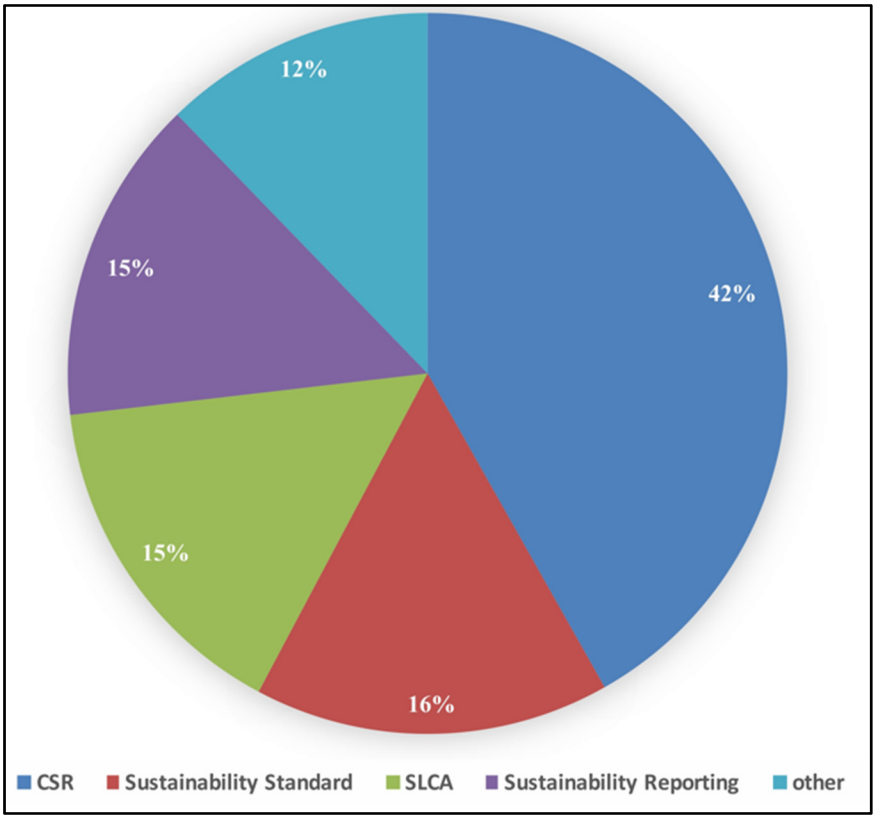

Figure 4.2 Most frequent industry social responsibility approaches

4.2.5 How present is the use of systems thinking in the literature?

Systems thinking was used in only 53 articles representing around 8.98% of the total population.

4.2.6 What are the most used systems thinking methodologies?

Of the articles employing systems thinking, SD constituted 24.07% and socio-technical systems was used in 20.37% of the articles. Moreover, operations research accounted for 16.66% whereas complex adaptive systems and complexity theory represented 9.25% and 7.4% respectively. See Figure 4.3.

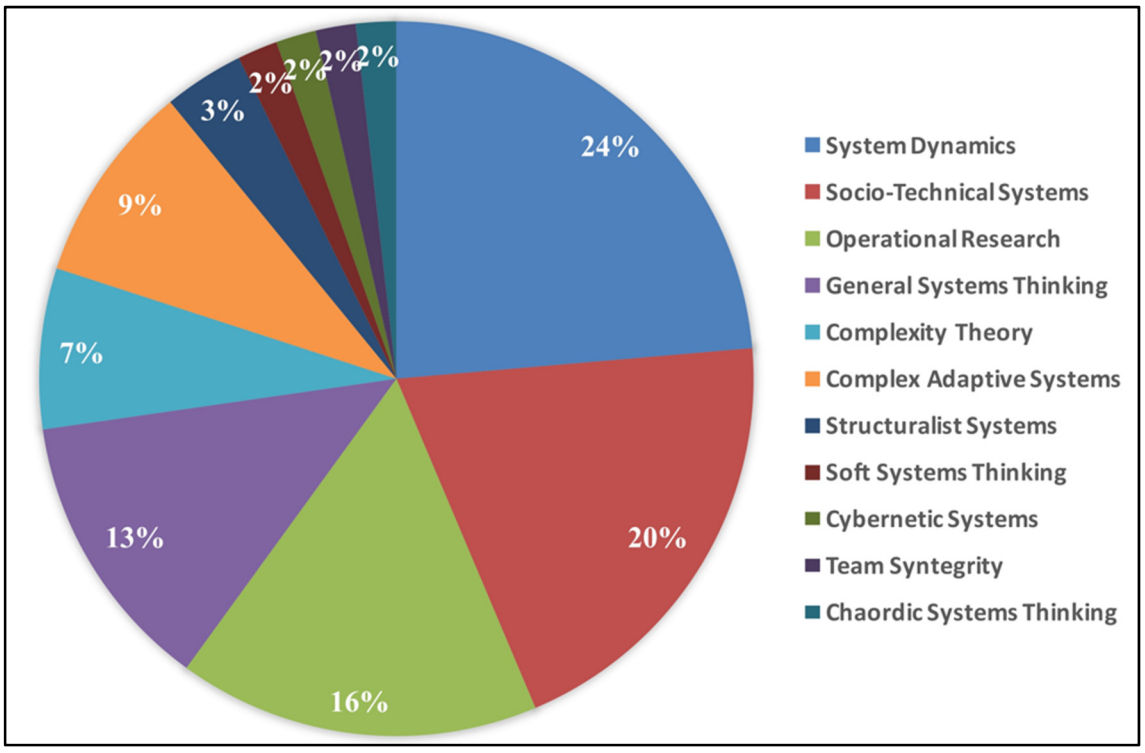

Figure 4.3 Most frequent systems thinking methodologies

4.2.7 Were systems thinking methodologies and industry approaches used in combination?

Yes, but to a very limited extent. Precisely, a total of 18 articles employed systems thinking with one or more industry approaches. For example, CSR was employed with operations research, complexity theory, SD and socio-technical systems. Another example combined socio-technical systems and SLCA. See Figure 4.4.

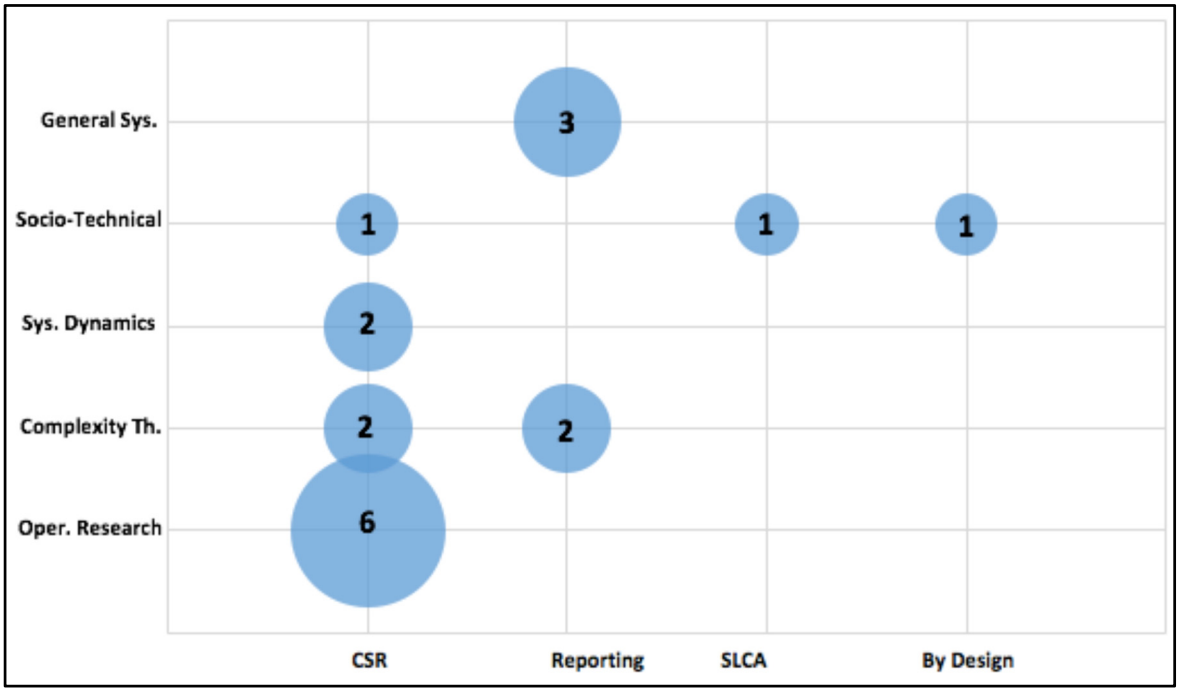

Figure 4.4 Counts of articles using both systems thinking and industry approaches

4.2.8 Does the literature demonstrate a bias toward an industry approach?

The data reveal a clear bias of some journals toward certain industry approaches. For instance, The Journal of Cleaner Production is mostly focused on CSR, SLCA, reporting and industry standards. The Journal of Corporate Social Responsibility and Environmental Management and The Journal of Business Strategy and the Environment are both more focused on CSR and sustainable reporting. The International Journal of Supply Chain Management, The International Journal of Production Economics and The International Journal of Business in Society are mostly interested in CSR.

4.2.9 Does the usage of industry approaches change with time?

The data reveal a continuous increase in using industry approaches over the selected period, starting with three articles published in 2004 to a peak of 110 in 2016. See Figure 4.5.

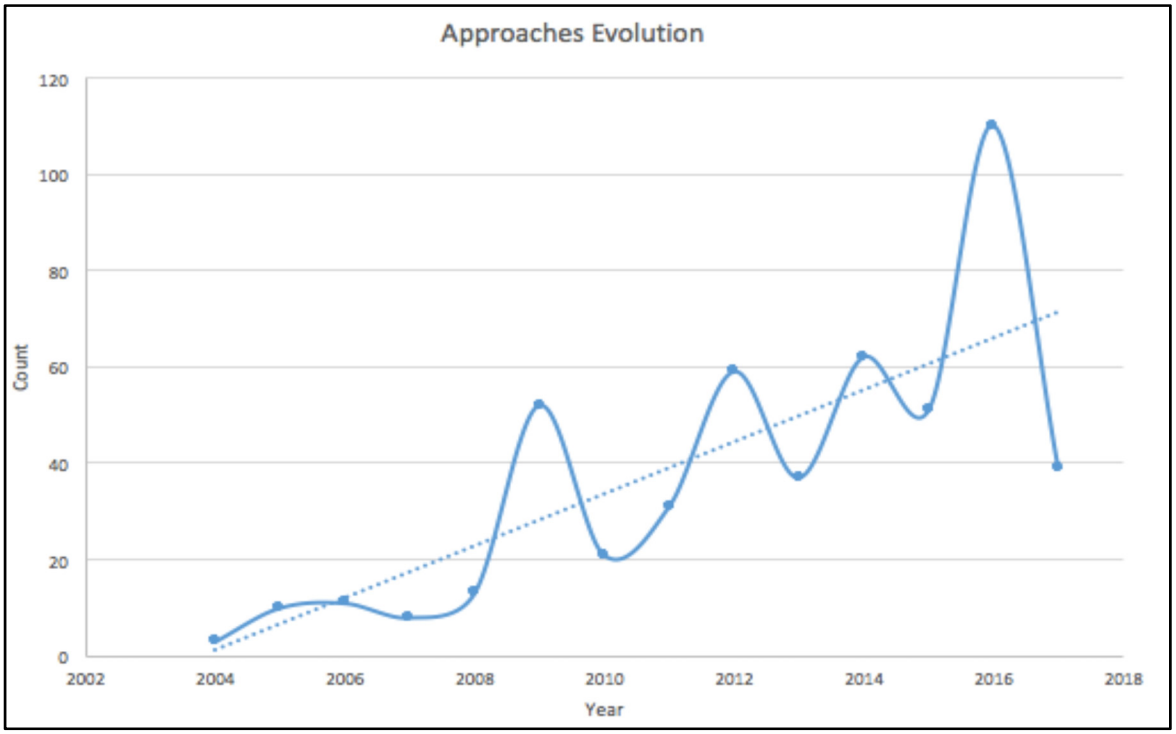

Figure 4.5 Industry approaches usage evolution from 2004 to 2017

4.2.10 Does the usage of systems thinking methodologies change with time?

The use of systems thinking has timidly evolved over the years and remains very limited. See Figure 4.6.

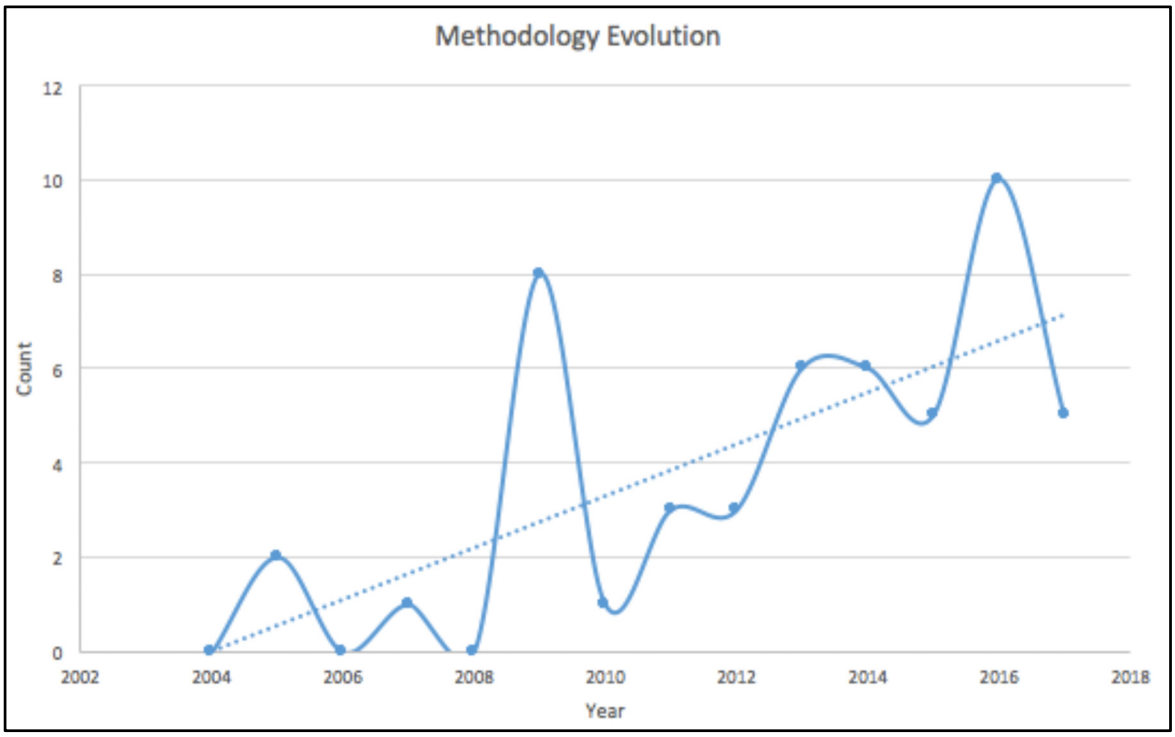

Figure 4.6 Systems thinking usage evolution from 2004 to 2017

4.2.11 How common is the use of multiple industry approaches in the literature?

Precisely 84 articles used more than one approach representing 16.56% of the articles using industry approaches.

4.2.12 Does the literature address all stages of the supply chain?

Yes, the majority of the literature addressed the supply chain in general without naming any of its stages. Nevertheless, a fair percentage explicitly addressed one or more stages including: sourcing; production; inventory; transportation; retail; and recycling.

4.2.13 Does the literature address all stages of the supply chain equally?

Over half of the literature addressed the supply chain in general. However, a much lesser percentage of the literature concentrated on specific stages. See Figure 4.7.

