UNDERSTANDING STAKEHOLDERS' PERSPECTIVE IN THE IMPLEMENTATION OF CIRCULAR SUPPLY CHAINS

By

Karla Ileana Tun Góngora

A thesis submitted to the University of Sheffield for the Degree of Doctor of Philosophy in the Management School

Sheffield University Management School

Faculty of Social Sciences

June 2021

(This page is left blank intentionally)

DECLARATION

I declare that this thesis is an original report of my research, has been written by me at the University of Sheffield. All sources of information presented in this work have been accordingly referenced.
This thesis has never been previously submitted at this University or any other institution.

This thesis is written in conformance to the rules of the Code of Practice for Research Degree Programmes (2019-20) of the University of Sheffield.

Abstract

Circular Economy (CE) is an alternative model to a linear economy to produce further efficient use of the resources and gain the most significant benefit all through the valuable life cycle. This idea seeks to convert the ongoing system and embrace a new framework in which the utility and cycle of the products and materials can be extended as much as possible using key strategies, for instance: Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, and Recover.

The objective of the present research is to conduct an extensive analysis of the supply chain in order to understand the multi-stakeholder perspective, barriers, and opportunities to implement further CE practices in the organisations. The industries proposed for this study were obtained as a result of the gaps found in the systematic literature review. The Food and Textile industries were recommended in two main regions: Yucatan, Mexico, and South Yorkshire in the United Kingdom.

The analysis was conducted through two main stages. The first one was a preliminary content analysis to evaluate the regions by exploring the websites of the top fifty companies in each industry for each region. The purpose of the first stage was the recognition of the most frequent CE practices currently adopted and the level of awareness. The second stage was to collect data complementary to the first stage data by conducting in-depth semi-structured interviews with people related to the redesign of the supply chain of the above-mentioned industries and through a critical analysis of the interviewees' discourse.

Drawing upon a planned theoretical framework incorporating stakeholder, resource based-view, agency, and institutional theory, this thesis proposed a review of the outcomes through this theoretical lens in order to holistically evaluate and fill some of the gaps in the present literature. The results of this study will help to understand how power structures influence the way institutions are managed along the supply chain and thus achieve better planning of strategies that encourage the adoption of more circular practices.

Acknowledgements

First and foremost, I want to dedicate this thesis to my parents Gaspar Tun and Maria Gongora, who have been a constant source of strength and my main mentors during all my life. Their endless love, support and encouragement always guide me in the pursuit of my dreams.

To all my family, the foundation of my life, especially to my sisters Patricia, Gabriela and my brother Gerardo who have always inspired and offered me unlimited love, support, humour, and joyful experiences that have made me who I am.

To my beloved husband, Kristos Sorfanes, who has been the pillar of my stability during this journey, ensuring I have stayed focused on my aim and assisting me untiringly day and night during the most despairing days.

I would like to sincerely express gratitude to my supervisors during my PhD: Professor Dr Andrea Genovese, Dr Robert Marchand and Dr Niraj Kumar. Their guidance, dedication, influence and continuous support in challenging times encouraged me throughout the creation of this research.

Further thanks must be presented to Mandy Robertson, PGR Administrator who helped me solve every problem related with my PhD performance. To my colleagues and fellow PhD students from the Management School for sharing advice, especially to my friends from the Operations Management Division with whom I have shared moments of profound concern but also great enthusiasm. Their presence was very important in a process that often feels isolating.

To my friends in Sheffield and in Mexico who have cheered me up and made me feel special every day. They have added so much light, fun, comprehension, and continuously lifted my mood in my daily life.

I must also acknowledge all the people in Mexico and the United Kingdom who have provided useful information for this study. Finally, I would like to thank CONACYT (Consejo Nacional de Ciencia y Tecnología - National Council of Science and Technology) for sponsoring this research.

Research Dissemination

Conference Presentations and Proceedings

1. Tun K., Genovese, A. & Marchand, R. (2019). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *3rd SUMS Doctoral Conference in Sustainable Operations, Logistics and Supply Chain Management*, University of Sheffield, 18 September 2019

2. Tun K., Genovese, A. & Marchand, R. (2019). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *Challenging Ideas about Mexico and the world*. *XVII Symposium of Mexican Students and Studies in the UK*, University of Cambridge, 26-28 June 2019

3. Tun K., Genovese, A. & Marchand, R. (2019). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *Art and science of procurement. International Purchasing and Supply Education Research (IPSERA) Conference 2019*. Politecnico di Milano, 14-17 April 2019

4. Tun K., Genovese, A. & Marchand, R. (2018). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *2nd SUMS Doctoral Conference in Sustainable Operations, Logistics and Supply Chain Management*, University of Sheffield, 12 September 2018

5. Tun K., Genovese, A. & Kumar, N. (2017). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *1st SUMS Doctoral Conference in Sustainable Operations, Logistics and Supply Chain Management*, University of Sheffield, 12 September 2017

Award

1. Best Paper Award in 3rd SUMS Doctoral Conference in Sustainable Operations, Logistics and Supply Chain Management - Tun K., Genovese, A. & Marchand, R. (2019). Understanding stakeholders' perspective in the implementation of Circular Supply Chains. *3rd SUMS Doctoral Conference in Sustainable Operations, Logistics and Supply Chain Management*, University of Sheffield, 18 September 2019

Podcast:

1. *Episode 09. Repiensa la economía, repiensa hábitos* (2019) 17th December 19 [Podcast]. Available at: https://www.proyectovisibl.com/

Table of Contents

List of Figures

List of Tables

List of Abbreviations and acronyms

CE	Circular Economy
CA	Content Analysis
DENUE	Directorio Estadístico Nacional de Unidades Económicas
EMF	Ellen MacArthur Foundation
EU	European Union
FAME	Financial Analysis Made Easy
INEGI	Instituto Nacional de Estadística y Geografía
IE	Industrial Ecology
IT	Institutional Theory
KF	Key Finding
MX	Mexico
RBV	Resource-Based View
OM	Operations Management
ONS	Office of National Statistics
SC	Supply Chain
SME	Small-to-medium enterprise
SCM	Supply Chain Management
SMT	Strategic Management Theory
UK	United Kingdom
UN	United Nations
VRIO	Valuable, Rare, Inimitable resources and Organisation
WRAP	Waste and Resources Action Programme
WW2	World War Two

CHAPTER 1

INTRODUCTION

The Industrial Revolution is one of the most significant events in human history over the last three centuries (Stearns, 2018), and it plays a central role in our understanding of the modern world (Berlanstein et al., 1992). The creation of new technologies helped to reduce transport costs and the production of goods; however, this contributed to dramatically increase the movement of people and trigger the mass production of products. The arrival of technological advances meant a change in the mind-set, the modern capitalist system was initiated, and linear production notably facilitated the acquisition of all kinds of merchandise at a lower cost. Nevertheless, several problems started to manifest due to the accelerated use of resources, and the level of pollution generated environmental problems that remain until modern times (Ashton, 1997). Despite significant efforts to control environmental pollution worldwide in the last decades, the contamination of the environment (water, air & soil) remains a severe problem in industrialised countries (Briggs, 2003). In recent times, the interest to implement greener policies in industrial production has been increasing due to a new uprising of environmental awareness among consumers and authorities (Robinson et al., 2006), since waste produced by industrial activities is usually displayed as one of the main contributors to global pollution (Clegg, 2015). Governments around the world started to pay attention to creating new policies in the interest of mitigating the impact of industrial activities on the environment. Between 1980 and 1990, the concept of 'Circular Economy' (CE) emerged in Europe, changing the general picture of a linear economy to that of a closed-loop system (Prendeville et al., 2011). This frame was considered as a solution to many problems such as waste generation, resource scarcity, and sustaining economic growth (Lieder and Rashid, 2016). Some members of the European Union launched new measures driven by the hope to redirect waste from landfill (McDowall et al., 2017). On September 1996, Germany made the ground-breaking move of incorporating the notion of CE into their laws and forcing producers and consumers to radically rethink their waste in the 'Act for promoting closed substance cycle waste management and ensuring environmentally compatible waste disposal' (Federal Ministry of Environment, Nature Conservation, 2006; Giesberts L.,

1996). Germany was the pioneer nation in Europe in terms of incorporating CE as a regulation, although some other countries followed the initiative.

Within this context and almost around the same years, the concept was also gaining momentum in Asia. China, for example, is a country that has in the last three decades undergone an accelerated economic evolution due to the transition from a planned economy to a free market (Yuan, Bi and Moriguichi., 2008; Zhu, Geng and Lai., 2011; Geng and Doberstein., 2008). Combined with an exponential population growth, resource shrinkage and environmental deterioration had an immediate effect on the country. Forced by the negative consequences for the environment, the Chinese central government settled a plan to minimise the side effects (Su et al., 2013). In 1998, scholars in China presented the notion of CE as an answer to several problems, but it was officially adopted as part of the national development strategy in 2002. The concept of CE gained importance among political leaders, influential nations, and agencies at the local, regional, national, and international level (Geissdoerfer et al., 2017). Likewise, in 2002, Japan encouraged its application by fostering the 'Basic Law for Establishing a Recycling-Based Society' (METI, 2003). Notwithstanding its European origins, it only became noteworthy in Europe less than a decade due to the first initiative of the European Commission regarding resource efficiency, namely the 'Roadmap to a Resource Efficient Europe' (European Commission, 2011).

Even though governments around the world are encouraging organisations to implement more CE practices, there are still many challenges to overcome. Internal problems are usually considered as organisational elements, such as improving operations, efficiency, ordering policies and production costs; the external barriers include regulation, customers, competition, and society (Walker et al. 2008). The implementation of CE practices in the supply chain requires fundamental changes all over the SC, starting from the design of the product, involving production operations and new business models, and finally, considering consumption habits of the market (European Environment Agency, 2016).