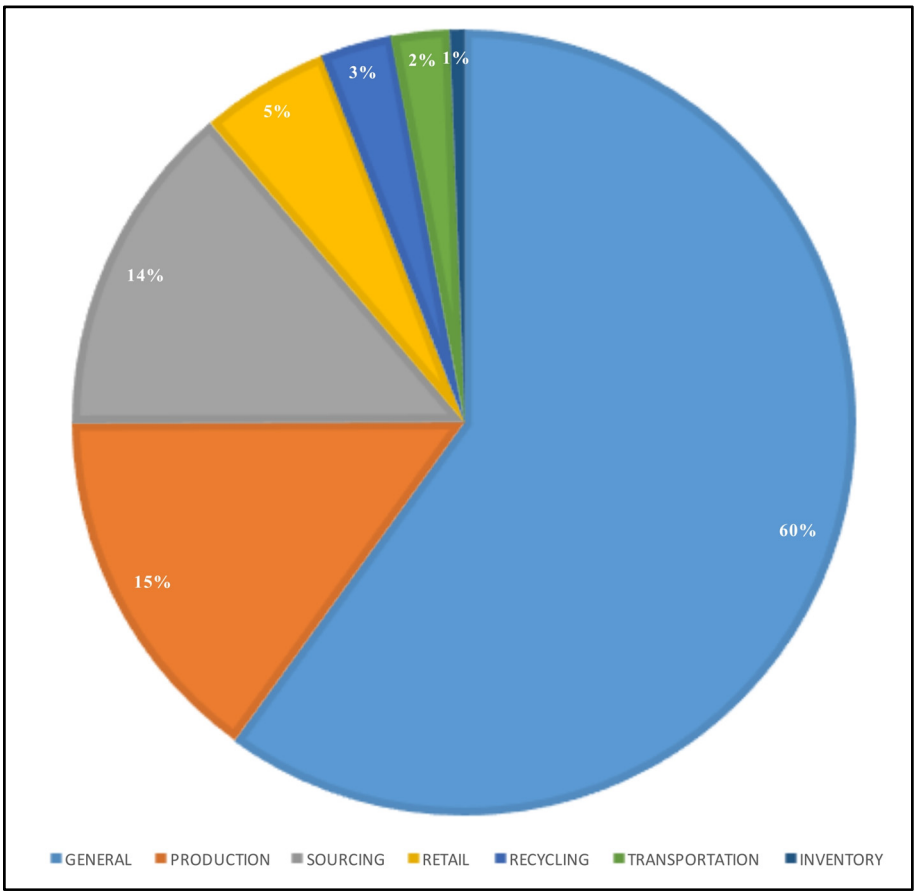

Figure 4.7 Focus of the literature on the supply chain stages

4.2.14 Is there evidence of focus by certain industry approaches on specific supply chain stages?

As expected from the preliminary analyses, CSR is the dominant industry approach across all stages of the supply chain followed by SLCA. The other industry approaches were employed to varying degrees. See Figure 4.8.

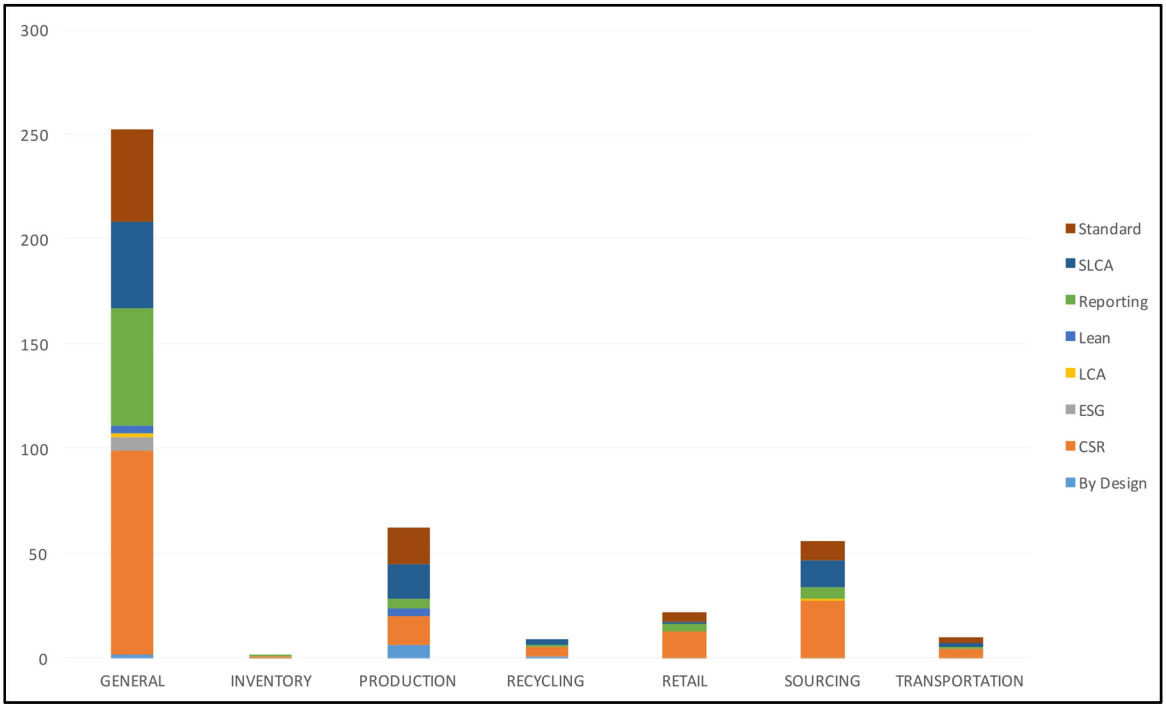

Figure 4.8 Focus of industry approaches on the supply chain stages

4.2.15 Is there evidence of focus by certain systems thinking methodologies on specific supply chain stages?

Yes, socio-technical systems dominated the sourcing stage, whereas SD was the primary methodology used in the production and recycling stages. Neither the inventory nor the transportation stages were the focus of any of the methodologies. See Figure 4.9.

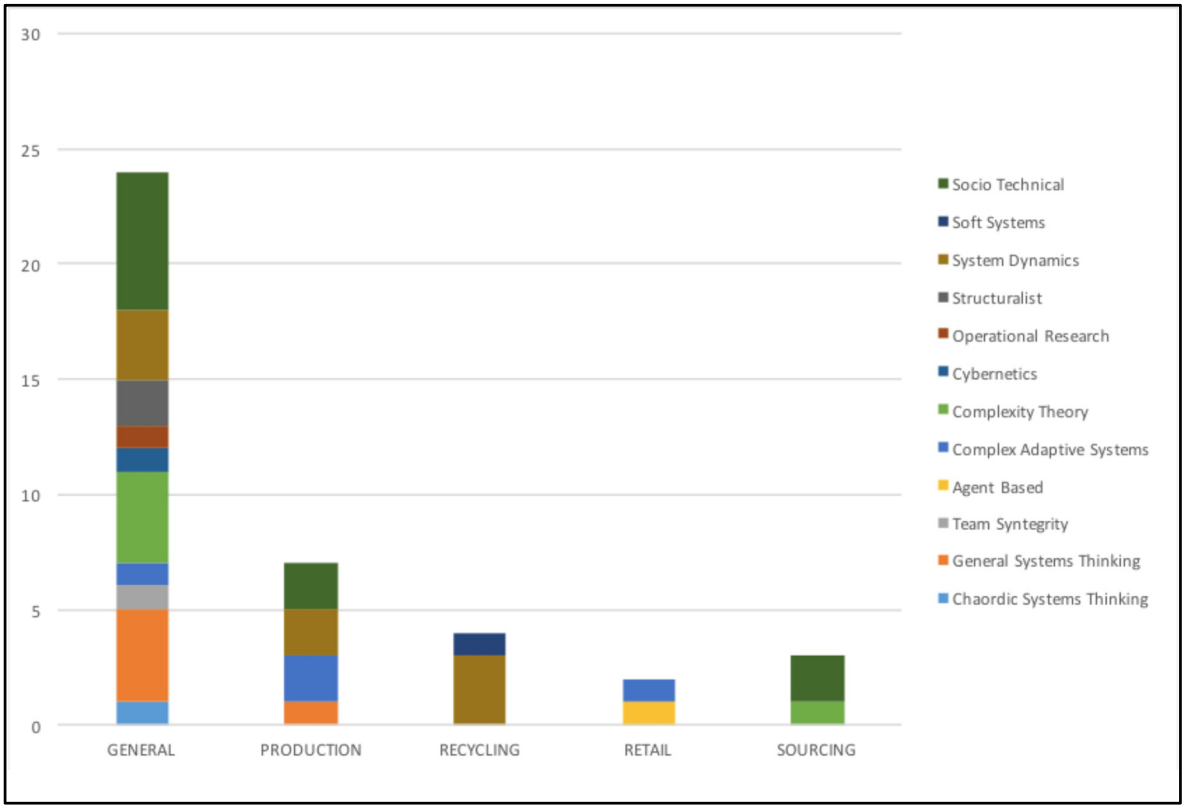

Figure 4.9 Focus of systems thinking methodologies on the supply chain stages

4.3 Discussion

The results presented in the previous section revealed that the work on the subject matter is fragmented across 243 different journals, where 56.11% published only a single article, and 23.36% published two articles. Journals publishing three articles amount to 9.35%, whereas journals that published more than three represent only 11.18%. Fortunately, the following journals seem to specialize in the subject matter by publishing significantly more pertinent articles accounting for over 27% of the publishers:

- Journal of Cleaner Production
- Corporate Social Responsibility and Environmental Management
- Business Strategy and the Environment
- Supply Chain Management: An International Journal
- British Food Journal

Moreover, certain journals were more biased toward certain industry approaches than others, for instance, The Journal of Cleaner Production was mostly interested in CSR, SLCA, sustainable reporting, and sustainability standards, whereas The Journals of Corporate Social Responsibility and Environmental Management and The Journal of Business Strategy and the Environment were focused on CSR and sustainable reporting. Finally, The International Journal of Supply Chain Management, and The International Journal of Production Economics were mainly interested in CSR.

The results also highlight a very interesting finding in that the use of industry approaches is dominant in the literature. Articles using one or more industry approaches account for over 85.93% of the population of articles. These approaches were used as is without modification nor extension hinting to the limited systemic creativity in the research community, no evidence was found in support of the community's capacity to be selective of the tools and methods from the different approaches, such systemic creativity, when tailored to the context of the problem situation, would naturally better factor in both the technical and social dimensions of the problem of interest, it seems as though the research community is taking a

passive stance toward the issues of interest and used only what is common and status quo, showing evidence of a bandwagon effect.

Amongst the articles that employed industry approaches, CSR was the mostly used accounting for 41.81%, this finding confirmed the authors' early expectations following the initial literature review. Articles that used sustainability standards, account for 15.97%, whereas 15.38% and 14.49% of the articles utilized sustainable reporting and SLCA respectively. Moreover, 16.56% of the articles used more than one approach.

It turns out that supply chains are still very likely to adopt what is widely common rather than look for innovative solutions and try various approaches before making a commitment to one or more. Additionally, SLCA accounting for 14.49% of the articles using industry approaches was unexpected given its relative complexity, this could be explained by the handful of clear steps and processes relying on data and capable of producing reports that SCM can quickly understand and work with, making it a valuable decision support tool. Moreover, ESG is not as popular as we thought even though it had gained increasing attention in various industry circles, especially in North America and Europe.

Conversely, the articles using systems thinking were very few representing only 8.98% of the total population of articles. Of the articles utilizing systems thinking, 24.07% were linked to SD, making it the most used method, followed by socio-technical systems accounting for 20.37%. Operations research occupied 16.66%, preceding structuralist systems which accounted for 3.52%. The remaining five systems thinking methodologies (SST, team syntegrity, OC, operational research, and chaordic systems) were each used only once accounting for 1.85% each. It is interesting to note that five articles representing around 15.48% of the systems thinking articles strongly advocate the use of systems thinking without specifying a particular methodology.

It follows that the finding that socio-technical systems representing a fifth of the articles using systems thinking demonstrates that supply chains are increasingly considering the human dimension as being as decisive as the technical one, i.e. a shift from the process

optimization mindset. Nevertheless, SD ranking first seemed quite normal given that it is one of the earliest and well known systems thinking methodologies, and is close to the analytical mindset common in nowadays management with concepts such as feedback loops, leverage points and rate or flow variables.

Some articles attempted to tackle the problem of interest by using a systems thinking methodology alongside one or more industry approaches, for instance, socio-technical systems was used with CSR, SLCA, and sustainable reporting. Another article used complexity theory with SLCA. The idea here is to compensate for the inability of an industry approach to handle either of the two dimensions of the problem situation with a systems thinking methodology that is more effective. For example, SLCA is good at dealing with the system's complexity dimension due to its analytical nature whereas socio-technical systems is effective in incorporating the systems stakeholders to achieve joint-optimization.

Most of the literature addressed the supply chain in general without being specific on any of its stages, such articles represent 60% of the population. However, in the articles that did, 15% were linked to production and 14% to sourcing. The retail, recycling, transportation and inventory stages accounted for 5%, 3%, 2% and 1% respectively, this considerably low interest hints to a serious oversight from the research community and presents itself as low hanging fruits that could result in high impact research findings.

Articles that addressed the supply chain in general used CSR the most, followed by sustainable reporting, SLCA, sustainability standards and ESG in the order of listing. CSR is also the dominant industry approach in the articles that explicitly addressed all the stages of the supply chain except production and inventory, followed by SLCA. The production stage, mostly focused on sustainable design, this finding highlights the sensible approach management of this stage is taking to incorporate sustainable decisions into the product design before production takes place, it is also the stage that used the most different industry approaches. Moreover, production, along with sourcing, also show strong interest in SLCA. The inventory stage seems to be almost ignored by the literature: only two articles of the

entire population explicitly addresses it. The transportation and recycling stages also seem to be of very little interest to the research community given the low number of publications.

Concerning what systems thinking methods were used in the different supply chain stages, socio-technical systems dominated the sourcing stage, whereas SD was the primary methodology used in production and recycling stages. The production stage used the most different methodologies, it used socio-technical systems, SD and chaordic systems thinking, there was also an article that addressed this stage and made a strong case for the use of systems thinking in general.

Surprisingly, neither the inventory nor the transportation stages were addressed by the literature using systems thinking, this is both good news and bad news, as these two stages of the supply chain would have benefited tremendously by using the ideas and tools from systems thinking in general and CST and creative holism in particular, however, this is also a low hanging fruit that could have quick positive effects when accounted for, and are indeed interesting future research opportunities.

In total twelve different systems thinking methodologies were used, spanning three of the four systems thinking paradigms: Functional; Interpretive; and Emancipatory; leaving out the Postmodern Paradigm. Although limited in number, but this finding reflects the diversity of thought by the different researchers who used systems thinking by attempting to tackle the same issues from different angles based on different assumptions, backgrounds and worldviews. This highlights a positive trend in that researchers are advancing in both dimensions of the issues of interest: the system's complexity and the compatibility of its stakeholders.

4.4 Conclusion

In light of numerous social responsibility incidents, supply chains adopted various preventive and reactive approaches. Incidents like factory collapses, worker exploitation and communal natural-resource depletion instigated reactions from implicated stakeholders; impacting supply chain bottom lines and continuity prospectives. The reactions manifest in many forms including: boycotts, negative media coverage, protests, reputation damage and targeted governmental regulation (Hutchins, 2010).

Thankfully, the topic of supply chain social responsibility witnessed increasing interest, especially after the early years of the current millennium. Searching the literature returns hundreds of articles that both discuss the topic as well as present solutions in the form of models, frameworks and methods. However, it quickly becomes evident that the literature is scattered over many databases and journals, and more importantly, is accumulating aimlessly: this is evidenced by the fact that the literature introduces several definitions of the issue, makes different assumptions about it; and therefore offers a plethora of divergent solutions. This reality makes extracting value from the literature a difficult process, and contributions continue to be hype-driven and guided by sheer randomness in terms of what research routes to take.

To solve this problem, this phase mapped the literature by completing a mapping study that analyzed 590 journal articles from 10 databases. This phase provides a clear understanding of what the literature offers in terms of solutions to supply chain social responsibility.

The findings uncovered various trends and patterns the most important of which is the overwhelming use of industry approaches accounting for 85.93% of the articles, with CSR, sustainability standards, sustainability reporting and SLCA representing 41.81%, 15.97%, 15.38% and 14.49% respectively of the articles that used industry approaches. Moreover, this study revealed the very limited use of systems thinking, only 8.98% of the articles used systems thinking.

In view of the findings presented by this study, supply chains are still very process oriented and are very likely to adopt a solution that offers a clear set of steps to implement and guidelines to follow, such as CSR, while not considering its shortcomings. This is clear from the finding that 85.93% of the articles used industry approaches and used them as is without modification nor extension. Moreover, the use of systems thinking remains very limited, and is mostly bound to socio-technical systems and SD, which are two of the very first systems thinking methodologies that are well known in the management sciences, this could be due to their analytical nature that is pervasive in today's management.

Furthermore, the findings revealed trends allowing for some predictions. For instance, a positive trend that could corroborate in the future is the increasing interest in stakeholder management along two axes: identification vis-à-vis a supply chain's sphere of influence; and better participation and inclusiveness procedures. We predict that this will further integrate social responsibility into the supply chain's business strategy, given that management will become more convinced of the dependency of the supply chain's continuation on proper stakeholder management practices, and will have suitable facilitation tools, such as AA1000. Nevertheless, we also predict that unless research in the subject matter takes a more strategic approach guided by mapping studies and SLRs, it will continue its bandwagon character and focus on what is popular, such as CSR, instead of identifying and filling gaps in the accumulated knowledge about the subject of interest.

Although mapping studies do map the literature in ways that highlight gaps and clusters of knowledge, it does have its shortcomings: they are limited by how encompassing the search step is, making it almost certain that a number of articles were missed; and although the results are of a quantitative nature, the effort leading to them is subjective and constrained by the authors judgment, especially during the classification step; and finally, they require considerable effort and resources to carry out in terms time, people and money.

In terms of future research, the limited use of systems thinking is an intriguing finding that merits further investigation, further research could analyze the articles again and look for the

implicit use of the methods from the stand point of each ones' assumptions along two dimensions: the supply chain's complexity, and its participants.

Other research efforts could investigate the incorporation of SST, interactive planning and strategic assumption surfacing and testing into CSR to serve as better stakeholder engagement tools, this will make stakeholder integral to the social sustainability decisions made by the supply chain, as well as turn them into allies and sources of strategic information rather than adversaries and sources of risk.

Another research direction would be to explicitly research the inventory, transportation, retail and recycling stages of the supply chain as the findings highlight the oversight by the research community in explicitly addressing them using both industry approaches and systems thinking methodologies.

The findings from this phase have practical implications on the supply chain and its stakeholders: they can help practitioners make better decisions that would reduce the supply chain's social footprint, thus mitigating its social risk and preserving its social license to operate; and more importantly, enhance its stakeholders' quality of living.

CHAPTER 5

PHASE TWO: TO WHAT EXTENT IS THE SCIENTIFIC LITERATURE ON SUPPLY CHAIN SOCIAL RESPONSIBILITY UNDERPINNED BY SYSTEMS THINKING PERSPECTIVES?

5.1 Introduction

Given the considerable impacts of messes like factory collapses and worker suicide-waves, supply chains are increasingly attentive to social responsibility. Such messes have instigated stakeholder reactions like protests, negative media campaigns, and targeted regulations; forcing supply chains to change their behavior (Feng, 2017).

The term "Mess" was coined by Russ Ackoff to denote complex problem situations that are characterized by their interdependent and ill-structured nature. Messes occur when rational actors exhibit behavior of collective self-damage. Resolving messes requires collective action following a systemic approach (Williams et al., 2017).

Investigating the supply chain sustainability literature revealed that researchers have addressed the messes of interest using a multitude of measures (Walker et al., 2014). However, the researchers' contributions to this body of literature were primarily focused on approaches like Corporate Social Responsibility (CSR), ISO26000, the Global Reporting Initiative (GRI) and Social Life Cycle Assessment (SLCA), while seldom employing systems thinking (Basta et al., 2018). A preliminary analysis of these approaches revealed their systemic limitations and differences regarding worldviews, assumptions, problem definitions, recognized stakeholder groups, and which factors are considered significant (Basta et al., 2018). These differences ultimately lead to divergent partial solutions (Basta et al., 2018). Thus, from a systems thinking perspective, none of these approaches can address supply

chains as complex adaptive systems embedded in complex social contexts (Williams et al., 2017).

Therefore, questioning the effectiveness of the accumulated literature becomes justifiable, especially when considering the limitations of the aforementioned approaches it developed. The literature could be itself based on overly simplistic assumptions and worldviews, making it inherently incapable of offering adequate solutions that are both creative and holistic (Wallis, 2016). One might legitimately ask: could it be the case that the literature addressed the messes of interest from only a single worldview, thereby resolving some of its factors while being unaware of others? If so, the literature can only offer simple, partial, and divergent solutions, and this might be the reason why social responsibility incidents persist (Chiarini et al., 2017).

From a recognition that simple solutions to complex messes are bound to fail (Popovic et al., 2015), the authors conducted a mapping study to understand to what extent the scientific literature on supply chain social responsibility is underpinned by systems thinking perspectives. This mapping study gathered evidence about the literature's use of principles from four systems thinking paradigms: Functionalism, Interpretivism, Emancipation and Postmodernism. The aim is to uncover the literatures' fundamental principles, assumptions, factors it considers significant, factors it ignores, as well as its fundamental strengths and shortcomings (Wallis, 2016). The mapping study involved 436 journal articles from 10 different databases.

To achieve such an understanding, it was necessary for this study to identify the latent implicit systemic biases in the literature as opposed to the explicit ones. However, given that interpretation is subjective, multiple coders where needed, therefore, three independent codings were completed (Krippendorff, 2012).

In essence, systems thinking is a holistic analysis approach for managing systems by considering the emergent system as a whole rather than its individual parts, their relations

and interactions. This is contrary to reductionism which focuses on the parts failing to predict and manage higher-level patterns (Boardman et al., 2013). There exists a plethora of systems thinking methodologies. However, different systems thinking methodologies belong to at most one of the aforementioned paradigms. Each paradigm constitutes a set of ideas, assumptions and beliefs that shape and guide activity (Kuhn, 2012). Moreover, each paradigm is based on assumptions not compatible with the others, making them in conflict with one another. Therefore, viewing messes from multiple paradigms allows for drastic different perspectives to be considered. This ensures that challenging positions with rigorous alternative theoretical foundations are considered (Hester et al., 2017). Consequently, revealing the paradigmatic pertinences of any approach or methodology will highlight its strengths and shortcomings.

Our findings revealed that the literature is clustered in various degrees around interpretivism, functionalism and emancipation while postmodernism is completely overlooked. Moreover, systemic creativity was found to be highly limited in terms of using multiple paradigms in the same article. As recommended by the mapping study methodology, the findings are presented as a set of questions and answers highlighting patterns and trends.

Our findings could be of significant importance to researchers and practitioners alike. Given that each paradigm has different systemic strengths and weaknesses, better judgment of the suitability of the literature in addressing social responsibility messes becomes possible in light of its pertinences to such paradigms. Moreover, this phase[6] highlights a knowledge gap in terms of the literature's lack of systemic creativity.

To the best of our knowledge, no similar work has been done before. However, a number of mapping studies investigated the subject matter from different angles. For instance, Tajbakhsh et al. (2015) synthesized "pan-chain sustainability measurements" found in the

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[6] Submitted for revision and publication to the Journal of Management Studies.

literature, their goal was to develop an all-encompassing sustainability measurement framework that accounted for social, environmental and economic factors. Additionally, Alexander et al. (2014) investigated the use of Decision Theory (DT) in sustainable supply chain management, they concluded that the ethical dimension of the literature lacked the use of DT which they highlighted as a future research venue. Moreover, Ashby et al. (2012) investigated how the literature connected the two concepts of sustainability and supply chain management, their goal was to identify gaps and future research opportunities.

The next sections are organized as follows: section two presents the results; section three is a discussion; and finally section four concludes the chapter and proposes future research venues.

5.2 Results

In this section, the phase's sub-questions are relisted in the form of subsections as recommended by (Petersen et al., 2008). Each subsection provides a concise answer with an illustration figure where applicable. The following is the main research question for this phase:

- To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?

It is worth noting that although we searched for the use of postmodernism in the literature, and had a code prepared for it, it was found that the paradigm was completely absent. This could be due to its equivocal and opposing nature to the other paradigms, and its rejection of all their grand narratives making it hard to associate with (Jackson, 2003).

5.2.1 How active is the research in the subject matter?

A total of 436 articles were published. The data show an increase of interest in the subject matter, the publications count per year started with a mere 4 articles in 2004 to 61 in 2015 with a peak of 77 in 2014. See Figure 5.1.

5.2.2 What are the top 10 journals with publications based on systems thinking paradigm principles?

The Journal of Cleaner Production published 31% of such articles, with Supply Chain Management: An International Journal, and Business Strategy and the Environment each accounting for 13%. See Figure 5.2.

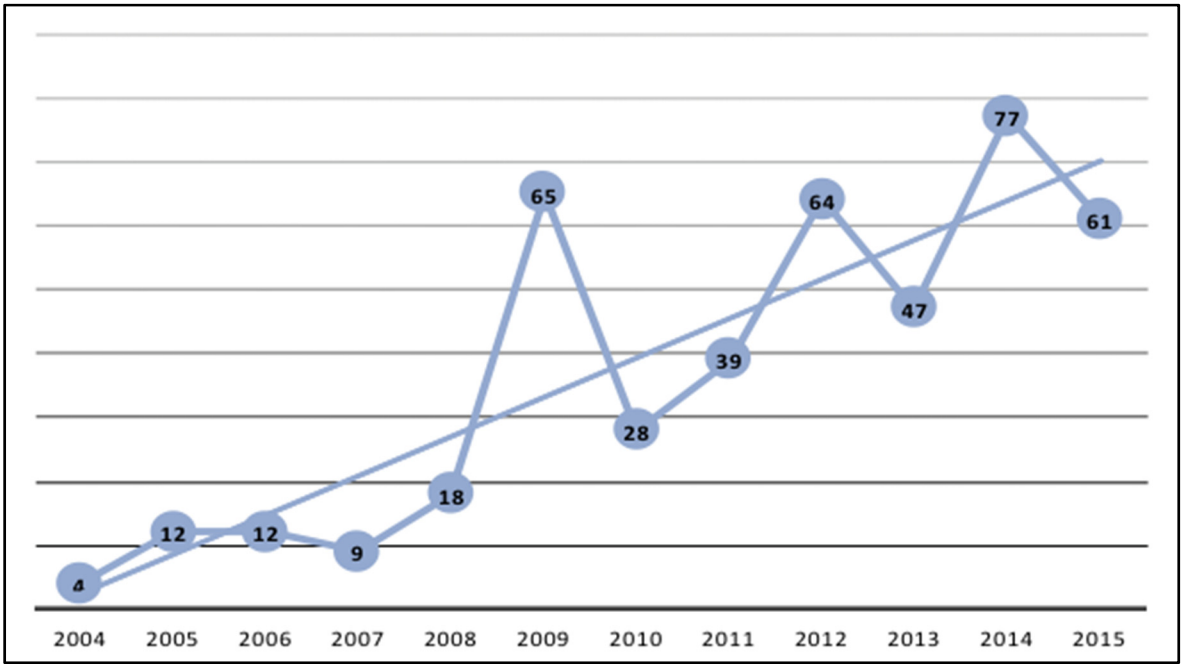

Figure 5.1 Research activity

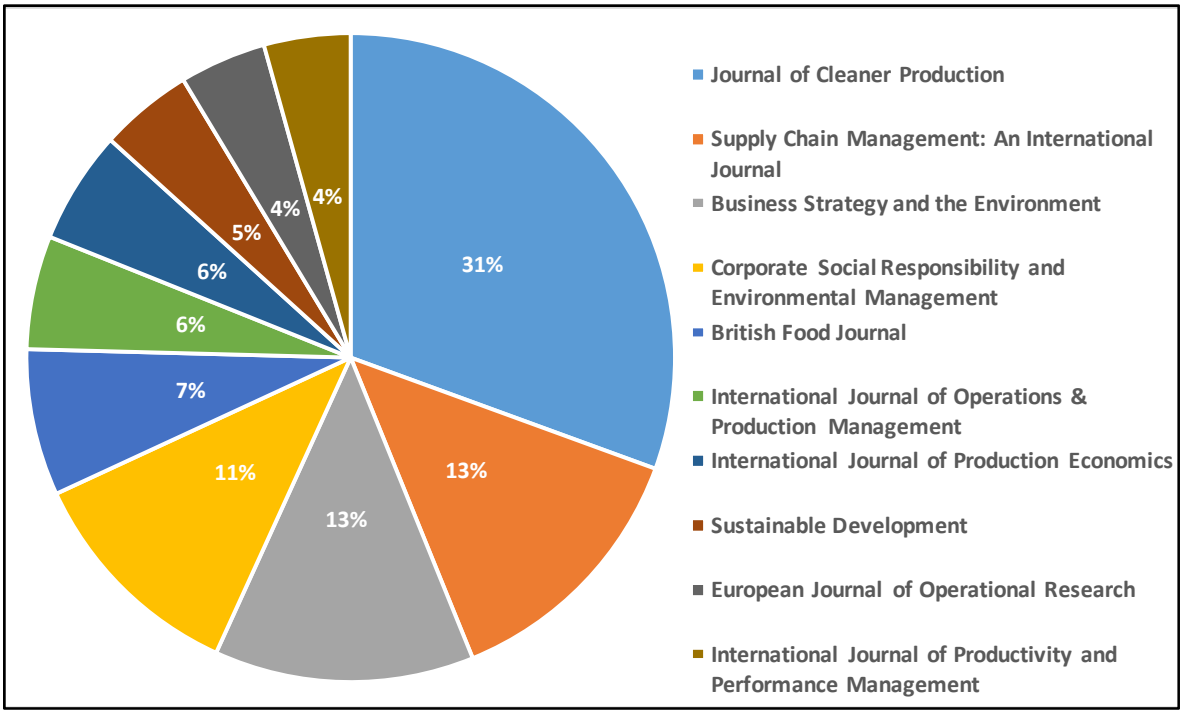

Figure 5.2 Top 10 journals with publications based on systems thinking paradigm principles

5.2.3 Does there seem to be a trend in the use of the systems thinking paradigms amongst the publishers?

Yes. Among others, publications by the British Food Journal were all interpretive. Moreover, Supply Chain Management: An International Journal and Business strategy and the Environment leaned toward interpretivism. Finally, the International Journal of Productivity and Performance Management and Journal of Cleaner Production were mostly focused on functionalism. See Figure 5.3.

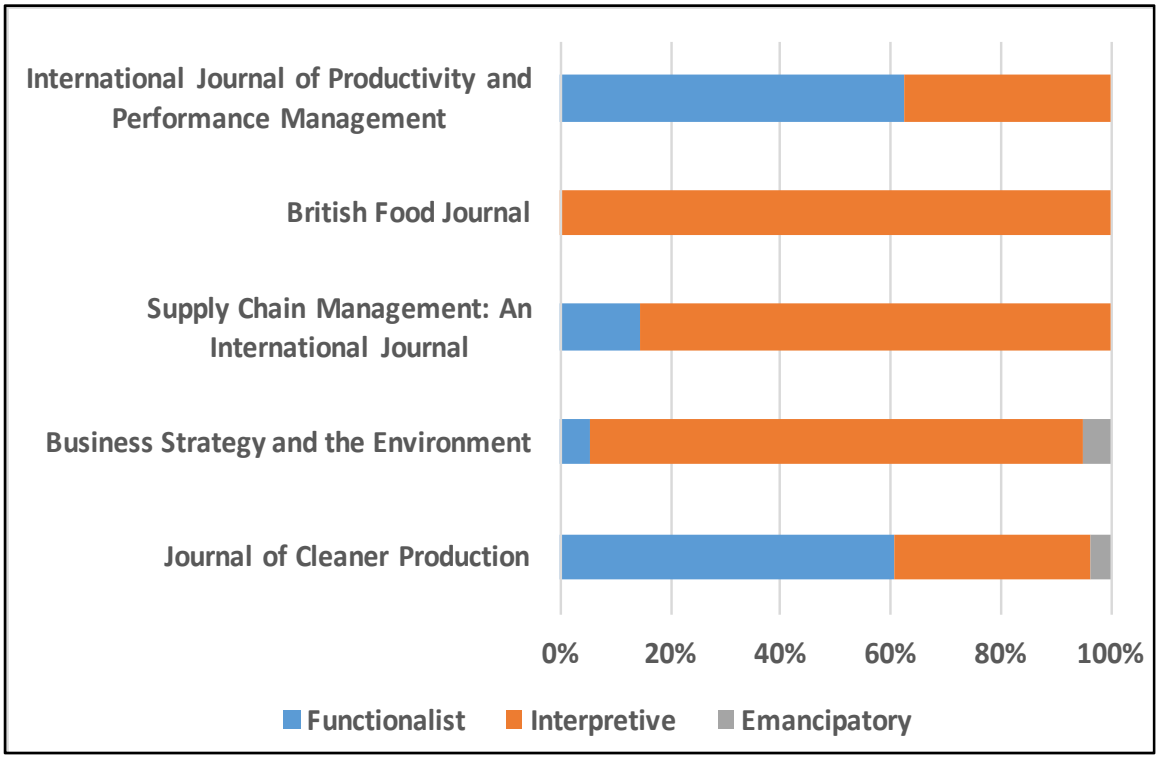

Figure 5.3 Journals bias toward systems thinking paradigms

5.2.4 How common in the literature are the systems thinking paradigm principles?

Around half of the literature was based on paradigm principles. The other half involved specific approaches like CSR, SLCA, SA8000.