1.1. What is Circular Economy?

The circular economy concept has received increasing attention from the academic and practitioner community. Nonetheless, analysts suggest that this notion means different

issues for different people (Kirchherr, Reike and Hekkert, 2017). There are several definitions and explanations about the framework. Launched in 2010, the Ellen MacArthur Foundation (EMF) is nowadays one of the most prominent charities working to accelerate the transition to CE (Ellen MacArthur Foundation, 2019a). In 2012, this organisation released the first report about CE, named 'Towards a Circular Economy: Business Rationale for an Accelerated Transition'. The above-mentioned report defined CE as:

> *'An industrial system that is restorative or regenerative by intention and design' (Ellen MacArthur Foundation, 2019a).*

This outline is possibly one of the most widespread and accepted definitions in the academic sphere. The main aim of CE is to extend the life of the resources and their usage for as long as possible, obtaining the highest utility from them while in use, then to recover and produce commodities and materials at the end of each useful life (WRAP, 2017). According to Prendeville et al. (2016), CE is an alternative model for transforming linear production into a closed loop and restorative system, considering three dimensions: social, economic and environmental (Iung and Levrat, 2014). Chapter 2 explains the origin of the term, the evolution and different approaches in depth.

1.2. Context of the study

This thesis is motivated by the need to understand the dynamic in different supply chains and industries regarding CE implementations. Resulting from the gaps found and explained in Chapter 2 (Section 2.7), the fashion sector and the food industry were chosen as they represent some of the fundamental industries for the preservation of human life and are considered likewise one of the most damaging for the environment. The intention of the analysis is to compare these practices between countries with different geographical positions and human indices to comprehend the level of implementations, identify main CE practices in each country and understand the role of stakeholders hindering or motivating the adoption. As a result of this evaluation, the final contribution of this thesis is to promote incentives for the application of CE practices.

1.3. Research aims and objectives

This research aims to understand the views of all stakeholders involved within the SC in order to comprehend the opportunities and challenges to address in the implementation of CE practices. The purpose of the analysis is to establish innovative business models using the Circular Economy framework; moreover, to understand all their activities throughout the SC. Notwithstanding, the goal of this study is to draw a mapping of all the possible parts and processes involved in the SC in two different industries (Textiles & Food) in order to help companies to implement more circular practices in their existing operations by stimulating them with innovative ideas.

In order to accomplish the intent of this research, the following objectives have been determined:

> RQ1: Which CE practices are currently being enabled within selected multi-tier and multi-stakeholder supply chains, and to what extent?
> RQ2: What factors can drive or hinder the implementation of CE practices in the selected multi-tier and multi-stakeholder supply chains?

1.4. Significance of the study and potential contributions

This research aims to complement contemporary studies about CE by providing an extensive understanding of stakeholders' perspectives towards the implementation of CE practices in different supply chains. The study will be focusing on specific sectors as, in this way, it will be possible to find gaps in the literature and propose new actions.

After an extensive examination of the past literature related to circular supply chains, two sectors (food and textile industries) were selected for the in-depth study in this research; an explanation about the rationale behind the choice of these sectors will be provided in the literature review analysis in Chapter 2.

The primary concern of this research is to increase the knowledge about stakeholders' perspectives in the implementation of the Circular SC, with the purpose of suggesting innovative ways to implement the principles of the circular supply chain in practice. The theoretical and practical contributions of this thesis are explained in the following two sub-sections.

1.4.1. Theoretical Contributions

There are several theoretical contributions of this thesis. The research seeks to contribute to theoretical development in the following ways:

i. Contribute to the existing academic literature by understanding challenges and opportunities in the implementation of the circular supply chain.

ii. Increase the knowledge through the study of multiple cases along with analysis of differences in CE implementation in diverse countries, industries, and economic contexts to obtain a holistic range of angles that can assist as points of comparison for future research. Kirchherr and Santa (2019) highlighted the lack of studies with a focus on less developed nations, with 95% dedicated on countries with superior levels of advancements. The lack of theoretical insight in less advanced countries hinder the expansion for further theoretical analysis. Countries in Latin America have a clear deficient in studies related with CE, hence this research can contribute to fill this disparity. Additionally, 61% of the articles on CE literature were dedicated to case studies (based on small sample sizes) with limited possibility of generalisation. By producing a general overview of the supply chain status in different industries and countries, the study can address this gap.

iii. Propose a theoretical framework to assist researchers to replicate the model in different countries and industries. Contemporary research has proposed that there is a deficiency of empirical work, since only 55% of the studies examined were empirical, while 45% were conceptual studies that were not endeavouring to produce theoretical data. (Kirchherr and Santa, 2019). Therefore, analysing the perspectives of several stakeholders in different supply chains can help to enhance the understanding of their perspectives, provide main narratives that will help to develop information to create future strategies and contribute to the development of theoretical basis for future research. The proposition for this research is to use multiple theory approach. In chapter 3 (Figure 3.3) a suggested framework about how to use multiple theoretical perspective to analyse different dynamics in the SC is suggested. Several authors recommend the use of multiple theories to understand situations that otherwise would be ignored by using single theories. A matrix containing examples of previous

research with the combination of all these theories is also provided to demonstrate the compatibility among theories.

1.4.2. Practical Contributions

CE is emerging as an alternative to the current linear economic system and the way that industries have historically operated. New procedures, materials, and products are being created by thinking in a more sustainable path and finding new directions to follow in accordance with regulations that protect the environment. The adoption of CE practices in different industries is becoming more popular due to the commitment of several governments to reduce their levels of toxic waste and to integrate a greener economic structure.

The following contributions are also aligned with the objectives of this research to support practitioners in the implementation of CE practices.

i. The first contribution aims to create awareness about the perspective of several stakeholders in the SC. It is essential to create knowledge about how the interaction among stakeholders can either motivate or hinder the adoption of CE practices in practitioners. With this understanding managers can elaborate specific strategies in their organisations to promote the application of sustainable practices.
ii. The second contribution is to identify various circular practices that can be replicated across the industries. By interviewing current key stakeholders in different industries across different regions, the purpose is to bring a map of the two selected industries.
iii. Understand the situation in different geographical places to comprehend the challenges and opportunities and share this knowledge across countries. This research target organisations in Yucatan and South Yorkshire regions to provide specific information that can help managers in their decision-making regarding how to assess their organisations in order to suggest implementations of the circular economy. Managers can use the current findings to inform decisions on how to motivate, based on the characteristics detected in their organisations.

1.5. Thesis structure

Chapter 1 gives an overall picture of the design of this research thesis. Within this chapter, the background of the motivation to conduct the study is introduced. The first chapter aims to provide a summary of the content for each chapter, an overview of the core structure, research gaps, contributions, and objectives to be achieved.

Chapter 2 will describe in depth the review of relevant literature conducted to support the views postulated in this academic research. The information gathered for this section includes substantial figures and evidence from both academic and industrial fields, given the fact that CE is a term of increasing interest to both scholars and practitioners. The second chapter describes in detail the origins of CE, the evolution around the school of thought, implementation in the supply chain, and defines the possible gaps to be filled by this thesis.

Chapter 3 will provide the core of the theoretical foundation. This chapter will work as an introduction to explain general management theories that will support the development of data collection methods, as well as to provide theoretical lenses to illustrate the results and analysis. Some examples of how to apply the theories to real situations in a CE context will be presented at the end of each theory.

Chapter 4 will help to explain how the research methods were used to construct the model for data collection and analysis. It will also illustrate the logic used to justify the adoption of qualitative methods as the appropriate tool to compile evidence to cover the proposed objectives.

Chapter 5 presents a preliminary study of the industries in the selected regions. This study will be carried out by means of grey literature analysis in order to understand in a general way the context of the industries to be explored. Subsequently, a content analysis of the websites will be made by selecting the top fifty most representative companies in the region that were chosen for their size for each industry. This analysis will help us to understand the type of practices that are currently conducted in the region and the degree of information provided by these organisations in terms of CE.

Chapter 6 will explain the in-depth thematic analysis undertaken on the data collected from semi-structured interviews with diverse stakeholders in the targeted industries. It

will present the main narratives found for different topics and will show real statements of the interviewers to describe each narrative.

Chapter 7 will describe the union of the preliminary data collected in the content analysis of chapter 5 with the results obtained from the in-depth data collection in chapter 6. Mixing and comparing these results will provide greater clarity on practice in the organisations, as well as help to understand whether the practices shown online correspond to those being implemented.

Chapter 8 will conduct critical discussion of the integrated data from chapters 5 and 6 that was presented in chapter 7. This chapter additionally presents in detail each objective set out in chapter 1 and how this thesis has fulfilled the objectives.

Finally, *Chapter 9* will review all the qualitative outcomes of the thesis and draw conclusions. This chapter will evaluate all the intended contributions of this research from theoretical, and practical standpoints, summarise the key findings and provide closing remarks. The final chapter of this thesis will conclude by making suggestions for future research directions and practical applications of the outcomes.

1.6. Chapter summary

The circular economy concept has received rising interest from the academic and practitioner groups. However, experts indicate that this concept imply different meanings for different groups, and it is under an umbrella term.

This thesis is driven by the demand to comprehend the dynamic in different supply chains and industries concerning CE practices and adoption. Taking in consideration the gaps found and explained in Chapter 2 (Section 2.7), the fashion sector and the food industry were selected as they exemplify critical industries for the preservation of human life which at the same time are considered as one of the most damaging for the environment.

This chapter has provided a brief explanation of the rationale of the thesis, and an overview of each chapter; Figure 1.1 provides a graphical map of the research process developed for this thesis, which will be employed as a guideline throughout the whole document in order to provide a guideline to the reader.

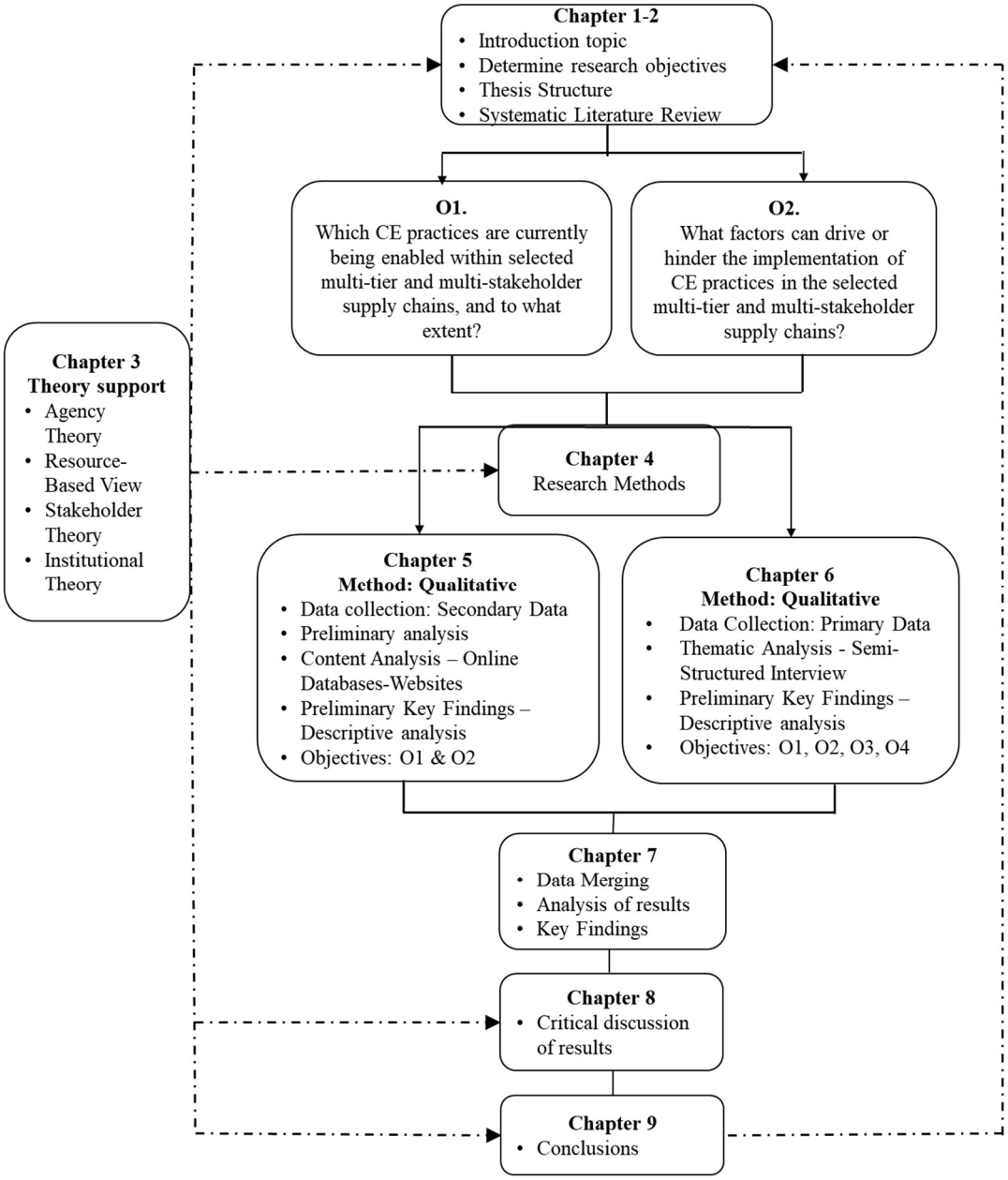


Figure 1.1. Research Process Map

CHAPTER 2

LITERATURE REVIEW

This chapter will provide an in-depth introduction to the Circular Economy concept, along with a critical discussion of its origins and its development in the academic literature. The beginning of this concept and its following development were documented in academic publications through different notions, culminating in the idea as we know it today. This chapter will provide a systematic evaluation of the available academic literature in order to identify the gaps from the literature and to be able to set out the research objectives. From this chapter onwards, a research map will be presented at the beginning of each chapter indicating the stage of the research and the connection with other chapters. In Figure 2.1, the grey-shaded areas represent the primary focus of this chapter.

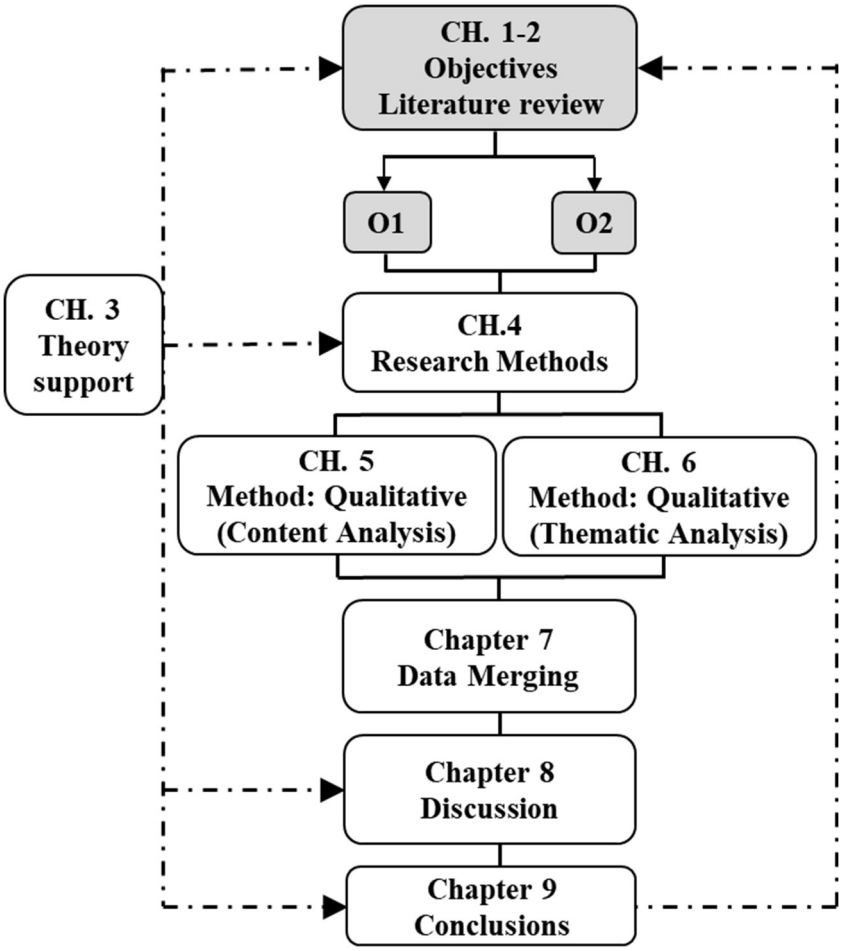


Figure 2.1. Research Map-Literature Review

2.1. The Circular Economy: an Introduction

There is a general conviction that industrial revolution is responsible for shifting the relationship between people and consumption habits (Siegle, 2006; Mathews, 2011; Strasser, 2000). This assumption is based on the premise that this historical development stimulated a new development model based on increased resource consumption, disposable products and alteration of the traditional interaction between humanity and nature, with the emergence of a *metabolic rift* (Foster, 1999; Genovese and Pansera, 2021). The development of societies based on a linear economic pattern (take-make-dispose) has increased the demand for resources, thereby creating industrial systems where resource consumption and waste generation have increased and caused deep environmental damages (Lieder et al., 2017; Prieto-Sandoval, Jaca and Ormazabal, 2018; Rizos et al., 2017). The demand to minimise environmental impacts (due to current high levels of pollution and contamination) has increased in the last three decades; parallel to this situation, alternative paradigms focusing on resource efficiency started to appear in organisations. The Circular Economy (CE) is an umbrella term which is being utilised for describing a more sustainable industrial economy in which the flows of materials, energy and by-products are re-utilised over and over again, in an attempt to overcome the whole idea of "waste" (Romero and Molina, 2014). Figure 2.2 represents one of the diagrams which is most widely used to represent the CE concept, created by the Ellen MacArthur Foundation (2020), one of the major global think-tanks which has contributed to the popularisation of CE.

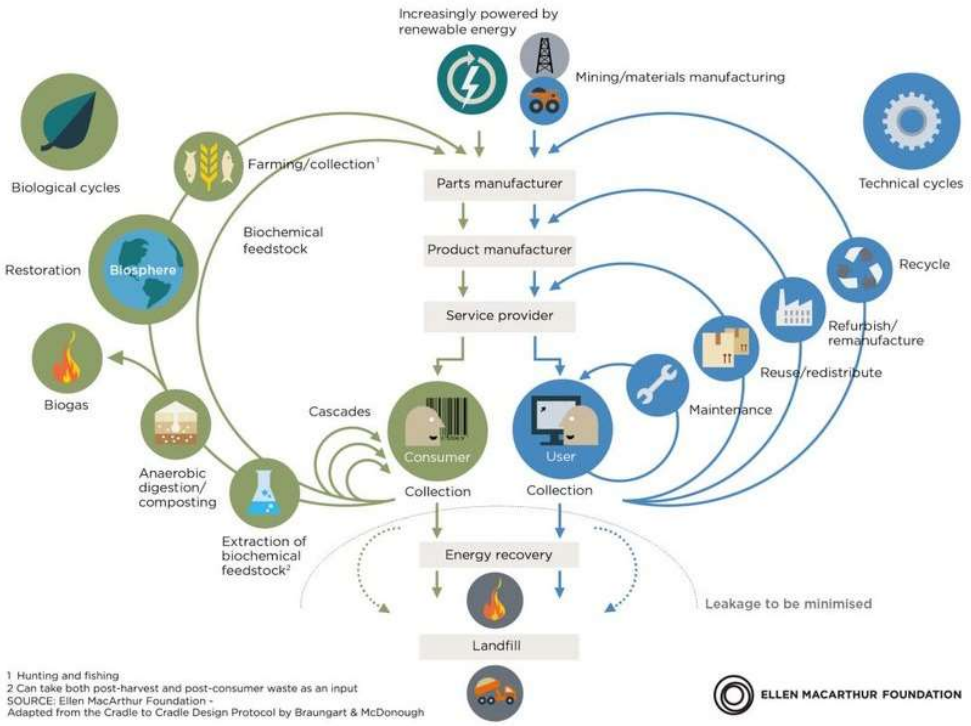


Figure 2.2: Circular Economy System conceptualised by the Ellen MacArthur Foundation (2020)