5.2.5 How do the articles cluster around the systems thinking paradigms?

The majority of the articles were based on interpretivism, a third on functionalism, and a tenth on emancipation. See Figure 5.4.

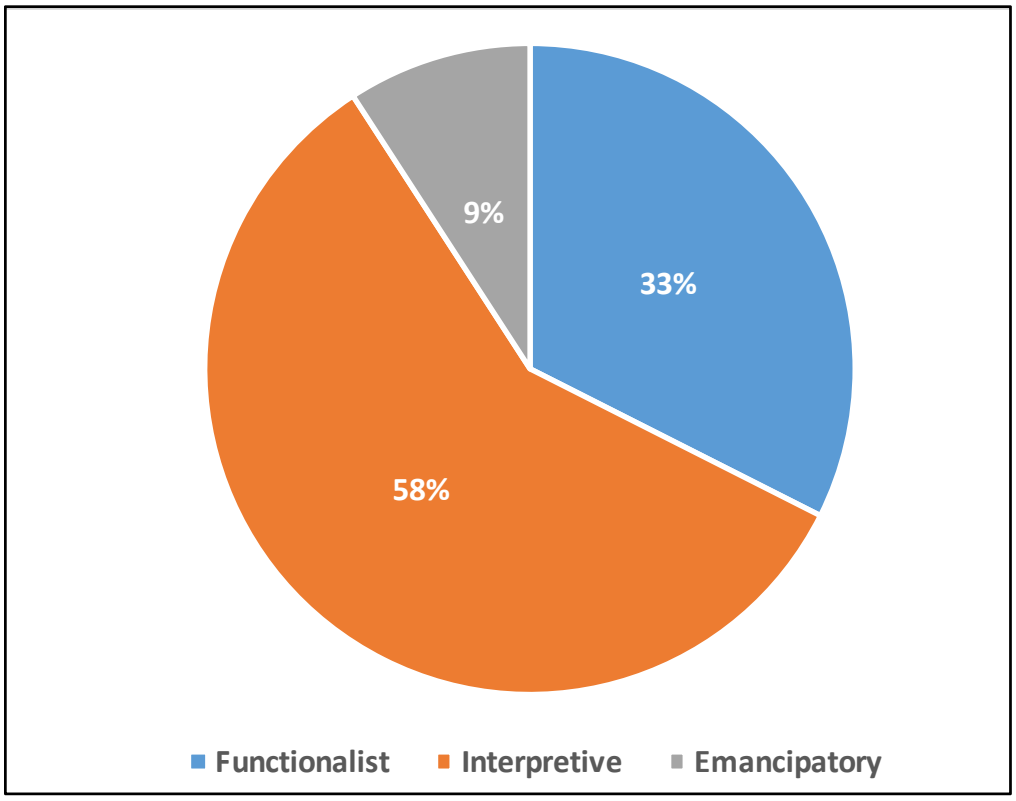

Figure 5.4 How the literature clusters around the systems thinking paradigms

5.2.6 Does the use of systems thinking paradigms change with time?

Yes, the literature diversified its use of the paradigms as the years progressed. The first two years where mainly interpretive oriented. However, as the years progressed, more principles from functionalism where employed. Nevertheless, emancipatory principles, although gaining interest starting from 2008, were employed in a relatively limited way. Overall, the literature seemed more interested in functionalism and interpretivism. See Figure 5.5.

Figure 5.5 Change over time of the usage of systems thinking paradigms

5.2.7 How common in the literature is the use of principles from more than one systems thinking paradigm?

Only five articles included principles from more than one paradigm. This involved the use of principles from interpretivism with either functionalism or emancipation.

5.2.8 Does there seem to be a systems thinking paradigm bias across supply chain stages?

Yes. For instance, all articles addressing the inventory stage were functionalist, whereas those redressing retail were all interpretive. Moreover, half of the articles addressing production were functionalist, while the other half was shared by articles that were either interpretive or emancipatory. See Figure 5.6.

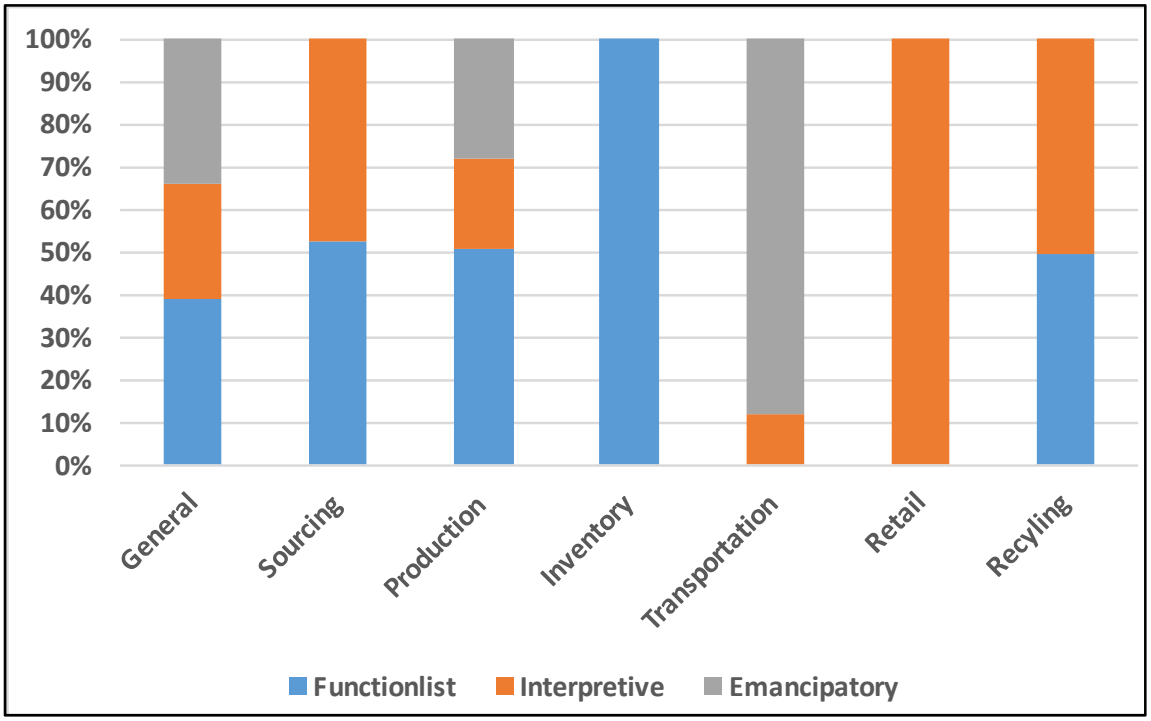

Figure 5.6 Systems thinking paradigm presence across supply chain stages

5.2.9 Does there seem to be a systems thinking paradigm bias across industries?

Yes. For instance, articles that were cross-industry were equally functionalist, interpretive and emancipatory. However, the banking, mining, petroleum, retail and aviation industries were addressed by articles based on interpretivism. Finally, articles addressing electricity, steel and sports were overwhelmingly functionalist. See Figure 5.7.

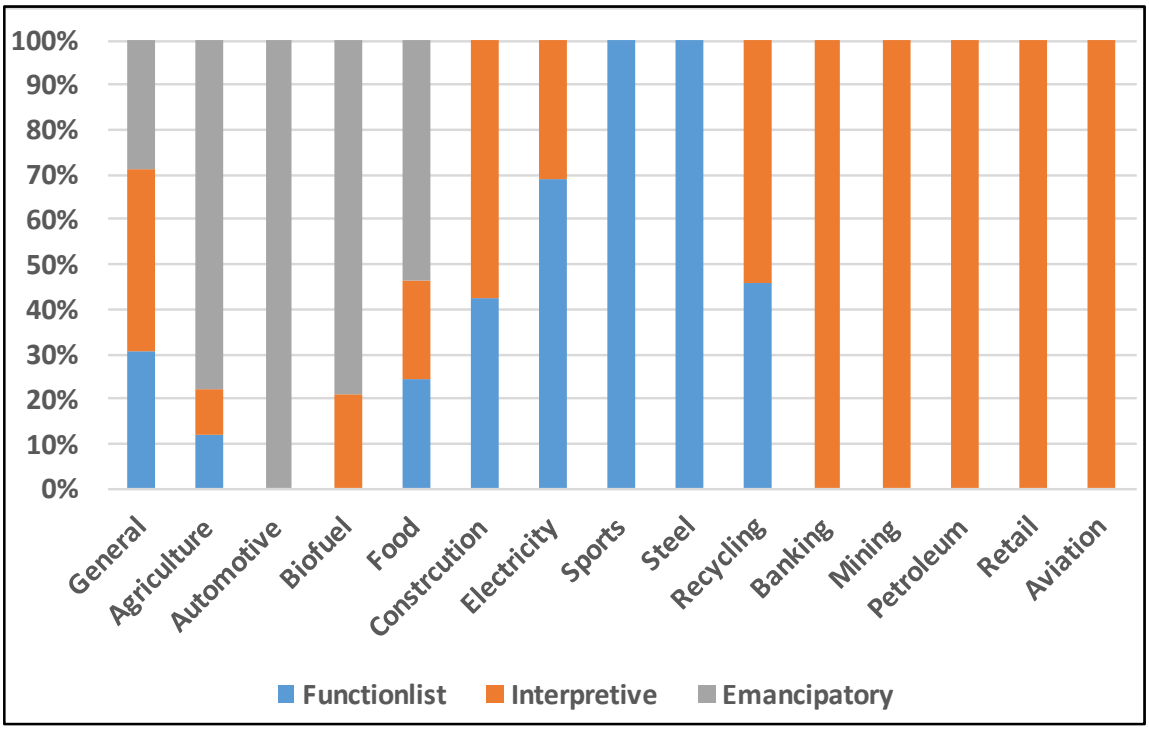

Figure 5.7 Systems thinking paradigm presence across industries

5.2.10 What countries made more than 10 publications?

The United States of America (USA) took the lead with 119 publications, followed by the United Kingdom (UK) with 101 publications then by Germany with 49 publications. See Figure 5.8.

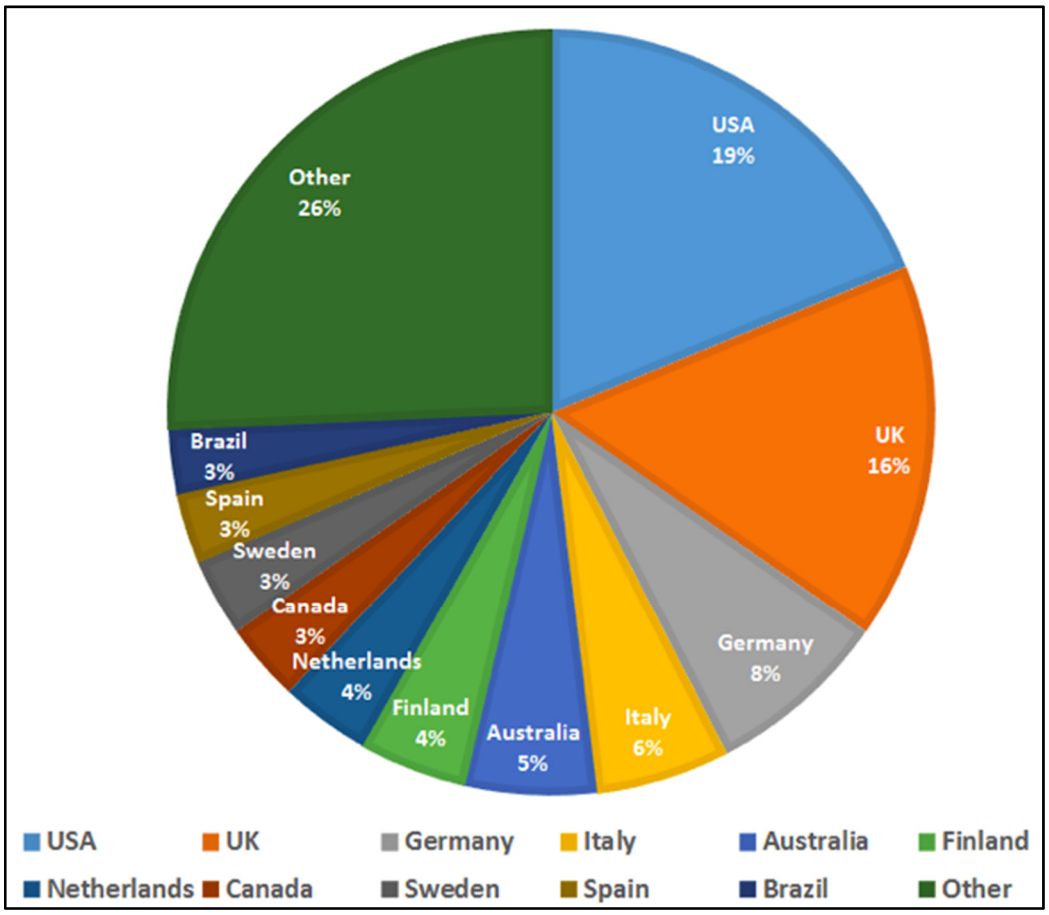

Figure 5.8 Top 10 publishing countries

5.2.11 Do certain countries exhibit a bias toward one or more systems thinking methodologies?

Yes. For instance, the UK, Spain, the Netherlands and Italy focused on socio-technical systems, whereas, the USA and Australia are focused on system dynamics. Germany showed equal interest in both socio-technical and system dynamics. Canada showed interest in only complexity theory. See Figure 9.

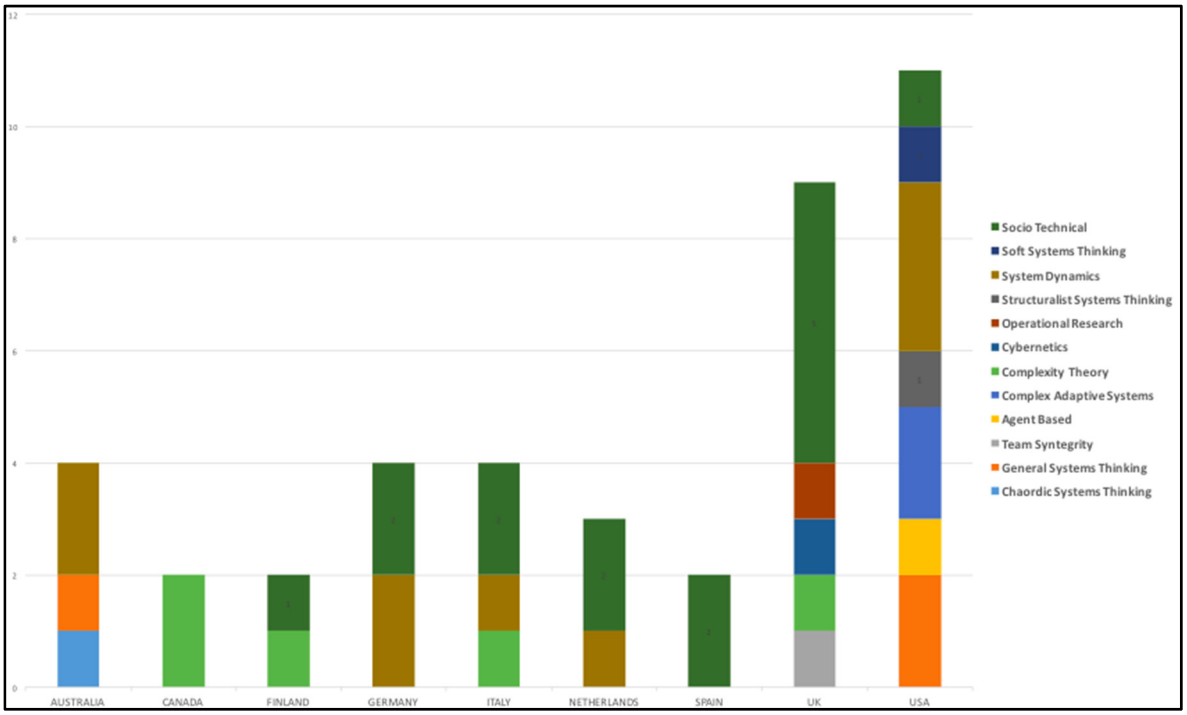

Figure 5.9 Country bias toward systems thinking methodologies

5.3 Discussion

The results from this phase provide a profound understanding on the state of the literature concerning its use of the systems thinking paradigms. Over half of the literature was based on systems thinking principles, of which interpretivism presented 58%, followed by functionalism and emancipation each accounting for 33% and 9% respectively.