This figure reveals the founding principles of a Circular Economy, which aims to convert streams of technical and biological resources into a 'value circle'. The diagram is a clear illustration of how the flow of resources in a Circular Economy system can continuously feed productive loops and extend the lifespan of products as much as possible by using different strategies. These strategies aim to decrease the overall number of resources extracted from the ecosystem and minimise the waste caused by human activities. Such strategies can be ranked from the least to the most disruptive. For instance, less disruptive strategies such as reusing, redistributing or repairing require lower amounts of energy since products can go back multiple times in their initial form without significant changes or maintenance, meaning that the item is preserved in satisfactory condition. When a product is refurbished/remanufactured, its form is restored/enhanced potentially to as-new product by substituting the elements, improving cosmetic appearance, or renovating its design; as such, significant energy and material inputs might be required. Most disruptive strategies can include materials recycling and reprocessing.

The CE concept as we know it now has been evolving from several school of thoughts and cannot be attributed to one single date or author. Boulding (1966), in his seminal

work “The Economics of the Coming Spaceship Earth” portrayed the planet as a closed and cyclical ecological system. His essay was influential, because he emphasised the idea that the pathway towards a sustainable future needs to be based on a thorough revision of the main production and consumption relationships within modern economic systems. The idea of limited resources in a closed economy was very influential for an initial framing of the CE agenda, even if Boulding did not explicitly coin the CE term.

During 1970s, the idea that human economic activity triggers detrimental changes to the environment began to gain momentum. This ideological movement was known as Industrial Ecology (IE). Many scholars consider that CE has its roots in the IE. The fundamental view of IE is the belief that society and industry are linked to natural ecosystems, and do not exist outside it. The IE research stream also contributed to the study of industrial processes and their material and energy flows.

Nevertheless, several authors (Ghisellini et al., 2016; Geissdoerfer et al., 2017; Blomsma and Brennan, 2017) trace back the formal introduction of the CE term to the early 1990s. Pearce and Turner (1990), in their fundamental book *Economics of Natural Resources and the Environment*, explain the evolution from a view of an open-ended economic system to a circular one.

Some countries, with their legislative initiatives, contributed likewise to shape the CE agenda. For instance, Germany enacted in 1996 “The Closed Substance Cycle and Waste Management Act” which was one of the first legislative actions to be adopted by a nation state aimed at encouraging the reduction of waste by incorporating product end-of-life responsibility into economic decision-making (Su et al., 2013). The incorporation of new legislation towards the implementation of CE was similarly repeated in several countries for instance Japan, Sweden, and the Netherlands. Recently, China has embraced CE as a national development strategy, as part of its recent five-year plans (Mathews and Tan, 2015; Lieder and Rashid, 2016). Table 2.1 shows some of the most important contributions and actions from different authors and countries towards shaping the CE notion.

In recent times non-governmental organisations have been working to actively promote and speed up the transition to a CE, promoting CE-thinking adoption by private organisations and businesses. The Ellen MacArthur foundation (EMF) is the

UK charity that has emerged in this regard as a global thought leader connecting Governments, Industry, society, and academia towards common goals in the implementation of CE solutions. EMF try to integrate concepts coming from different research strands and school of thoughts such as Industrial Ecology, Natural Capitalism, Biomimicry, performance economy, regenerative and cradle-to-cradle design, Blue economy (Ellen Mac Arthur Foundation, 2013).

Table 2.1 summarises several of the main contributions that shaped the evolution of the CE concepts. From key single authors providing an initial idea of circular production systems, to nations and non-governmental organisations encouraging the shift to a more sustainable path, CE has been gaining momentum in the last decades, not only as a philosophy, but also as a socio-economic model for our future generations. While the concept is gaining momentum, there are still many challenges to face that will require social, technical and economic aid. CE requires to be considered as a collective, intellectual, and constitutional endeavour, including commercial, technical, and industrial innovations (Hobson and Lynch 2016).

Table 2.1 Circular Economy evolution and contributions

Timeline	Author(s)	Country	Contribution to the CE transition
1966	Kenneth Boulding	United States	Portrayed the planet as a closed and cyclical ecological system where a circular agreement is a necessity for the preservation and the sustainability of human life.
1990	Pearce and Turner (UK)	United Kingdom	"Economics of Natural Resources and the Environment". Evolution from the established open-ended economic system to a circular one.
1990's	Several nations and governments	Germany, Japan, Sweden, the Netherlands, and China	Incorporate CE as part of their legislation and domestic development plan.
2010	Ellen MacArthur Foundation	United Kingdom	Non-governmental organisation established with the intention of fostering the CE collectively with its industry allies.

2.2. Circular Economy as a contested concept

There are several definitions and ideological positions regarding the conceptualisation of CE, however, some of them share certain core values. The increasing suggestion of the CE model as a path to accomplish **a more sustainable production and consumption** has persuaded researchers to propose a variety of approaches to implement it. Nonetheless, different points of view equally generate a debate derived from the conflicting ecological benefits and the concern for advantageous economic outcomes.

CE is a model promoted predominantly by the EU, although numerous governments worldwide also participate in this campaign including China, Japan, UK, France, Canada, The Netherlands, Sweden, and Finland alongside numerous multi-national firms around the globe (Korhonen et al., 2018). The result is that **there is a plurality of studies in the CE field proposing conflicting implementation approaches,** and multiple socio-economic foundations (Genovese and Pansera, 2021).

This literature review attempts to provide a broad idea of the different notions and a consensus view of the CE framework highlighting its relationship with eco-innovation. The following part presents key views from different agendas as an effort to comprehend the arguments and agreements towards a consensus from conflicting interpretations.

The idea of CE builds on an effort to face environmental problems and encourage an eco-compatible organisation of production and consumption; it has in recent times gained momentum in the discussion of academics, practitioners, and policy-makers. The concept has been shaped from a set of proposals derived from a diverse array of technical fields and scientific hypotheses (Korhonen et al., 2018). CE has roots from various philosophies that likewise share similar purposes. Table 2.2 introduces some of the philosophies related with the CE notion and indicates the central beliefs and authors. It can be noted that such philosophies span across a very wide range, with some just proposing some incremental changes to the way modern capitalist economies function (such as eco-efficiency) to some more radical concepts, which require a radical rethinking of production systems and of their ultimate aims (e.g., degrowth).

Table 2.2. Roots of CE as a compilation of different philosophies (Korhonen et al., 2018)

Philosophy	Main principle	Authors
Industrial ecology	Discipline that traces the stream of material and energy from natural resources through industrial systems.	(Frosch and Gallopoulos, 1989; Lifset and Graedel, 2001; Graedel, 1996)
Ecological economics	Focus on the interconnection and coevolution of humanity household (economy) and nature's household (ecosystems).	(Georgescu-Roegen, 1971; Daly, 1996; Ring, 1997; Boulding, 1966; Ayres, 1999)
Industrial ecosystems	An industrial ecosystem encompasses an entire flow of goods and services from source to end consumption.	(Jelinski et al., 1992)
Industrial symbiosis	Represents a network of local collaborations where, partners offer, contribute and reuse resources to foster eco-innovation and shared value.	(Chertow and Ehrenfeld, 2012)
Cleaner production	Environmental management with the intention to minimise waste and emissions as a preventive initiative from businesses.	(Ghisellini et al., 2016; Lieder and Rashid, 2016; Stevenson and Evans, 2004)
Product service systems	Facilitate cooperative intake of both products and services, with the target of eco-friendly outcomes.	(Tukker, 2015)
Eco-efficiency	Founded on the notion of producing extra commodities and services while consuming a small number of resources, thus producing less waste and pollution.	(Huppes and Ishikawa, 2009; Haas et al., 2015; Welford, 1998)
Cradle-to-cradle design	Biomimetic approach based on the design of products with regenerative cycle of nature in which waste is reused.	(Braungart et al., 2007; McDonough and Braungart, 2002)
Biomimicry	Discipline of emulating nature-inspired models in human manufacturing and innovation to create sustainable designs.	(Benyus, 2002)
Resilience of social-ecological systems	Assessment of how environmental culture intermingles with other elements of a social-ecological structure.	(Folke, 2006; Crepin et al., 2012)
Performance economy	The objective of the performance economy is to decouple growth, as well as jobs and wealth creation from resource consumption.	(Stahel, 2010; EMAF, 2013)
Natural capitalism	Built on the premise that companies can be good for the environment, Natural Capitalism illustrates how prominent companies are performing a different category of industrialism that is more effective and lucrative, as at the same time protecting the earth and generating jobs.	(Hawken et al., 2008)
Zero-emission industrial systems	Zero Emissions represents a change from the conventional industrialized paradigm in which	(Pauli, 2010)

	wastes are believed the standard, to unified systems in which everything has its use.	
Degrowth	A concept that evaluates the global capitalist structure which chases growth at all expenses, affecting human development and environmental devastation. The degrowth movement promotes societies that focus on social and environmental well-being rather than corporate profits, over-manufacturing, and extra consumption.	(Fournier, 2008)

Circularity, however, is usually portrayed in terms of scientific and technological challenges; socio-political aspects related to the transition towards more sustainable futures, along with social justice implications are usually neglected (Pansera et al., 2021).

However, the academic literature, especially the one concerned with supply chain management aspects related to the transition towards a CE, seems to neglect the underlying contradiction between an ambitious CE and the pursuit of economic growth at all costs (Genovese and Pansera, 2021). As such, a reductionist interpretation of CE seems to be prevalent at the moment.

Although, a significant discussion regarding the foundation of the CE concept and its various framings is emerging, there is a scarcity of research about the future direction and potential developments, as pointed out by Genovese and Pansera (2021). Bauwens et al. (2020) presented an analysis of four plausible future CE scenarios based on the level of technology (Low-tech/High tech) compared with the level of centralisation of the power (Centralised/decentralised government).

In reference to the dimension of technology, High tech Innovations are related with complex technologies represented by high-level of Research and Development investment, and higher knowledge transfer expenses. On the other hand, Low Tech Innovations are technologies specified to be as easy as possible, described by low Research and Development investment and low knowledge allocation expenses. They do not need substantial R&D activities, and are designed to be as simple as possible, requiring minimal capital investments and mainly relying on behavioural changes (Bauwens et al., 2020). It is clarified those solutions concerned with different types of R-imperatives can be associated with both types of innovations; however, *refuse* solutions (aimed at decreasing overall consumption of resources) are mainly to be implemented at a behavioural level.

The question whether a CE should be centrally or decentrally implemented mirrors the debate about democratic and authoritarian environmentalism (Hysing, 2013). In term of the governance axes, centralised governance refers to the focus of political and economic control and duties into the hand of national governments and larger firms. Proponents of authoritarian and technocratic transitions highlight the length and short-termism of participatory processe (Shearman and Smith, 2007).

On the contrary, some authors argue in favour of decentralised environmental governance, expanding local autonomy through transfer of powers and responsibilities away from a national political and administrative body, within an economic system where decision-making is distributed among various economic agents rather than concentrated in a few central authorities (being them public or private).

Figure 2.3 shows the four proposed scenarios for circular futures, resulting from the combination of different options under the two dimensions.

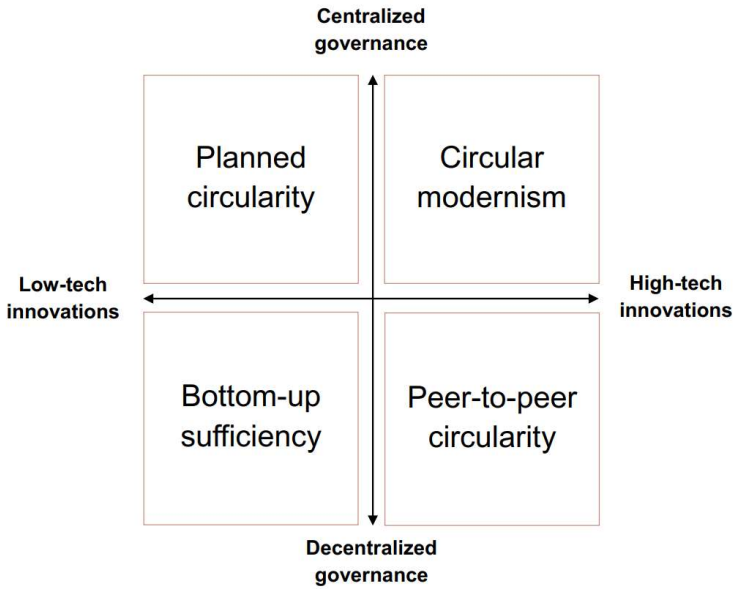


Figure 2.3. Four scenarios for circular futures (Bauwens et al, 2020)

The circular modernism scenario described by Bauwens et al. (2020) is the dominant conception of what currently constitutes the CE narrative. This scenario is reflective of an eco-modernist approach (Grunwald, 2018; Genovese and Pansera, 2021) in that technological innovation and market forces are viewed as being able to successfully decouple resource use and carbon emissions from human development. As such, this scenario is compatible with a concept of 'green growth' given that it does not question

the high consumption and growth-orientated focus of western capitalist (Smulders et al., 2014; Hickel and Kallis, 2020).

In a planned circularity scenario, the transition towards a CE is centrally piloted by the government, through command-and-control regulations (based on taxation, bans on certain materials, direct economic intervention, and mandatory right-to-repair initiatives) to force state-owned and private businesses to engage in CE-inspired strategies. The current Chinese way to the CE illustrates this approach; however, as Genovese and Pansera (2021) point out, this approach might not be free of eco-modernist assumptions.

In a bottom-up sufficiency scenario, small-scale low-tech CE solutions are implemented at the local level; production is mainly aimed at satisfying the immediate needs of the community, thus challenging surplus production and the principle of servicing export markets. The focus here is on a radical interpretation of CE, which is critical of the eco-efficiency agenda and is based on several tenets from the degrowth literature.

In a peer-to-peer circularity scenario, the focus is on technologies (such as blockchain, 3D printing and internet platforms) enabling collaborative consumption. This will allow to generate diverse decentralised organisation of economic activities. This scenario can be coupled with notions such as “sharing economies” (Belk, 2014; Frenken and Schor, 2017) or “collaborative consumption” (Bostman and Rogers, 2010). Given its reliance on servitisation, this scenario could be seen as related to the narratives of the “sharing economy”. Organisations and individuals shift their focus from products to access to resources, through arrangements that could also be beneficial from an ecological point of view thanks to higher asset utilisation.

The likelihood of these scenarios will depend on historical legacies, institutional and social pressures in different regions. As an example, the authors stated that in several Eastern Asian countries – such as China, Japan, Thailand, and Vietnam - where strong central governments have been part of their development, planned circularity will be more likely to arise. On the other hand, countries similar to Netherlands where systems are relying on liberal-democratic governments, along with the availability of high-tech innovation (Crielaard, 2015), the route for circular modernism is expected to be implemented. Bottom-up sufficiency according to the authors, might be more prone to

develop for instance in countries with similar characteristics to Southern European countries.

2.3. Motivation for implementing Circular SC principles

The opportunities could be substantial if the conditions for applying the CE are met in the many different contexts. The benefits to implement CE practices can be seen in a micro level such as implementation in firms or macro level for example implementations in a country or worldwide. Some examples of this motivations are the following ones.

At the micro level, the following motivations can be retrieved:

- *Brand Image.* The image of a company can be improved in the mind of the customer if the company starts to apply greener policies and letting the clients know about the company's concern for the environment. This is not only about green washing but about creating value and sense of awareness about the environment and green innovations. A "green image" could be a factor that informs a costumer's decision whether or not to patronise a specific provider (Vlachos et al., 2007).
- *New business models.* There are many companies today that have revolutionised the way they once used waste at the end of the supply chain. To mention just a few examples, the oil used by McDonalds is reused to create biodiesel (Vivaldini and Pires, 2016), while denim has been used to create insulation materials for the construction of houses. This opens up the possibility of creating different businesses and turning the waste into profit. Other examples of new uses for recycled materials include the case of the Lenzing company which is producing a cellulose fibre called Refibra, created using cotton scraps and wood (Egerton-Read and Iles, 2017); also the company Worn Again created a chemical process that allows used textiles to be turned back into new yarn, textiles and clothes (Worn Again, 2017).
- *Eco-efficiency*. Within the "ultra-efficient factory" project, Sheehan et al. (2016) suggested a model for addressing the challenge of ensuring infinite material circulation without losses in value or volume for value networks, where materials are currently destroyed or lost. Moreover, Das & Posinasetti

(2015) produced interesting research about environmental concerns in CE SC, suggesting the collection of end-of-life and other customer returned products through retailers by providing incentives for retailers and customers. However, Zink & Geyer (2017) along with Bimpizas-Pinis et al. (2021) have warned about the potentially controversial effect of policies and practices aimed at achieving eco-efficiency, with potential rebound effects which could hinder the achievement of sustainability goals and drive higher overall resource consumption.

At the macro level, the following motivations can be retrieved:

- *Environmental protection.* The most known reason to apply CE is because the continuous progress in industry as well as the increment of the population is causing vast amounts of pollution of the planet. If everything continues in this direction, there will be a lack of natural resources in the future and levels of contamination in the environment that will cause severe damage to human life. Therefore, it is essential to develop better strategies of action based on sustainable progress.
- *Sustainable Growth.* This requires keeping the total natural capital stock at or above the current level (Costanza & Daly, 1992). With more sustainable practices and effective planning the effective development of a nation becomes possible. Many countries are incorporating the CE model into their strategy to make sure that in the future the benefits will be not only environmental but also will include creation of new habits in their population that will multiply the benefits for the future and create sustainable development in many areas. Although "Zero waste" commitments have been made by a considerable number of provinces and nations, no waste too often becomes less waste in practice (Greyson 2007).
- *Examples from other countries.* By studying CE, it is possible to find new paths to apply in other countries; for example, Latin America is a region where this topic has not yet been well explored and can bring a lot of new possibilities because the mode of work and legislation are different from most of the studied countries. This region is considered rich in natural resources but with a scarcity of relevant policies and an inefficient linear model of resource consumption. (Waughra, 2013). This lack of policies is causing much loss of resources in the

region, and it is expected that most of the countries in Latin America and the Caribbean will be water scarce by 2025 (Circular Economy Club, n.d.)