The dominance of interpretivism is a positive finding denoting that stakeholder subjectivity is being addressed. However, we think that this progress from functionalism to interpretivism is not enough, especially given that interpretivism does have its shortcomings, which in turn are inherited by the social responsibility literature implementing its principles. Interpretivism is limited to solutions committed to by the important stakeholders, while the viewpoints of whom it considers unimportant are ignored, thus, articles based on interpretivism are bound to miss those viewpoints as well. Moreover, who is considered part of the supply chain is also decided by the important stakeholders. Finally, interpretivism assumes that agreements are always possible, which is not always true (Hester, 2014).

Additionally, a third of the literature was based on functionalism. Functionalism is certainly not the best choice for addressing supply chain social responsibility messes (Proches et al., 2015). For instance, Amazon's optimizing its fulfillment centers for speed, efficiency and customer satisfaction, came at the expense of its workers, who described their work conditions as the "ultimate nightmare", workers reported having to walk long distances without breaks in order to meet fulfilment performance goals, workers who miss their goals a third time get fired; Amazon would most certainly benefit from the other paradigms to provide a humane workplace for its employees. Functionalism addresses the issue of interest as an optimization problem in pursuit of clearly defined goals, which are set by the politically powerful amongst managers. Its solutions are inherently incapable of handling complexity, given its reliance on modeling which only incorporates essential characteristics of the real world, and can neither handle a multitude of different viewpoints nor conflicts amid stakeholders, thereby missing the very essence of social responsibility (Tjasa et al., 2014).

The results from this phase also demonstrated that the literature increasingly employed more paradigm principles as the years progressed, albeit at a slow pace. For instance, during 2004 and 2005, only interpretivism was used, then starting from 2006, functionalism witnessed increased interest and was always second to interpretivism. On the other hand, emancipation was first used in 2008 and continued to be used in a consistently marginal way onward. This is all positive, but the pace at which the literature is incorporating more types of stakeholders, especially those with conflicting worldviews, is still slow. Therefore, fairness in supply chain decision-making will continue to be an issue given that full and open participation of all stakeholders who are impacted by such decisions will continue to be limited (Williams et al., 2017).

Moreover, the results from this phase revealed a worrisome finding. Only five articles used principles from more than one paradigm, and these articles were mainly based on interpretivism along with either functionalism or emancipation. This finding confirms the literature's lack of systemic creativity, and underscores its inability to offer solutions that view the messes of interest from multiple perspectives. This multiplicity in perspective is required to account for all factors pertaining to the messes of supply chains social responsibility. Factors that are concerned with optimization, addressing subjectivity and ensuring fairness (Wallis, 2016).

As far as the top publishers go, each journal had different trends in using one or more of the paradigms. For instance, publications by the British Food Journal were entirely based on interpretivism, while publications by Supply Chain Management: An International Journal and Business Strategy and the Environment were overwhelmingly based on interpretivism with little focus on functionalism, and almost negligible interest in emancipation. Moreover, publications by the International Journal of Productivity and Performance Management and the Journal of Cleaner Production, although showing reasonable interest in interpretivism, were mainly based on functionalism. This could be an indication of an intra-journal bandwagon effect as more research seemed to follow along with using the same paradigms mostly used by the journal publishing its work.

Interestingly, the analyzed articles were published by authors from 55 countries. Authors from the USA published 119 articles, whereas their counterparts from the UK and Germany published 101 and 49 articles respectively. Moreover, 76% of countries had authors who published 15 articles or less. Finally, authors publishing only a single article spanned 17 countries, thereby accounting for approximately a third of all publishing countries. These insights show that supply chain social responsibility is of international interest. Authors from different countries are involved regardless of where their respective countries are on the development spectrum.

Moreover, in terms of which systems thinking methodologies were most used per country, socio-technical systems is the preferred method in the UK, Spain, the Netherlands and Italy. Systems dynamics is the favorite in the USA and Australia. Canada on the other hand used only complexity theory. Germany used both socio-technical systems and system dynamics equally. It is worth noting that the countries that used the most different methods were the USA, the UK and Australia, each using seven, five and three different methods respectively.

In terms of which paradigms were used in addressing the different supply chain stages, the results from this phase showed that the inventory and retail stages were both based on functionalism followed by interpretivism. This represents suitable appropriation of these paradigms as the inventory stage is mostly about optimization, whereas the retail stage is mostly about satisfying customer needs with a keen interest in their preferences, backgrounds, and viewpoints.

Moreover, transportation was mainly addressed using emancipation, showing that real effort in incorporating the disadvantaged stakeholders in decision making was made. This marked the most significant progress made by the literature in addressing this particular stage. Moreover, sourcing and recycling were equally addressed using both functionalism and interpretivism, whereas production was equally addressed using functionalism, interpretivism, and emancipation.

Finally, when looking at the different sectors of the economy, the findings from this phase revealed interesting trends as well. For instance, the banking, mining, petroleum, retail and aviation industries were addressed using interpretivism, representing another suitable paradigm appropriation; as these sectors are keen on maintaining their social licenses to operate, and so are particularly interested in the viewpoints of their stakeholders. Moreover, the steel, electricity and sports sectors were mostly based on functionalism. The agriculture, automotive, biofuel, and food industries were mostly based on emancipation. Finally, the construction and electricity sectors used interpretivism and functionalism almost equally.

Although mapping studies do map the literature in a way that highlights trends as well as gaps and clusters of knowledge, they do have a number of shortcomings. They are limited in their ability to include all related articles given time, labour, and financial constraints. An more importantly, interpretation of the accumulated qualitative data is subjective and constrained by the authors' judgment.

Moreover, a limitation of this study is its overlook of rejected submissions. Had such data been accessible, it would have been possible to uncover how the different journals are biased for or against certain systems thinking paradigms. For instance, if a journal rejects 75% of submissions based on interpretivism, but only 10% of those based on functionalism, that would be a clear indication of the journal’s bias for functionalism and its bias against interpretivism. This knowledge will help new researchers address the proper audience and know where their contributions will most likely be appreciated.

5.4 Conclusion

Supply chains are increasingly engaging in social responsibility by allocating considerable resources in implementing concrete social responsibility initiatives (Sarkis et al., 2010). However, its related literature focused on common approaches like CSR while overlooking systems thinking (Basta, et al., 2018). This situation raises questions about the extent to which the scientific literature on supply chain social responsibility is underpinned by systems thinking perspectives.

To scientifically explore the literature, the authors conducted a mapping study to gather evidence on how the literature used four systems thinking paradigms. The mapping study analyzed 436 articles. The articles were of high quality, and were found by searching 10 databases. Moreover, the research process and its outcomes were validated using a reliability data set that was recoded by two more independent analysts (Kitchenham et al., 2010).

This phase presented a number of important findings, primarily, over half of the articles pertained to three systems thinking paradigms, with interpretivism accounting for over 58%, followed by functionalism and emancipation with shares of 33% and 9% respectively.

Moreover, this study showed that the literature progressed from relying on functionalism toward interpretivism, and to a lesser extent emancipation. This finding highlighted that socially responsible supply chain management moved away from the analytical model that is concerned with optimization with no regard for the human factor. Consequently, informed supply chain managers will likely become better at addressing stakeholder subjectivity and conflict by widening their supply chain's sphere of influence to include the disadvantaged stakeholders. Therefore, if this trend continues, we predict that more supply chains will improve their social footprint and maintain their social licenses to operate.

Nevertheless, the literature is significantly limited in terms of systemic creativity. The takeaway from this is that the overwhelming majority of the literature cannot account for all

factors of the messes of social responsibility. Rather, it can only detect a subset, thereby only addressing those while the rest remain unperceived, or considered insignificant.

In terms of practical implications, this phase provided a scientific exploration of the social responsibility literature. In doing so it showed how the literature clustered around three systems thinking paradigms. This exploration gave an objective account of how systemic the literature is in improving efficiency, addressing subjectivity and ensuring fairness.

Moreover, this phase highlighted a knowledge gap and showed that there is a need for holistic and creative solutions; the type of solutions that are capable of accounting of all the significant factors of supply chain social responsibility messes. Until sufficient research is done, researchers and practitioners alike, when making decisions, need to keep in mind the limited nature of the social responsibility literature and the solutions it proposes.

Additionally, this phase confirmed what seemed to be a bandwagon effect when it comes to which systems thinking paradigms are used. The effect is present at the supply chain stage level, industry level, and country level. For instance, all articles addressing the inventory stage pertain to the functionalist paradigm, whereas those addressing retail pertain to the interpretive paradigm.

Given what we learned from this mapping study, we predict more of the literature will include impacted stakeholders, directly and indirectly, in its social responsibility strategies. We believe so for two reasons: the considerable impact in terms of financial and customer loyalty losses on big-brand firms that have faced social responsibility incidents; and the substantial power at the disposal of all stakeholders to force behavioral changes on supply chains. However, we do not see any encouraging trends that would fix the literature's lack of systemic creativity given the rate at which it was previously adopted. Finally, our hope is for systems thinking and creative holism to gain more ground and exposure as it is the best fit to offer any serious solutions.

In terms of future research possibilities, the limited systemic creativity of the literature is an interesting finding and is worthy of further investigation. Additional research could investigate the possibility and effectiveness of solutions in the form of Critical Systems Practices (CSP), as such solutions are more capable of defining a mess and accounting for all its factors by providing tailored interventions guaranteed to be creative and holistic. Another research venue is to investigate the use of systems thinking paradigms in the supply chain stages where they were overlooked.

CHAPTER 6
PHASE THREE: TO WHAT EXTENT ARE KEY SUPPLY CHAIN SOCIAL RESPONSIBILITY APPROACHES UNDERPINNED BY SYSTEMS THINKING PERSPECTIVES?

6.1 Introduction

Time and again, social responsibility messes have resulted in serious consequences to the supply chains that endured them, ultimately impacting revenues and threatening growth prospects. Therefore, the need for ways to prevent and manage such messes is real, urgent, and justifiable (Feng, 2017). It follows that because such messes are complex, interdependent and are the result of subjective and conflicting worldviews, any resolution has to be systemic in nature (Williams et al., 2017).

There exists an abundance of social responsibility approaches that claim remediation (Walker et al., 2014). However, despite their widespread adoption, supply chain social responsibility incidents are on the rise (Rajeev et al., 2017). Supply chains continue to act in socially irresponsible ways in the eyes of their stakeholders, who respond by demanding tough concessions, changes in behavior, and revoking social licenses to operate (SLO) (Provasnek, 2017). A SLO is the ongoing and broad stakeholder acceptance of a supply chains' operations. Such acceptance is granted when stakeholders approve of how well a supply chain adopted their values, ideals as well as its performance in terms of expected social-activities such as funding local schools and employing local labour (Provasnek, 2017).

A preliminary analysis of the aforementioned approaches revealed their systemic limitations and differences regarding worldviews, assumptions, problem definitions, and recognized stakeholder groups (Basta et al., 2018). These differences ultimately lead to divergent partial solutions (Basta et al., 2018). Thus, from a critical systems thinking perspective, none of these approaches can creatively account for supply chains as complex adaptive systems, especially when considering their social interconnectedness (Williams et al., 2017), i.e., the

best these approaches can do is address the messes of interest from a single viewpoint accounting for some of their factors while being completely incognizant of others (Chiarini et al., 2017).

From a recognition that simple solutions to complex messes are bound to fail (Popovic et al., 2015), this phase[7] set out to uncover how three selected social responsibility approaches are divergent from a critical systems thinking perspective. These approaches are the most common, giving them prominence and further adoption in academia and industry circles alike (Basta et al., 2018). Moreover, this phase demonstrates that the three approaches are complementary rather than contradictory, and therefore can be used to tailor better and context aware interventions in the form of Critical System Practices (CSP) (Bowers, 2014).

To overcome the subjective nature of qualitative research, and ensure the rigorousness of this phase, specific techniques from the content analysis methodology were incorporated (Krippendorff, 2012). Firstly, the analysis was guided by a data-language following four systems thinking paradigms: Functionalism, Interpretivism, Emancipation and Postmodernism. Secondly, the results were validated by having a calculated reliability data set for each approach recoded by an independent analyst who had received proper training and a guiding codebook. Finally, the outcomes of the second coding were used to calculate intercoder reliability coefficients to prove this study's validity and generalizability.

The approaches analyzed are Corporate Social Responsibility (CSR), Social Life Cycle Assessment (SLCA), and Social Accountability 8000 (SA8000). Each approach was analyzed to uncover its paradigmatic pertinences; its fundamental principles and assumptions concerning the messes of social responsibility in the context of the supply chain; why they emphasize certain factors as being significant and ignore others; and to understand their fundamental strengths and shortcomings (Wallis, 2016).

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[7] Submitted for revision and publication to the Academy of Management Journal.

This phases' results reveal that CSR is interpretive in nature: it considers the engagement of stakeholders, within a defined sphere of influence, to be essential to the success of any social responsibility initiative. SA8000 was found to be emancipatory: it stipulates that stakeholders affected by the supply chains' activities, regardless of where they fall in its sphere of influence, must take part in the decision-making process. SLCA is functionalist: it relies on data gathering, mathematical modeling and analyses to recommend solutions in the absence of any real form of stakeholder engagement and involvement in decision making.

This phases' findings are significant to researchers and practitioners alike. Being aware of the systemic strengths and weaknesses of each of the social responsibility approaches permits better judgment of their suitability given a problem situation. Moreover, the findings make it clear when to expect each approach to fail, in what way, and what can be done in such cases.

Nevertheless, having established that each approach is confined within a distinct systems thinking paradigm opens new opportunities. The various tools and methods can be detached from their usual approaches and used in tandem to devise cross-paradigm interventions based on CSP (Bowers, 2014). Such interventions are capable of recognizing all factors of a supply chain social responsibility mess (Zdenka et al., 2014); a capacity that none of the existing approaches possesses given their single paradigmatic nature.

To the best of our knowledge, no similar work of this kind was done before. However, from the literature, a handful of articles recognized the shortcomings of certain supply chain social responsibility approaches. These articles incorporated other approaches and systemic methods that were believed to address such shortcomings.

For instance, Molderez et al. (2018) used rich pictures in the form of art paintings to foster soft systems thinking competences and develop holistic solutions in the context of CSR. The authors reported that soft systems thinking and its tools allowed a better understanding of CSR related issues, their holistic nature, and interconnectedness.

Moreover, Waller (2015) advocated for using systems thinking to facilitate making social responsibility a mainstream supply chain activity instead of being a niche, localized luxury affordable only by big-brand firms. The authors advocated that holistic systems thinking, because of its ability to enable collaboration and innovative strategic planning, is at the heart of supply chain CSR initiatives and is crucial to their success. The authors highlighted the importance of interpretive and emancipatory systems thinking for stakeholder management and conflict resolution, in order to minimize the supply chain's total cost of logistics.

Additionally, Starik et al. (2013) used system dynamics and its tools to model and address the interconnectedness between social sustainability components—people, organizations, society, and environment—across temporal and spatial dimensions. The authors argued that only structural systems thinking, as opposed to traditional management theories, can offer holistic and multifinal solutions appreciated by all the stakeholders involved.

The remainder of this chapter is organized as follows, section two discusses the findings, and section three is a conclusion with suggestions for future work.

6.2 Discussion

The analyses highlighted valuable insights on the most adopted social responsibility approaches and their systems thinking affiliations. This discussion is organized into subsections following this phase's research questions listed in The Overall Research Methodology chapter. The following is the main research question for this phase:

- To what extent are key supply chain social responsibility approaches underpinned by systems thinking perspectives?