2.3.1. Circular economy drivers and barriers

Although numerous benefits have been linked with the application of a circular economy, not sufficient findings have been presented that explore contemporary state-of-the-art drivers and barriers. The assessment of existing practices would enhance the circular economy's stance and would help recognise the current level of application.
Firstly, to acknowledge and comprehend the motivational element to employ the CE in a supply chain, the drivers will be assessed. Govindan and Hasanagic (2018) identified thirteen motivational drivers and classified them inductively based on their similarities given as a result five clusters (Table 2.3).
The authors also classified the drivers in internal and external. Internal refers to drivers that happen inside the organisation and are associated to resources in the company that stimulate the implementation of CE. External drivers include reasons or motivations beyond the corporation that encourage the application of CE practices. Within the 13 drivers identified, 9 were related to external environment while 4 related to internal.
The circular economy concept has been a topic for discussion in special in the European Union (EU). Although, reduced improvement has been achieved to this point concerning its application. A high number of academic research attribute this on a variety of technological aspects. Kirchherr et al., (2018) presented one of the first the first large-N-research on CE barriers in the EU (208 survey respondents, 47 expert interviews). Likewise, different researchers presented reports concerning barriers to implementing the CE, for instance, Preston (2012) mentioned that some of the barriers are related with: elevated costs; complicated global value chains; the intense use of resources infrastructure, deficient cooperation between companies, lack of user interest, and inadequate dissemination of innovation between emerging markets and industrialised nations.

Table 2.3. Circular Economy Drivers (Govindan and Hasanagic, 2018)

Drivers	Description (Clusters)	Drivers
1. Policy and economy	Comprising of mandatory regulations and policies of waste management and economy growth.	D1. Keep within laws and policies of waste management (External) D2. Economic growth by implementing CE in SC. (Internal)
2.Health	Refers to improving animal and public health by encouraging a cleaner environment. Likewise, health pays heavy prices for overconsumption of resources and energy.	D3. Public health pays heavy prices for overconsumption of resources and energy. (External) D4. Animal health pays heavy prices for overconsumption of resources and energy. (External)
3.Environmental protection	Contains climate change, quality of agriculture and the protection of renewable resources.	D5. Due to Climate change /Global up warming it is important that CE is implemented in SC. (External) D6. Modern agriculture rapidly improves productivity, but it pays a heavy price for overconsumption of resources and energy. (External) D7. Demand for renewable energy is increasing and therefore it is important to protect the environment. (External)
4.Society	Involves population growth, urbanisation, job creation potential and consumer awareness.	D8. To protect the future growth of population the implementation of CE is important. (External) D9. Urbanisation is increasing and the environment has been negatively affected by this increase. (External) D10. Job creation potential in supply chain (Internal) D11. Consumers' environmental awareness places pressure on industries to develop CE in SC. (External)
5.Product development	Describes the upgrade and efficiency of supplies and energy consumption to increasing the value of products.	D12. Improve the efficiency of materials and energy use in supply chain. (Internal) D13. Increase the value of products by increasing the quality. (Internal)

Govindan and Hasanagic (2018) provided a list in addition of 39 barriers and classified them in eight clusters with a similar inductive methodology as previously mentioned for the drivers. The eight clusters are mentioned in the following Table 2.4.

Table 2.4. Barrier clusters (Govindan and Hasanic, 2018)

Barriers cluster	Description
Governmental issues	Describes to the absence of standard procedures for performance evaluation, ineffective reprocessing strategies, legislation that are passed with lack of organisation and current regulations that do not sustain the CE.
Economic issues	Contains financial and economic barriers linked to the application of the CE in a SC.
Technological issues	Refers to the barriers involving technological shortcomings, handling ambiguity at the end-of-life stage for manufactured goods, managing merchandise value throughout the lifecycle of a product, project challenges to create or preserve durability.
Knowledge and skill issues	Comprises the deficiency of trustworthy data, absence of community consciousness, lack of abilities and the lack of consumer awareness about the importance of refurbished/recycled products
Management issues	Refers to the paucity of assistance from leading administration; other issues have a higher priority in enterprises and within the organisational structure.
Circular economy framework issues	Includes the circular economy framework issues; other solutions might be more favourable than the circular economy framework.
Culture and social issues	This cluster refers to the lack of enthusiasm towards enacting the circular economy, consumer perception towards reused products and the thrill of purchasing a new product.
Market issues	This cluster includes considerations such as externalities that prevent companies from taking advantage of refurbished products, regulations around ownership and no industry standards on refurbishment products.

From the 39 recognised barriers, 10 were linked to the external environment and 29 were associated to the internal environment.

Additional to the previous barriers, the implementation of the CE depends on collective efforts from Government, Businesses, and society together to achieve their successful development. The debate of CE has become dominant within European institutions (Genovese and Pansera, 2021). As previously explored CE agenda is usually judged as an apolitical belief, nevertheless some authors consider this conviction to be mistaken since the idea has become a hegemonic formulation within European Organisations developing particular agendas (Genovese and Pansera, 2021). According to the authors, the implementation of this idea also presents conflictive shortcomings that needs to be deemed. Their appraisal is concentrated on aspects such as the CE notion being a dominant discourse exploiting the desire for a capitalist economy used to grow and boost trade value. The second analysis is directed in the

direction of the pragmatic and collective viability of CE, along with the seeming no political agenda of CE when in reality reacts to several governmental plans.

2.4. Literature Review

2.4.1. Previous Circular Economy reviews

Numerous reviews of the literature have been presented to explain Circular Economy foundations (Govindana et al., 2015; Gupta, 2011; Lieder and Rashid, 2016; Souza, 2012; Tukker, 2015). For instance, Lieder and Rashid (2016) introduced a review of 158 articles from 1950 to 2015 discussing the status of academic research with regards to the CE concept. They suggested that the majority of studies completed in that period were predominantly related to waste generation, resource use, and environmental impact. This analysis revealed that the first studies about CE was not considering business and economic perspectives, however, in the last two decades business and management research about CE significantly increased (Ghisellini et al., 2016). The lack of information about the social advantages in the implementation of CE practices is a research gap that is consistently mentioned in all the review papers about circular economy.

2.5. Circular Economy Literature reviews

A systematic literature review allows understanding of the body of knowledge in a specific topic by using a structured procedure aimed at evaluating all the available studies. From a systematised perspective, the literature review could be described as a content analysis where quantitative and qualitative details are combined to assess the structure and the content criteria of the documents (Seuring & Müller., 2008). Mentzer and Kahn (1995) consider the literature review as “a major contribution to research progress”. A literature review provides a historical perspective of a subject and produces more solid bases for future research by providing the possibility of avoiding repetitions and discarding methods and topics already studied. Having detailed control of the information increases the possibility of finding gaps, and at the same time helps to decrease the bias in our research.

By considering all the benefits and the value of a well-structured literature review, a structured methodology will be adopted to review literature in the area of Circular

Economy applications in supply chains. Within this context, a circular supply chain refers to an SC that aims to reduce waste at every stage, including activities related to the reverse SC. In Figure 2.4, the four search stages through which the systematic literature review will advance are explained:

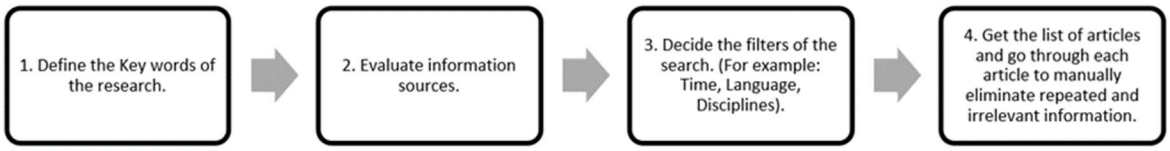


Figure 2.4: Search design. (Source: Gimenez and Tachizawa 2012).

The primary step in starting an appropriate analysis is to define the Keywords that will be used to guide the investigation (Gimenez and Tachizawa 2012). Circular Economy is a concept that has been propagating in the last two decades in the academic field; therefore, in order to get a proper understanding of current research topics in the field, a new review was undertaken with the intention to gather fresh material and identify research gaps more effectively.

In the last decades, many alternative wordings have been associated with Circular Economy practices, for instance, Closed-Loop, Cradle-to-Cradle, Industrial Symbiosis, Industrial Ecology; all these terms have been generally treated as synonyms. Preston (2012) described those alternative wordings in his article: 'A Global Redesign? Shaping the Circular Economy', but he referred to different terms, for example, Circular Economy is usually considered an approach, while the other terms (Closed-Loop, Cradle-to-Cradle, Industrial Symbiosis and Industrial Ecology) are treated more like procedures to explain CE.

A first issue that can be perceived is the deficiency of a precise definition for CE; diverse authors used the term to describe ecological practices, sustainability, recycling, or, in some cases, an entirely new philosophy where companies take into consideration numerous areas to accomplish better organisation between them and accomplish better practices. This systematic literature review will use keywords which were identified according to the objectives and research questions of the investigation. Objectives are focused on analysing the degree of penetration of Circular Economy concepts and practices along the supply chain in manufacturing industries; however, Circular Economy is a novel concept, and for this reason, not many studies might have

explicitly mentioned this term. Some alternative terminologies have been used in the past to describe Circular Economy practices. All these terms were included to have a bigger panorama of the actual investigation in this field. Lastly, to complete the search, the term 'Supply Chain' was included in order to provide developments with a specific application to this domain.

2.5.1. Material collection

Rowley and Slack (2004) consider it essential to evaluate information sources utilised in order to gather information for the literature review. In this context, many academic search engines are available online; however, Scopus currently represents the most significant international cross-disciplinary abstract and citation resource. For this reason, it was selected to present the initial extraction of the review materials, by employing the following sensible formula of keywords:

[("Circular economy" OR "Closed-Loop" OR "Cradle to Cradle" OR "Industrial ecology" OR "Industrial Symbiosis") AND "Supply chain"].

This search was specifically selected to attempt to examine the penetration of CE concepts in the Supply chain management literature; as such, this specific search can help to clarify the gaps in a stronger way. The keywords were searched in Scopus by giving the instruction to look for these in the title, abstract and body of the paper. For the next step, filters must be applied for all research to exclude publications that are not within the scope of the research. To accomplish this aim, the following filters were used to eliminate inappropriate information for the research; filters are related to several dimensions, such as time, language and sources:

i. Time was not considered applicable; as such, all the papers (independently of their year of publication until the date of this search) were chosen, to get a complete perspective of the evolution of the CE topic.
ii. Only documents published in the English language were collected, to get a more international perspective (although much information of this topic could be in Chinese, as this country was the pioneer in implementing CE solutions).
iii. Scopus allows us to find information from different document types; however, for this study, just Press articles were included and hence conference papers were excluded.

Given the mentioned keywords, syntax and the stated filters, Scopus retrieved a total of 788 articles. Once the list was obtained, the next step consisted of reading every article and going through the entire list article by article to select the ones that came within the target of the research. The objective is to understand the literature to answer the research questions about the current theoretical status in order to find the gaps.

Articles not focusing on CE implementation in supply chains as their main topic were deleted. Figure 2.5 is presented to summarise the inclusion and exclusion criteria of the research and clearly illustrate all the steps previously explained.

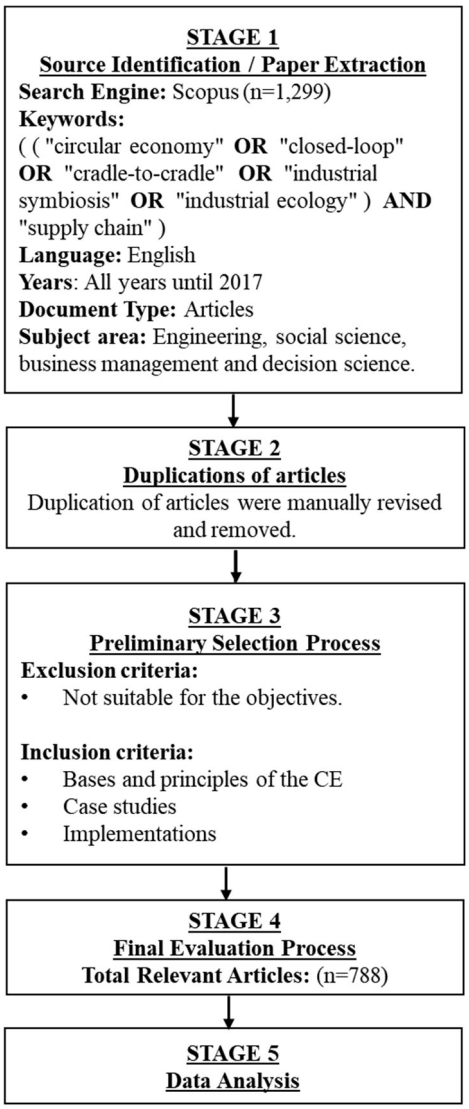


Figure 2.5: Search design. Exclusion and Inclusion Criteria

2.5.2. Material Evaluation

In order to get a stronger idea of the leading research previously conducted in the field of Circular Economy, it is essential to analytically review published papers and to understand and classify them according to the topic they deal with and the utilised methodology. This systematic process can be beneficial for finding gaps in the current body of literature research and propose new paths to explore. Additionally, in order to have a better panorama of the current status, it was necessary to make a classification of the articles and divide the different papers into different categories. Each category will be explained in the following subsections:

2.5.3. Descriptive analysis

Since many authors have different definitions and uses for the term Circular Economy, classification of the different papers makes it possible to obtain the main perspectives from the different authors and acquire a better idea of the fundamental ideas surrounding the term.

2.5.3.1. Classification by concept

In order to have a better understanding of the field of study, classification of the articles according to different sub-fields was performed. The following classification is based on the different terminologies utilised to deal with CE concepts, for example, papers are classified in the following categories: Circular Economy, Closed-Loop, Cradle-to-Cradle, Industrial Ecology, Industrial Symbiosis. This helps to understand which aspects have received more attention. In the following, a synthetic description of all identified sub-areas is given:

- *Cradle-to-Cradle.* Articles included in this category all contain the key words "Cradle-to-Cradle" either in the title or in the abstract. The term Cradle-to-Cradle refers more to a form of regenerative design and is about the design of the products. Such concepts were first introduced in Braungart and McDonough's (2002) work. This category was the least popular in the classification, with only four from the 788 articles referring to it; such papers mainly deal with applications in the following sectors: Food & Beverage Industry (Pelletier and Tyedmers 2010), Metal and Mining Industry (Gao et

al., 2009) and generic Manufacturing Industry (Kumar & Putnam 2008), (Matos and Hall 2007).

- *Industrial Symbiosis.* Articles containing the words: "Industrial Symbiosis" either in the title or in the abstract are included in this category. According to WRAP (2017), Industrial Symbiosis refers to an association between companies or industrial centres in which collaborations are developed in terms of exchange of by-products. In essence, waste coming from one company might be utilised by other businesses as a raw material in their production process. Papers from this category focus on the development of collaboration between companies. The search generated thirteen articles, providing applications of these models to different sectors: Oil and Gas (Gonela et al., 2015); Textile (Tseng and Bui., 2017); Online Services (Halstenberg et al., 2017); Multisector (Ruiz Puente et al., 2015; Haskins, 2007) and generic Manufacturing Industries (Mulrow et al., 2017; Mattila et al., 2010; Bansal and McKnight, 2009; Yuan and Shi, 2009).
- *Circular Economy.* This category refers to all the articles including the words "Circular Economy" either in the title or in the abstract. The term CE is considered to deal with a holistic transformation of consumption and production patterns, involving innovative business models. CE is presented as the most recent approach. Thirty papers were related to this category, mainly dealing with the following industrial sectors: Automotive industry (Jiliang et al. 2013); Construction Industry (Nasir et al., 2017; Densley-Tingley et al., 2017); Electronics Industry (Fernandez et al., 2017; O'Connor et al., 2016; Park et al., 2010); Food Industry (Noya et al., 2017; Borrello et al., 2017; Vivaldini and Pires., 2016; Strazza et al., 2015); Industrial parks (Zeng et al., 2017); Metals and Mining Industry (Niero and Olsen., 2016; Golev and Corder., 2015); Multisector (Di Maio et al., 2017; Genovese et al., 2017); Textile (Fischer and Pascucci., 2017); Waste Industry (Winkler and Kaluza., 2006); and finally, Manufacturing Industry (Sprecher et al., 2017; Despeisse et al., 2017; Jensen and Remmen., 2017; Gilbert et al., 2017; Salemdeeb et al., 2016; Dalhammar, 2016; Low et al., 2016; Webster, 2013; Zhu et al., 2011; Zhu et al., 2010; Zhu, 2006).
- *Industrial Ecology.* This category refers to all the articles with the words "Industrial Ecology" either in the title or in the abstract; 55 papers out of 788

were assigned to this category. The term Industrial Ecology is another way to refer to sustainable practices in industry, where the main focus is on the investigation of flows of resources and materials across and through industrial organisations. Papers falling into this category represent several industrial applications, mainly related to the following areas: Automotive Industry (Hawkins et al., 2013; Early et al., 2009; Crotty and Smith, 2006; Backhouse et al., 2004); Construction Industry (Irland, 2007); Electronic Industry (Linton et al., 2002; Vendries-Algarin et al., 2015), Food and Beverage Industry (Gold et al., 2017; Courtonne et al., 2016; Yu et al., 2016; Ren et al., 2015; Sayogo et al., 2015; Ziegler et al., 2013; Ziegler et al., 2011; Andrews et al., 2009); Household Waste (Lenzen and Peters., 2009); Information Technologies Industry (Scavarda et al., 2009); Metals and Mining Industry (Ali., 2017; Corder et al., 2015), (Dahlström and Ekins., 2007), (Geyer et al., 2007); Multisector (Ramaswami et al., 2012), (Seuring., 2004); Oil and Gas Sector (Chavez et al., 2012), (Iriarte et al., 2012), (Halog., 2009); Textile Industry (Seuring., 2004), (Chouinard and Brown., 1997), Transportation and Logistics Sector (Clark and Chester., 2017); Waste Industry (Fry et al., 2016); and Manufacturing Industry (Gemechu et al., 2016), (Kwon et al., 2015), (Pelton and Smith., 2015), (MacLachlan., 2013), (Gerber et al., 2013), (Lifset and Eckelman., 2013), (Molecular Diversity Preservation International. et al. 2009), (Kogg and Mont., 2012), (Cadarso et al., 2012), (Hawkins and Matthews., 2009), (Perl and Vorbach., 2009), (Davis et al., 2009).

- *Closed-Loop systems.* This category refers to all the articles explicitly mentioning the term "Closed-Loop" either in the title or in the abstract. Govindan et al. (2015) define Closed-Loop Systems (and, in turn, supply chains) as "systems aimed at maximising value creation over the entire life cycle of a product with the dynamic recovery of value from different types and volumes of returns over time". Most of the authors and researchers used this term to refer to Circular practices in the later years before the term Circular Economy appeared. Closed-Loop systems strive for recycling of materials indefinitely without degradation of properties. This category had the largest number of papers (686 out of from 788 articles). Applications for several industries have been developed (related authors are not reported here for the sake of brevity). For this category, the sectors involved were the following:

Third-Party Logistics (3PL) Industry, Aerospace, Aquaculture, Automotive, Construction Industry, E-Commerce, Electronics, Energy, Finance and Banking, Food and Beverage, Healthcare Industry, Information Technologies, Manufacturing, Metals and Mining, Military Sector, Multisector, Oil and Gas, Services, Textile, Transportation and Logistics, among others.

Figure 2.6 shows the distribution of terms after the analysis and classification of each article. It is essential to note that "Closed-Loop" is by far the most commonly used term for referring to practices related to Circular Economy. The majority of articles contained in this category involve case studies in which new practices and procedures are being implemented in different supply chains related to Closed-Loop Systems, such as optimisations, new technologies, new procedures or innovative implementations, (Choong et al., 2016; Tsiliyannis, 2016; Soleimani et al., 2016; Cannella et al., 2016; Cobb, 2016; Accorsi et al., 2016; Krikke et al., 2010; Mcareavey. 2007; Johannsdottir, 2014; Khatamia et al., 2015).