6.2.1 What are the top three supply chain social responsibility approaches?

It was found that CSR was used in 41.81% of the articles that employed industry approaches, whereas standards such as SA8000 represented 15.97%. Moreover, SLCA and sustainable reporting, such as the Global Reporting Initiative (GRI), each occupied roughly 15%. Consequently, the official references for CSR, SA8000, and SLCA were acquired for further analysis.

6.2.2 To what extent is Corporate Social Responsibility underpinned by systems thinking perspectives?

Analyzing the CSR reference revealed that the majority of its paragraphs identified various principles, practices, and instructions that associated the approach with the interpretive paradigm. This became clear given its emphasis on addressing stakeholder subjectivity and on the idea that stakeholder inclusiveness and engagement are prerequisites to success. Moreover, many of the paragraphs indicated that CSR is suitable for all business sizes, be it a single small firm or an entire supply chain. See Figure 6.1.

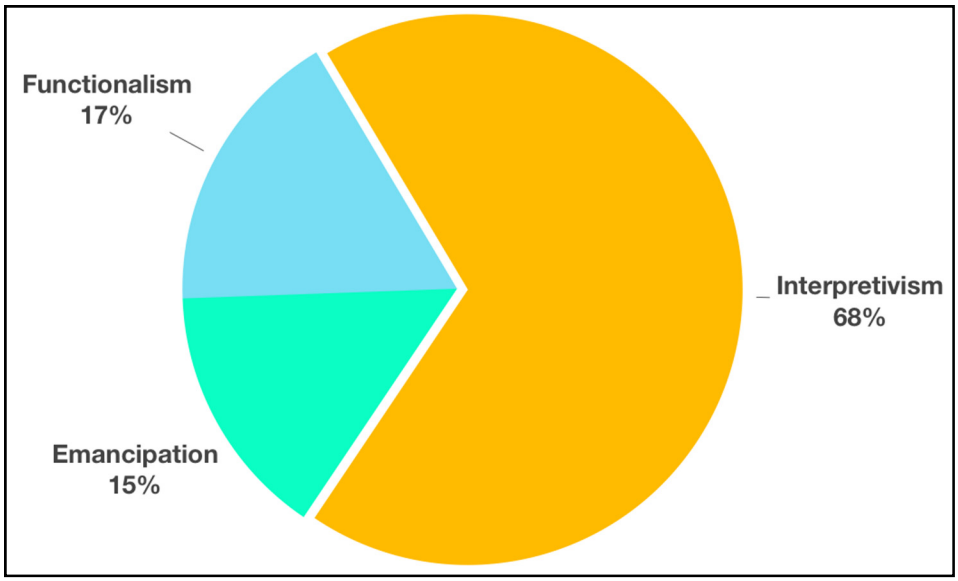

Figure 6.1 Corporate Social Responsibility Paradigm Usage

Interestingly, a few paragraphs from the CSR reference uncovered hints of emancipation where all stakeholders affected by the activities of a supply chain take part in the decision making process, e.g. “it can also be useful to reach beyond those with whom the firm has contractual relations”. Nevertheless, such evidence was in the form of recommendations not requirements, and revolved around stakeholder consultation rather than inclusiveness in decision making. Moreover, the reference makes it clear that it is senior management who decide who amongst the stakeholders is within the sphere of influence.

Additionally, a few paragraphs underscored some CSR practices that follow predefined and process like procedures, e.g. conducting initial assessments. Such practices require the participation of initiating-stakeholders with political power—senior management or the board of directors—therefore hinting at a very limited functionalist nature of CSR. Finally, no paragraphs were found suggesting relevance of the approach to postmodernism.

6.2.3 To what extent is Social Life Cycle Assessment underpinned by systems thinking perspectives?

Inspecting the coding results of the SLCA reference showed that the approach is strictly functionalist, with the exception of a few paragraphs recommending but not stipulating the participation of certain stakeholder groups, e.g. “engage [impacted people or their communities] as much as possible”, thus relating the approach in a way to interpretivism. Similarly, a few other paragraphs recommended but did not necessitate the involvement of the disadvantaged stakeholders in decision making, hence adding an emancipatory trait to the approach. Furthermore, the SLCA reference made it very clear that the approach is intended only for supply chains and is not particularly useful when implemented by a single firm; given the limited data it can collect about its impacts in such cases. See Figure 6.2.

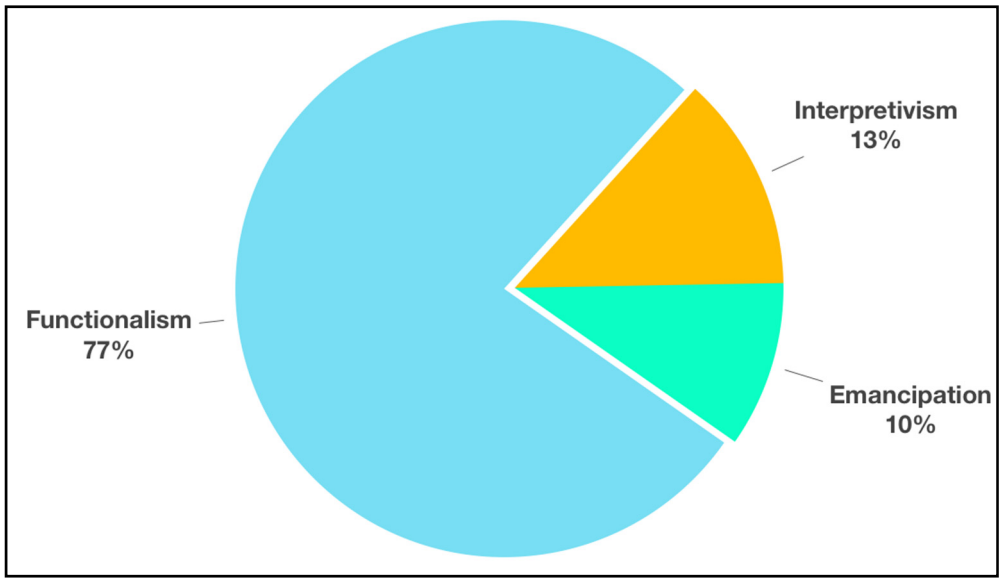

Figure 6.2 Social Life Cycle Assessment Paradigm Usage

6.2.4 To what extent is Social Accountability 8000 underpinned by systems thinking perspectives?

Finally, examining the coding results of the SA8000 reference revealed that the approach is uniquely emancipatory, with the exception of a few paragraphs suggesting very limited interpretive and functionalist traits, such as giving the audited organization's management the freedom to establish a complaints management system of their choosing; without involving the impacted stakeholders.

The chief goal of SA8000 is to get all stakeholders affected by the organization to become part of its decision making process. The approach has the loosest definition of a what signifies a stakeholder, therefore it includes much wider and diverse stakeholder groups such as communities, workers, worker-families and even school teachers. The approach is designed to be used by single organizations with the possibility of collaboration with immediate suppliers. The approach also recommends but does not require the collaboration with lower-tier firms in its supply chain. See Figure 6.3.

6.2.5 Are any of the top three supply chain social responsibility approaches multi-paradigmatic from a systems thinking perspective?

By the same token, the results revealed varying degrees of association between the top three supply chain social responsibility approaches and the four systemic paradigms. For instance, CSR showed evidence of Strong Association (SA) with interpretivism, Week Association (WA) with emancipation, Very Week (VWA) association with functionalism, and No Association (NA) with postmodernism. Table 6.1 is a heat map depicting the associations between the three approaches and the paradigms. To summarize, SLCA is concerned with improving goal seeking and viability by solving a well-defined problems identified by the powerful amongst the stakeholders; CSR is concerned with exploring purpose while addressing the subjectivity of stakeholders; and SA8000 is concerned with ensuring fairness by emancipating all impacted stakeholders.

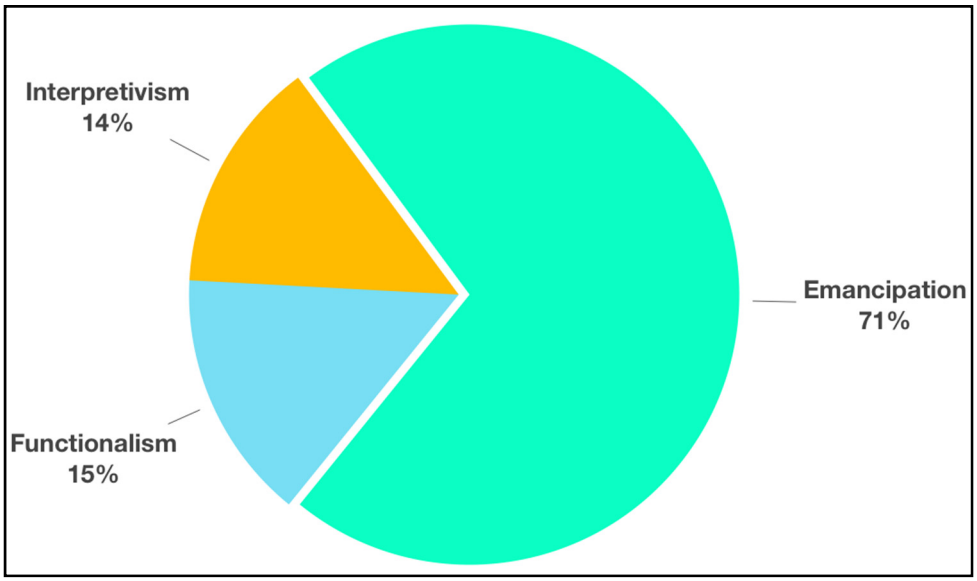

Figure 6.3 Social Accountability 8000 Paradigm Usage

It is worth noting that the degrees of association denote how the principles from a certain paradigm are present in an approach as shown in the previous figures, and whether they take the form of requirements or suggestions.

Table 6.1 Approach paradigm association

	Functionalism	**Interpretivism**	**Emancipation**	**Postmodernism**
CSR	VWA	SA	WA	NA
SLCA	SA	VWA	VWA	NA
SA8000	VWA	VWA	SA	NA

The results also highlighted an interesting finding in that none of the approaches was associated with postmodernism. All three approaches followed a particular school of thought and a process-driven way for tackling social responsibility. Moreover, all three approaches promised improvements when implemented; such are ideas rejected by postmodernism which is essentially opposed to the premise of systemic solutions and instead promotes diversity, creativity, as well as contested and localized solutions that are justified on the basis that they "feel" right (Jackson, 2003).

Perhaps one of the most important findings from this phase is that each approach dominantly relates to one paradigm, despite none of them making its systems thinking underpinnings clear. The findings revealed that all three are in fact systemic approaches. Moreover, their assumptions can be summarized in relation to two dimensions: the complexity of the business entity they address, and the views of the stakeholders they acknowledge, see Table 6.2. However, none of the approaches is holistically multi-perspective, and each does different things to solve the factors of the messes of interest it perceives. See Figure 6.4.

Table 6.2 Approach assumptions

	Business Entity Complexity	**Stakeholder Views**
CSR	Single Firm, Supply Chain	Pluralist
SLCA	Supply Chain	Unitary
SA8000	Single Firm	Coercive

6.2.6 Are the top three supply chain social responsibility approaches capable of addressing all factors of a social responsibility mess from a systems thinking perspective?

The finding that each of the top three supply chain social responsibility approaches pertains to a different systemic paradigm is significant, this shows that none of them takes a creative and holistic view of the messes of interest, therefore making different assumptions about them, and considers some factors more significant than others. This finding uncovers that each these approach defines the problem differently, given what their corresponding paradigm allows, and hence offers divergent and partial solutions. Therefore, there is no one-size-fits-all approach, but rather different approaches specialize and do well in addressing different parts of a social responsibility mess. To further frame the finding from a systems thinking perspective, Table 6.3 shows where the three approaches are located on the SOSM grid based on their systemic assumption along the grids' two dimensions.

Table 6.3 The SOSM Approaches Map

		Participants		
		Unitary	Pluralist	Coercive
Systems	Simple		CSR	SA8000
	Complex	SLCA		

Legend:
Functionalism Interpretivism Emancipatory

The table can be used as a map, called the SOSM Approaches Map (SAM), to determine the suitability of an approach given the context of a social responsibility mess. SAM makes it clear why a supply chain adopting only one of these approaches is almost guaranteed to continue to endure social responsibility messes. SAM shows how a certain approach reduces the messes of social responsibility into its systemic paradigm assumptions and worldview.

6.2.7 Can the top three supply chain social responsibility approaches be used in tandem in a CSP like intervention?

Then again, the finding that each of these top three approaches is confined within a different systemic paradigm could be discouraging. However, from a CSP standpoint, the opposite is true. CSP advocates for holistic and creative interventions by deducing solutions that better account for the context (reality-types) of a social responsibility mess. CSP emphasizes that messes cannot be understood and addressed from one paradigmatic perspective. It seeks to guarantee pluralism in perspective by compensating for the systemic weaknesses of one approach by the strengths of others. By doing so, CSP ensures that factors concerning technical-optimality (Functionalism), practical-subjectivity (interpretivism) and political-fairness (emancipation) are addressed.

With CSP viewing the different approaches as complementary, it is poised to offer interventions that address all factors of supply chain social responsibility messes as opposed to any of the paradigm-confined approaches. CSP sees the bigger picture when dealing with complex systems such as the supply chain and their complex social context. CSP allows for a plurality of approaches to be used in a coherent and complementary manner to promote successful interventions where there are complex organizational and societal problem situations.

From a practical view and in light of the findings from this phase, SLCA is a functionalist approach, it excels at solving the well-defined social impact assessment factors of the messes of supply chain social responsibility, it answers the questions of those with the organizational power and resources who initiated it. However, it fails quickly when different stakeholders with different views, aims, and backgrounds are involved, in such situations is where CSR shines. With great ease, CSR is capable of bringing stakeholders with different viewpoints together to agree on small plans of action, or accommodations, that move the cause forward and enable progress. Nevertheless, CSR, being dominantly interpretive in nature, falls short in face of conflict or when the unaccounted for stakeholders are wary, specifically those who are affected by the supply chains' activities but do not participate in decision making. Such situations require approaches of an emancipatory nature such as SA8000 capable of giving the disadvantage stakeholders a say in decision making.

Therefore, we propose a framework for addressing the messes of supply chain social responsibility. The framework is an application of Jackson's CSP metamethodology. The framework is called CSP for Social Responsibility (CSPSR) and is a proposal that remains to be tested. In this framework, each approach is broken into its composing techniques, then interventions are tailored by reassembling carefully selected techniques from different approaches according to the nature of the mess being addressed. Therefore, the interventions tailored by CSPSR are cross paradigm, this is guaranteed given its incorporation techniques from various approaches that are founded on different systemic paradigms. Researchers and practitioners alike, who are not familiar with systems thinking, can leverage the capabilities

this framework has to offer to devise critical and holistic interventions in an informed and scientific way.

For example, a CSPSR-based supply chain social responsibility intervention may utilize CSR tools to bring together stakeholders with different worldviews to formulate objectives, develop a strategy and agree on commitments. Moreover, stakeholder definition and interviewing techniques from SA8000 can be used to ensure that all impacted stakeholders such as surrounding communities participate in the aforementioned activities. Additionally, SLCA could be used to get an objective account, based on data collection, of what the current social footprint is, as well as providing reports that give an idea of what initiatives are possible and where resources should be allocated.

Figure 6.4 depicts the proposed framework. Each circle represents one of the analyzed approaches. The small distinct shapes within each circle represent the tools of the corresponding approach. The figure also highlights how each approach is confined within a different paradigm, hence highlighting their limitations, and how this setting can allow them to only offer partial solutions to the factors of a mess they perceive and consider significant. More importantly, the figure shows how the proposed framework functions across the paradigms by using various tools from the different approaches while also considering the social context. This way, the framework can perceive all facets of a mess and tailor interventions that are far better than what the other approaches can singly offer.

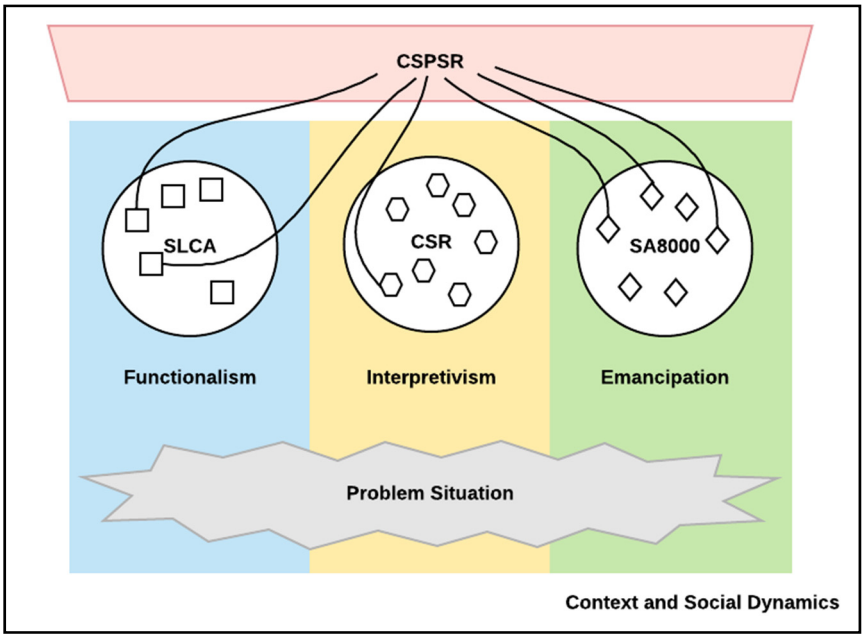

Figure 6.4 Proposed framework for supply chain social responsibility

6.3 Conclusion

Supply chains are increasingly incorporating social responsibility into their strategies. This trend is being further reinforced by the direct impacts to bottom lines by incidents like protests, consumer boycotts and negative media coverage. Such incidents result from absent or ineffective social responsibility practices, which in turn caused serious issues such as worker abuse, factory collapses, and natural resource depletion.

Consequently, a myriad of approaches and techniques emerged promising solutions. To validate their viability, this phase analyzed three of the top used amongst them to understand to what extent these approaches are underpinned by systems thinking perspectives. The approaches that were analyzed were CSR, SLCA, and SA8000.

The analyses revealed that each approach is confined within one systems thinking paradigm. Therefore, each approach has different worldviews, considers different factors as significant,

and consequently offers divergent partial solutions. Different approaches regard the messes of interest as either optimization issues, addressing subjectivity, or resolving conflict. In systems thinking terms, each approach makes different assumptions about the context of the messes of interest in terms of supply chain complexity and the societal situation in which it is embedded.

The findings reveal that the three approaches are holistic in nature; they seek to address the emergent system by accounting for the entire supply chain and the messes it faces, therefore, all three approaches avoid the linear analyses model known as reductionism. As per the findings, CSR is dominantly interpretive, whereas SLCA and SA8000 are respectively functionalist and emancipatory. However, being confined within one paradigm, none of the approaches can singly offer holistic and creative solutions. Such solutions require the incorporation of multiple paradigms.

Accordingly, this phase shows that SLCA is concerned with improving goal seeking and viability by solving well defined problems identified by the powerful amongst the stakeholders. On the other hand, CSR is concerned with exploring purpose while addressing the subjectivity of stakeholders, whereas SA8000 is concerned with ensuring fairness.

Nevertheless, the findings are promising from a CSP standpoint. Advocating that approaches from different paradigms are complementary rather than contradictory, CSP is in a position to offer superior multi-paradigm interventions by incorporating the tools and techniques from CSR, SLCA and SA8000, thereby constructing a complete view of a social responsibility mess. Therefore, researchers and practitioners alike can deduce holistic and creative CSP interventions based on these three approaches, with the advantage of not having to learn the various systems thinking paradigms and their associated methodologies.

In terms of practical implications, this phase provides a scientific exploration of the top three social responsibility approaches from a systems thinking perspective, something that is so far done superficially via interviews and surveys, therefore filling an important knowledge gap.

Moreover, this phase sheds light on an overlooked yet important factor concerning the limitations of the most common social responsibility approaches. After having established the systemic paradigms of each, it is fairly straightforward to determine the suitability of an approach given a social responsibility mess. This is further simplified using the SAM framework presented earlier.

Finally, this phase showed that new forms of better interventions are possible. These interventions can perceive all factors of a supply chain social responsibility mess, therefore tailoring customized solutions based on the tools and methods from the very well understood existing approaches, making such interventions highly convenient and practical.

For future research, it is worth investigating more mainstream approaches such as the GRI, ISO26000, ESG, and others. Moreover, an intriguing research project would be to conduct an action research based on the findings from this phase where a volunteering firm, that is interested in preventing or is facing social responsibility messes, is guided into implementing an intervention using CSPSR.

CHAPTER 7

GENERAL DISCUSSION

The goal of the research presented herein is to surface the underlying biases, strengths and weaknesses of the scientific literature addressing supply chain social responsibility as well as the approaches it developed and employed. The findings from this research offer a solid foundation for future research. This study contributed new insights about current research and practices with regard to their problem-solving bases from a systemic perspective. This research is guided by the following research question:

- What are the systemic underpinnings of the current supply chain social responsibility literature?

Three sub-questions were devised from the main research question, each addressed in a standalone research phase based on a qualitative research methodology, either the mapping study or systematic literature review methodologies. The results of each phase resulted in a journal article that was published or submitted for review. The following are the three subproblems:

4. How is the scientific literature on supply chain addressing social responsibility challenges?
5. To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?
6. To what extent are key supply chain social responsibility approaches underpinned by systems thinking?

In light of the findings presented thus far, this chapter serves as a general discussion and is organized as follows, the three first sections discuss the three phases of this research in order, the last section discusses the practical implications of this research for researchers and practitioners.

7.1 How is the scientific literature on supply chain addressing social responsibility challenges?

One of the major contributions of this thesis is the collection and classification of evidence, not before available, on which of the supply chain social responsibility approaches are the most prevalent. The goal was to understand the status quo in order to identify both knowledge gaps and knowledge clusters, thereby giving way to more strategic research directions; as opposed to taking part of the random and hype-driven additions to the relevant body of literature.

To that effect, phase one conducted a mapping study that analyzed 590 articles from 10 different databases. The findings showed that the work on the subject matter is highly fragmented over more than 240 different journals, with only 9.35% of them publishing more than three relevant articles. Interestingly, different journals were found to be biased toward certain industry approaches and systems thinking methodologies.

Furthermore, the findings highlighted the dominance of industry approaches in the literature with a share of around 85.93%; with CSR representing 41.81%, sustainability standards 15.97%, sustainable reporting 15.38% and SLCA 14.49%. These findings demonstrated that supply chains are likely to use what is widely common without much critical assessment.

Conversely, the articles using systems thinking accounted for only 8.98% of the literature spanning three paradigms: Functionalism; Interpretivism; and Emancipation; while completely overlooking Postmodernism. Of these articles, 24.07% used SD, followed by socio-technical systems and operations research accounting for 20.37% and 16.66% respectively. It is worth noting that five articles representing around 15.48% strongly advocated the use of systems thinking without specifying a particular methodology.

Although limited in number, the use of systems thinking methodologies, such as socio-technical systems, demonstrated that supply chains are increasingly giving more importance to the human dimension, thereby shifting from the process optimization mindset, albeit in a

slow pace given that structural methodologies, such as SD, are still the most used due to their relatively simple concepts that appeal more to management.

Furthermore, 60% of the literature did not address a specific supply chain stage. However, in the articles that did, 15% focused on production, 14% on sourcing, while retail, recycling, transportation and inventory accounted for only 5%, 3%, 2% and 1% respectively; effectively highlighting a serious oversight by the research community. Looking closer, we found that different industry approaches and systems thinking methodologies focused on different supply chain stages as well. For instance, CSR was the dominant approach followed by SLCA in all stages except production and inventory, while socio-technical systems dominated the sourcing stage, and SD was the primary methodology used in production and recycling. It is worth noting that the production stage used the most different industry approaches and systems thinking methodologies.

7.2 To what extent is the scientific literature on supply chain social responsibility underpinned by systems thinking perspectives?

Phase one revealed that systems thinking is significantly underused by the supply chain social responsibility literature when compared to approaches like CSR. This finding raised doubts about the literature's credibility, as it could be confined within a restricted set of assumptions and worldviews, limiting it to suboptimizations and localized quick-fixes not capable of addressing all the factors of the messes of interest.

To understand to what extent the scientific literature on supply chain social responsibility is underpinned by systems thinking perspectives, phase two conducted a mapping study that analyzed 436 journal articles from 10 different databases to outline the literature's distribution over four systems thinking paradigms: Functionalism, Interpretivism, Emancipation and Postmodernism.

The findings showed that the literature increasingly employed more paradigm principles as the years progressed. At the time of this study, over half of the literature heavily borrowed from the paradigms' principles; with interpretivism standing out as the most present with a 58% share, followed by functionalism and emancipation each accounting for 33% and 9% respectively, whereas postmodernism was completely overlooked.

The use of emancipation is a very positive finding denoting that more stakeholder groups were incorporated into the supply chain decision making process, especially those with conflicting worldviews or those who are underprivileged. However, its limited use shows that, in general, fairness toward the disadvantaged remains to be an issue.

Likewise, a third of the literature using functionalism underscored how pervasive the process optimization mindset still is, as well as its continued misappropriation given the clear incompatibility between the paradigm and the messes of interest. The paradigm has a number of shortcomings when used in this particular context. It considers the issue of interest as an optimization problem, its handling of complexity is limited given its reliance on modeling, which can only incorporate essential characteristics of the real world, and most importantly, can neither handle a multitude of different viewpoints nor conflicts amid stakeholder; in fact, functionalist interventions cannot even start without an objective account of a problem situation, therefore such interventions lean toward satisfying the goals set by the powerful amongst the stakeholders.

It is safe to assume that the articles using the different paradigms inherit the latter's advantages and disadvantages. For instance, interpretivism is limited to offering solutions good at only reaching small accommodations, permitting frequent and successive small commitments amongst key stakeholders. The paradigm overlooks many perspectives and viewpoints from whom it considers unimportant stakeholders. Finally, interpretivism assumes that consensus is always possible, this is clearly not true given what is known about previous supply chain social responsibility incidents.

In terms of systemic creativity, the findings revealed that the literature is considerably limited in this regard, hence confirming its inability to offer solutions that view the messes of supply chain social responsibility from multiple viewpoints; thereby addressing all of its factors.

7.3 To what extent are key supply chain social responsibility approaches underpinned by systems thinking perspectives?

The third phase investigated why supply chains continue to endure significant impacts due to social responsibility incidents despite their adoption of approaches such as CSR. This phenomenon hints to an innate flaw impeding such approaches from offering effective solutions.

Accordingly, the third phase conducted an SLR examining three of the most prolific social responsibility approaches, namely CSR, SLCA and SA8000. The goal is to uncover what systems thinking paradigms each approach embraces, thereby revealing their intrinsic limitations, assumptions, worldviews as well as their competences. Each paradigm represented a lens or frame through which we can understand how each of the approaches engages the messes of interest, the supply chain, and the social context.

The results revealed that each of the approaches is confined within a distinct and opposing paradigm. CSR, SLCA and SA8000 are primarily interpretive, functionalist and emancipatory respectively, therefore none is multi-perspective and none can offer creative and holistic solutions accounting for all factors of a problem situation, i.e. each does different things to solve only the factors it perceives of the messes of interest.

Nevertheless, despite the limitations of the aforementioned approaches, CSP enables new possibilities. CSP deduces holistic and creative interventions by combining approaches belonging to different systemic paradigms. The goal is to compensate for the systemic weaknesses of some by the systemic strengths of others. In doing so, CSP accounts for all

factors of a problem situation and guarantees pluralism in perspective, i.e., CSP ensure that the technical, practical and emancipatory factors of a problem situation are properly tackled.

Therefore, this phase proposed a CSP based framework for addressing the messes of supply chain social responsibility. In this framework, tools and techniques from each approach can be used to tailor interventions that respond to the specificities of a problem situation, its context, and more importantly, the objectives and expectations of the variety of its stakeholders. The framework allows researchers and practitioners who are not familiar with systems thinking to leverage the capabilities of CSP by using approaches they already know, while being aware of their systemic strengths and weaknesses, to devise superior interventions.

For example, a CSP based supply chain social responsibility intervention may use CSR techniques to convene stakeholders, with different viewpoints and backgrounds, to agree on objectives, develop a strategy and make commitments. Moreover, stakeholder identification and communication techniques from SA8000 could be used to ensure that all impacted stakeholders are also involved and heard. Finally, before the intervention starts, SLCA could be used to get a data driven objective account of what the current social footprint is, what type of initiatives are best and how resources should be allocated.

7.4 Practical implications

The practical implications of this study are many fold and of benefit to both research and practice. The following two subsections provide more details.

7.4.1 For researchers

The findings from this study put forth many practical implications to supply chain management researchers in the context of social responsibility. From the findings of this study, researchers are made aware of the underlying systemic nature of the relevant literature in terms of its assumptions, biases, strengths and limitations.

Additionally, this study uncovered research gaps such as the limited use of systems thinking methodologies in the relevant literature, its limited systemic creativity, and the continued dominance of certain systemic paradigms in certain supply chain stages and industries. Being aware of the current situation of the literature, will help researchers work on studies that would address these gaps, and have a greater impact in the field.

Moreover, the findings highlighted an inter-journal bandwagon effect and tendency to prefer certain approaches and systemic paradigms over others; being aware of this will help researchers select journals that better correspond with their work, thereby increasing their chances of making publications.

7.4.2 For practitioners

The findings from this research have many practical implications for supply chain practitioners across industries from a social responsibility perspective. This study uncovered the underlying systemic nature of a number of prevalent supply chain social responsibility approaches, and by doing so, this study showed that there is no one-size-fits-all approach, but

instead, suitability of an approach to a given social responsibility mess should be contrasted against different systemic paradigms.

Moreover, this study showed that only holistic and critical approaches can account for more factors of a certain social responsibility mess, this is guaranteed given the many different perspectives such approaches possess. Furthermore, this study highlighted how any chosen approach should perform well regarding the aforementioned measurements of efficiency, efficacy, effectiveness, elegance, emancipation, empowerment, exception, and emotion.

Finally, this study emphasized the importance of effective stakeholder management to the success of any supply chain social responsibility initiative. This could be done by widening the sphere of influence of the supply chain to include more stakeholders—turning these stakeholders into proponents instead of opponents—and by becoming more inclusive in soliciting the participation of all impacted stakeholders in decision making.

With this understanding, practitioners who integrate social responsibility into their supply chain strategic fit, will gain a difficult to mimic strategic advantage. This is due to the acquired differentiation based competitiveness, the ability to shape regulations, as well as the access to information which can only be acquired after gaining the trust of impacted stakeholders.

CHAPTER 8

LIMITATIONS AND FUTURE WORK

The goal of the research presented herein is to surface the underlying biases, strengths and weaknesses of the scientific literature addressing supply chain social responsibility as well as the approaches it developed and employed. The findings from this research offer a solid foundation for future research. This study contributed new insights about current research and practices with regard to their problem-solving bases from a systemic perspective.

Although this research aspired for the best in terms of research design, execution, analyses, interpretations, findings, and overall quality; it does have its limitations. The following subsection outline such limitations. Moreover, the final subsection proposes a number of future work venues.

8.1 Limitations

This research used a mixed-method research design, and was organized into three phases. The first two phases were based on the mapping study methodology, whereas the third phase was based on the systematic literature review methodology.

Although the selected research methodologies were carefully chosen to suit each phase's goal, they do have limitations. For instance, due to constrained time, labour, and financial constraints, both research methodologies cannot warrant that all relevant articles addressing a subject matter are found and included.

Moreover, being qualitative in nature, both methodologies rely on interpretation, in both data gathering and analyses, the results of which are naturally constrained and influenced by the authors subjectivity.

Nevertheless, there exists a number of well-established research techniques to address these shortcomings, including reliability data, multiple codings, and intercoder-agreement coefficient calculations. By using these techniques, internal and external validity could be attained, and overall research quality guaranteed.

Moreover, constrained again by limited resources, phase three only involved three of the most prevalent supply chain social responsibility approaches.

Finally, another limitation is the inability to access rejected submissions. Had such data been available, it would have been possible to understand how the different journals are predisposed for or against certain systemic paradigms. For instance, by knowing that a certain journal rejects most of the articles that are interpretive in nature but accepts the majority of articles that are functionalist would be a clear indication of the journal's bias for functionalism and its bias against interpretivism. This knowledge could help orient researchers to address the proper audience and know where their contributions will most likely be appreciated.

8.2 Future work

In terms of future work—given the arguments this research brought forth in support for multi paradigmatic interventions to address social responsibility messes in the context of the supply chain—an interesting study would be an action research where the proposed framework is used to guide a volunteer firm in deducing a suitable intervention. The firm would then implement the devised intervention to prevent or resolve its social responsibility messes.

Another study would be to replicate this research using a larger data set, this data set would encompass articles from a wider timeframe. Such a study would overcome the relatively narrow period analyzed by this research and validate its findings.

Furthermore, Other research efforts could investigate the incorporation of SST, interactive planning and strategic assumption surfacing and testing into CSR to serve as better stakeholder engagement tools, this will make stakeholders integral to supply chain social responsibility related decisions, as well as turn them into allies and sources of strategic information rather than adversaries and sources of risk.

Additionally, another research direction would be to explicitly research the inventory, transportation, retail and recycling stages of the supply chain as the findings from this research highlight the oversight by the research community in explicitly addressing these stages using both industry approaches and systems thinking methodologies.

Finally, further approaches such as Social Impact Assessment (SIA), the Global Reporting Initiative (GRI) as well as Environmental Social and Governance (ESG) could be analyzed to enrich the proposed framework with more techniques, and add more to its plurality in perspective.

CHAPTER 9

CONCLUSION

The objective of this research is to surface the underlying biases, strengths and weaknesses of the supply chain social responsibility literature and the approaches it developed in order to offer a solid foundation for future research. This research was motivated by the following research question:

- What are the systemic underpinnings of the current supply chain social responsibility literature?

The work described herein presented a number of original contributions that offer new insights about current research and practices with regard to their problem-solving bases from a systemic perspective. Such contributions would help supply chains avoid and manage significant impacts to their bottom lines due to their intended or unintended, direct or indirect, socially irresponsible behaviors inciting punitive stakeholder reactions.

This research was divided into three phases, each phase addressing part of the overall goal, and the results of which served as input to the next phase and inspired its direction.

The first phase mapped the existing supply chain social responsibility literature over an extended period of time spanning a little shy of a decade and a half. The main contributions from this phase is the finding that industry approaches account for the overwhelming majority of the literature with CSR, sustainable reporting and SLCA being the three most prolific. Another major contribution is the uncovering of the significant insufficient use of systems thinking and the absence of CST. Moreover, this phase highlighted the lack of systemic creativity in the literature in terms of using multiple methodologies in the same article, and a bandwagon effect exhibited by the continuous use of what is already prolific, such as CSR, at the expense of what is novel, such as emancipatory approaches. Another

contribution is the reveal that certain supply chain stages are understudied, such as the stages of retail, transportation, and recycling. Finally, this phase also revealed the bias different journals have toward different approaches and systems thinking methodologies.

The contributions from phase two included an exploration of the supply chain social responsibility literature, to understand its systemic underpinnings from a CST perspective. This phase showed that the literature is unequally distributed over three systems thinking paradigms. Interpretivism accounted for almost two thirds, functionalism a third, while emancipation was underused. Interestingly however, postmodernism was completely overlooked. After revealing the latent systemic biases of the literature, another contribution from this phase is revealing the lacking of the literature in terms of systemic pluralism in perspective, hence confirming its inherent inability in offering creative and holistic solutions and underscoring the need for solutions based on CST; the type of solutions that are capable of accounting for all factors of supply chain social responsibility messes.

Finally, phase three showed that the reason why supply chains continue to endure social responsibility related impacts despite their adoption of a plethora of remediation approaches is due to the latter's innate flaws resulting from their confinement within distinct systems thinking paradigms. This phase showed how each approach can only perceive some factors of the messes of interest, and therefore can only address those, hence resulting in a partial solution. This phase confirmed the aforementioned flaw by thoroughly analyzing three of the most prevalent approaches: CSR; SLCA; and SA8000. This phase showed that each approach is restricted within a distinct paradigm: CSR is interpretive; SLCA is functionalist; and SA8000 is emancipatory. Hence, none of these approaches has the capacity to offer creative and holistic solutions accounting for all factors of a problem situation. This phase presented a better framework inspired by CSP and based on the aforementioned approaches' systemic strengths and knowledge of their weaknesses. The framework guarantees systemic creativity and pluralism in perspective given its emphasis on the necessity of using tools from the three aforementioned paradigms.

In terms of practical implications, this research provided a scientific way of determining the suitability of any social responsibility approach to a given social responsibility mess. Using this research, academics and practitioners alike can reveal the paradigmatic pertinences of any social responsibility approach, thereby understanding their systemic strengths and weaknesses as well as which social responsibility factors they can address and which ones they cannot. Therefore, This research gives academics and practitioners alike the capacity to make informed decisions by being aware of the risks associated with their social responsibility decisions. For instance, using this research, a supply chain manager deciding to use SLCA over SA8000 will be aware that not all stakeholders who are impacted by their business operations will be involved in the supply chains' social responsibility related decisions. This information will help such a manager account for the risk they accepted to take. This dynamic was not possible before this research, as social responsibility related decision seemed to follow the status quo, and what was trendy at the time of making those decisions.

By the same token, using this research, academics and practitioners planning to improve their ongoing social responsibility practices can get an objective account of their current situation, and make informed decisions on which of the social responsibility approaches to adopt in order to fill in any found gaps. For instance, managers who have already established a social responsibility reporting practice using the GRI can select amongst the other approaches—including CSR, SA8000, and SLCA—depending on whether they want to become more inclusive, involve all impacted stakeholders in decision making, or reduce their social footprint when consuming resources vital to the livelihood of their stakeholders.

In terms of future research, an intriguing research effort would be to conduct an action research to test the proposed framework where a volunteering organization, interested in preventing or is facing social responsibility issues, is guided into implementing a social responsibility initiative using the proposed framework. The results would give insights into the framework's effectiveness and how it performs in comparison to the mainstream remediation approaches.

Moreover, reproducing the results with a larger data set spanning a wider timeframe is of high value, such an effort would overcome the relatively narrow period covered in this research and confirm its findings. Moreover, given the limited resources, phase three was restricted to three approaches, we propose analyzing further approaches such as Social Impact Assessment (SIA), the Global Reporting Initiative (GRI) as well as Environmental Social and Governance (ESG). The results from such an analysis would further strengthen the proposed framework in two ways: first making more tools and techniques from these approaches available to be used in interventions devised by the framework; and second by adding more plurality in perspective to the framework.

Additionally, given the scarce systemic creativity in the literature, a research effort could investigate the use of one or more approaches with one or more systems thinking methodologies while keeping in mind their paradigm limitations. For instance, the incorporation of Critical System Heuristics (CSH) into Corporate Social Responsibility (CSR) to serve as better stakeholder engagement tools. This will allow the disadvantaged stakeholder groups to become central to the social responsibility related decisions made by the supply chain, as well as turn them into supporters and sources of strategic information rather than opponents and sources of risk.

Finally, after the findings from this research showed that certain supply chain stages are overlooked or understudied, another research direction would be to focus on the inventory, transportation, retail, and recycling stages of the supply chain using both industry approaches and systems thinking methodologies.

In closing, our recommendation is twofold: firstly, we recommend that researchers and practitioners become aware of the underlying systemic paradigms of the approaches and methodologies they select when addressing messes of supply chain social responsibility. Such awareness would clarify the systemic strengths and shortcomings of their selections, allowing for a scientific way of determining their suitability, as well as highlighting the risks with selections founded on a single paradigm; secondly, we recommend that researchers and

practitioners always opt for multi paradigmatic interventions, for the reasons set forth in this research, based on well-established approaches and systemic methodologies.

APPENDIX I

CODING SAMPLES OF THE REFERENCES OF THE THREE TOP SUPPLY CHAIN SOCIAL RESPONSIBILITY APPROACHES

In this appendix, sample codings of the references of CSR, SLCA and SA8000 are presented in tabular format. These approaches are amongst the most prolific in the supply chain social responsibility domain. The sample coding tables have the following columns:

- Paradigm: The paradigm the text fragment is based on
- Complexity: The complexity of the system the text fragment suggests
- Participants: The nature of the participants the text fragment suggests
- Evidence: The details of the text fragment
    - Id: the assigned document identifier
    - Pg: shorthand for "Page", specifying the page number of the text fragment
    - Prg: shorthand for "Paragraph", specifying the paragraph number
    - L(s): shorthand for "Line(s)", the lines of the text fragment in the paragraph
    - Text: the text fragment content
- Emphasis: what the text fragment emphasizes in the context of the systems thinking paradigms

Table-A I-1 CSR reference sample coding

Paradigm	Complexity	Participants	Evidence				Text	Emphasis
			Id	Pg	Prg	L(s)		
Interpretive								
2	Simple and Complex	Diverse	Ref1	4	1	4 - 5	Social responsibility […] ***takes into account the expectations of stakeholders***; is in compliance with […] law and […] is integrated throughout the organization.	Inclusiveness of diverse Stakeholders
5	Simple and Complex	Diverse	Ref1	10	4	5 - 7	***Considering the interests of parties concerned about a firm's impact*** is one way of better anticipating and managing risk	Inclusiveness of diverse stakeholders
6	Simple and Complex	Diverse	Ref1	11	3	2 - 4	***Drawing feedback from diverse stakeholders*** can be a rich source of ideas for new products, processes and markets, resulting in competitive advantages.	Inclusiveness of diverse stakeholders
7	Simple and Complex	Diverse	Ref1	11	6	2	A company with its "ear to the ground" through regular ***stakeholder dialogue*** is in a better position to anticipate and respond to regulatory, economic, social and environmental changes that may occur.	Inclusiveness of diverse stakeholders
11	Simple and Complex	Diverse	Ref1	23	2	2 & 6	How to do an assessment […] ***assemble a CSR leadership team*** […] ***identify and engage key stakeholders***	Inclusiveness of diverse stakeholders
14	Simple and Complex	Diverse	Ref1	26	2	3 - 5	[…] the team may wish to ***hold discussions with key external stakeholders*** about CSR. ***Mapping the interests and concerns of stakeholders against those of the firm can reveal both opportunities and potential problem areas.***	Inclusiveness of diverse stakeholders
17	Simple and Complex	Diverse	Ref1	32	3	5	A CSR strategy is a road map […] allowing the firm to be successful […] to meet market needs and ***fulfill stakeholder expectations***	Inclusiveness of diverse stakeholders
34	Simple and Complex	Diverse	Ref1	49	2	1 - 5	***Due to the complexity of international supply chains and the corresponding CSR issues which can arise, […] tend to place high priority on seeking consensus among stakeholders and formalizing such agreement in the form of "minimum standards" for participating members/ institutions.***	Consensus building
44	Simple and Complex	Diverse	Ref1	76	3	5 - 7	***stakeholder engagement includes, at a minimum, a genuine effort to understand stakeholder views, and assess how the firm should hear their perspectives, and respond.***	Inclusiveness of diverse stakeholders
Emancipatory								
56	Simple	Disadvantage	Ref1	47	3	5	***It can also be useful to reach beyond those with whom the firm has contractual relations to more broadly affected groups***, such as consumer, labor and environmental organizations, community groups and governments..	Empowering of the disadvantaged

Table-A I-2 SLCA reference sample coding

Paradigm	Complexity	Participants	Evidence				Text	Emphasis
			Id	Pg	Prg	L(s)		
Functionalist								
1	Complex supply chain	Compatible	Ref2	9	3	2 - 3	*How can we begin to assess and measure the social effects […] How do we assign a result or a number to the working conditions in […] factories*	Goal Setting
7	Complex supply chain	Compatible	Ref2	40	3	1 - 3	*Results may be expressed quantitatively using Life Cycle Attribute Assessment […] results need to be expressed in a way that renders the proportional weight of the unit processes in the life cycle of the product.*	Optimization
12	Complex supply chain	Compatible	Ref2	46	3	1 - 4	*A stakeholder category is a cluster of stakeholders that are expected to have shared interests due to their similar relationship to the investigated product systems […] The proposed stakeholder categories are deemed to be the main group categories potentially impacted by the life cycle of a product.*	Optimization
14	Complex supply chain	Compatible	Ref2	50	2	1 - 3	*The first thing needed when initiating a S-LCA is a clear statement of purpose, the goal.*	Goal Setting
15	Complex supply chain	Compatible	Ref2	50	3	1 - 5	*The second step is to define the scope. As part of defining the scope, the function and the functional unit of the product is defined. Based on that information the product system will later be modeled using process or input-output data. […] In order to define the depth of the study, activity variables (such as worker hours or value added) may be used.*	Modelling
22	Complex supply chain	Compatible	Ref2	53	2	1 - 3	*build and model the product system. Modeling the product system is essential to identifying locations and specific stakeholders involved. It is also important in estimating the need for and setting targets for site-specific data collection.*	Modelling
23	Complex supply chain	Compatible	Ref2	53	9	1 - 5	*One of the primary purposes of a functional unit is to provide a reference to which the input and output data are normalized (in a mathematical sense). Therefore, the functional unit shall be clearly defined and measurable.*	Optimization
28	Complex supply chain	Compatible	Ref2	56	5	1 - 3	*It is suggested to apply iterative refinement to system boundary setting […] calling for sensitivity assessments of system boundaries during modeling (rather than after the study is done).*	Optimization
36	Complex supply chain	Compatible	Ref2	58	9	2 - 4	*prioritization and estimation of the relative importance of all the process of the product system would still be relevant to guide data collection and allocation of efforts in the S-LCA study*	Optimization

Table-A I-3 SA8000 reference sample coding

R#	Complexity	Participants	Evidence				Text	Emphasis
			Id	Pg	Prg	L(s)		
Emancipatory								
1	Simple one organization	Incompatible	Ref3	4	1	1 – 9	The intent of SA8000 is to […] ***protect and empower all personnel within a company's scope of control and influence, who produce products or provide services for that company, including personnel employed by the company itself, as well as by its suppliers/subcontractors, sub-suppliers, and home workers.***	Empowering of the disadvantaged
12	Simple one organization	Incompatible	Ref4	13	3	1 - 6	***Involving interested parties is an important strategy for auditors in identifying and addressing issues of child labour or young workers.*** Auditors should determine if the organization cooperates with government, social service, and/or department of labour inspection agencies. Local unions and NGOs […] ***Community interviews with teachers, social workers child welfare advocates, and even with the children's families are also useful for the auditor to understand how the organization is addressing child labour risks.***	Inclusiveness of the disadvantaged
13	Simple one organization	Incompatible	Ref4	14	6	1 - 4	***A key method for identifying the presence of child labour or young workers is through interviews with young workers, or workers who appear to be young***	Emancipation
15	Simple one organization	Incompatible	Ref4	22	1	9 - 11	***evidence of compliance should be collected through interviews with workers, family members and local community groups […] Additionally, through worker interviews and by checking with management and local community groups, auditors should ascertain how the organization recruits its workers, where they come from and who helps find them.***	Emancipation
28	Simple one organization	Incompatible	Ref4	64	3	7 - 10	***off-site interviews with workers and other community members to verify that all workers, especially female or minority workers, receive equitable treatment and have access to equal opportunities in all stages of employment, including hiring, remuneration, benefits, bonuses and promotions.***	Emancipation
31	Simple one organization	Incompatible	Ref4	68	2	1 - 6	***Questions related to discrimination can be incorporated into the general interview with workers […] auditors can ask questions […] whether their gender, race, pregnancy status, territorial origin, or other personal characteristics have affected and/or continue to affect their application or advancement.***	Emancipation
32	Simple one organization	Incompatible	Ref4	69	2	1 – 3	***The victims of workplace gender discrimination are often women. It can help if an auditing team includes female member […] sensitive topics such as sexual harassment or abuse.***	Empowering of the disadvantaged
34	Simple one organization	Incompatible	Ref4	79	1	2 - 3	***To verify the voluntary nature of overtime, auditors should review the organization's policies and agreements between management and workers. In-depth interviews with workers are also important for***	Empowering of the disadvantaged
56	Simple one organization	Incompatible	Ref4	127	7	1 - 2	***It is important for organizations to obtain input from a wide range of stakeholders […]. 1) Conversations with workers […] Conversations with local organizations […] Conversations with managers and supervisor***	Inclusiveness of the disadvantaged
62	Simple one organization	Incompatible	Ref4	133	5	1 - 2	***In developing its list, the organization should not only include first-tier and direct value-chain suppliers, but also those lower down in the supply chain, as they can present major risks to the organization.***	Inclusiveness of the disadvantaged

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