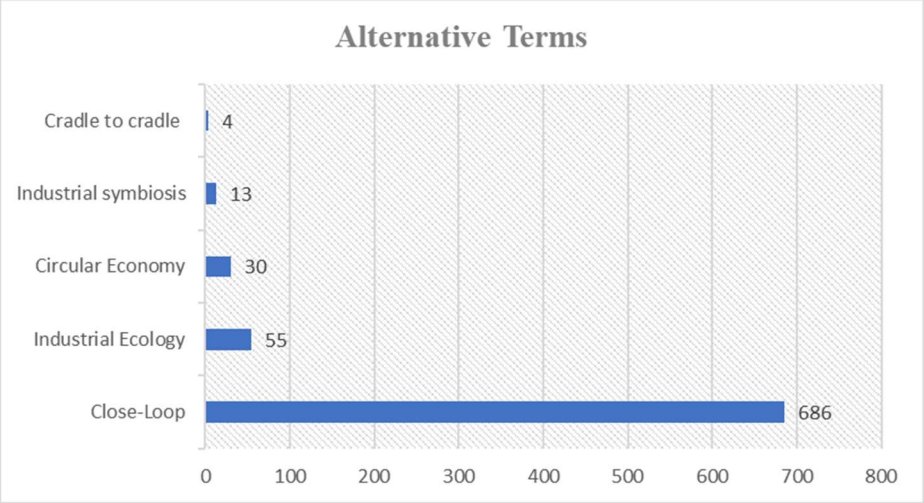


Figure 2.6: Classification of Alternative terms

Also, generic papers that could not be fitted into a specific sector could be retrieved in this category. For example, Fahimnia et al., (2013) conducted a case study investigation of the impact of carbon pricing on a closed-loop supply chain in an Australian company. Also, theoretical papers such as that by Aydin et al. (2016) were retrieved; specifically, this study studied the coordination of partners in a manufacturing supply chain in order to determine the product return rate for remanufacturing activities, while Zu-Jun et al. (2016) investigated interactions among the different parties in a closed-loop supply.

As a conclusion to this section, it can be observed that CE discourse has been penetrating into the Supply Chain Management literature mainly through the Closed-Loop idea. Although the number of studies is very significant, this might suggest that most of these papers look at the "micro" level (i.e., implementation of CE strategies in one supply chain, disregarding meso and macro levels), which in turn might suggest a lack of studies on the economic feasibility of these initiatives on a larger scale.

2.5.3.2. Classification by Year of Publication

Figure 2.7 presents a clear representation of the historical evolution of the Circular Economy in academic research. In 1997 an American clothing company called Patagonia presented a study with the primary interest of the industry becoming more sustainable in its practices, starting by thinking about better utilisation of the materials for its products (Chouinard and Brown, 1997). Twenty years later the number of papers and publications has considerably increased with an annual average in the last three years of more than a hundred papers.

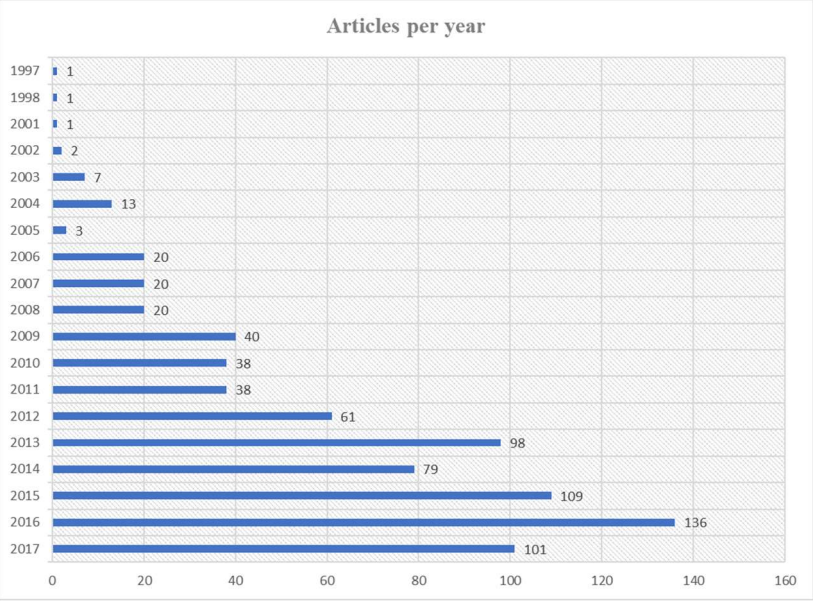


Figure 2.7: Classification of the Articles by Year

2.5.3.3. Classification by Source

The total number of articles analysed was 788. Table 2.5 presents the number of articles per journal based on the classification of different themes. Journals with less than five publications were considered in the same category as "Other Journals",

giving a result of 362 papers, almost half of the total publications, which shows the importance accorded to Sustainability in Journals of all backgrounds.

Table 2.5: Classification of the Articles by Journal

	Journal	Number of Articles
1	International Journal of Production Economics	57
2	Journal of Cleaner Production	49
3	International Journal of Production Research	47
4	Journal of Industrial Ecology	34
5	European Journal of Operational Research	28
6	Computers and Industrial Engineering	21
7	Applied Mathematical Modelling	16
8	International Journal of Advance Manufacturing Technology	16
9	Journal of Manufacturing Systems	16
10	Transportation Research	16
11	Production and Operations Management	15
12	Sustainability (Switzerland)	15
13	Resources, Conservation and Recycling	14
14	Mathematical Problems in Engineering	12
15	Decision Sciences	8
16	International Journal of Logistics and Systems and Management	8
17	Omega (United Kingdom)	8
18	Computers and Operation Research	7
19	Discrete Dynamics in Nature and Society	7
20	International Journal of Sustainable Engineering	7
21	Progress in Industrial Ecology	7
22	Expert Systems with Applications	6
23	Journal of the Operational Research Society	6
24	Supply Chain Management	6
25	Other Journals (less than 5 publications)	362
	Total	**788**

The journal in this list with the largest number of articles is the International Journal of Production Economics, with 57 Articles. The top five journals, all dedicated to the study of new sustainable approaches and developing innovative proposals for the different industries, are the International Journal of Production Economics (IJPE), Journal of Cleaner Production (JCP), International Journal of Production Research (IJPR), Journal of Industrial Ecology (JIE) and European Journal of Operational Research (EJOR). The journals all have their own specialist areas; for example, some have more topics related to sustainability; others are focused on the business perspective, finance, management, or a more methodological perspective. For

instance, IJPR and IJPE are journals focused on treating the interface between Engineering and Management, whereas Industrial Ecology and Cleaner Production are journals explicitly focused on Sustainable Production and Consumption Mechanisms, and it would therefore be expected that many papers could be found here. That we observed the penetration of CE concepts into mainstream journals at the interface between Industrial Engineering and Operations Management, such as IJPE and IJPR, testifies that these communities are now paying attention to these topics. The other relevant phenomenon is the presence of EJOR, a more methodological journal (Operational Research). This demonstrates that there is also a methodological interest in problems arising in Circular Supply Chains. There is a lack of policy papers, with most of these journals being decidedly operational in nature. It was further noticed that the journals present a lot of case study research.

2.5.3.4. Classification by subject analysed.

The classification of articles by subject refers to the type of theme that was covered in the papers analysed. The classification of the articles was done manually, in which topics related to the supply chain or administrative issues were added in an inductive way. This process enabled creation of a list of thirteen topics which were designated as categories for the purpose of this research. This categorisation of articles according to the topics made it possible to identify the most studied subject areas, as well as less explored ones that could represent research gaps. **Error! Reference source not found.** illustrates the main topics studied in most of the articles that indicate the current trends of academia and where the main gaps are in terms of suggesting new ways of action.

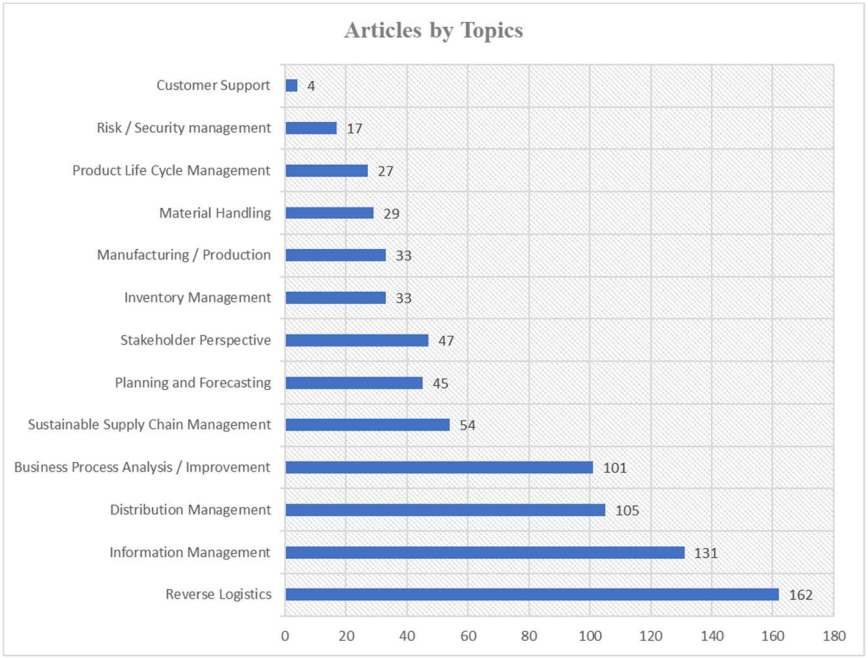


Figure 2.8. Classification of the Articles by topics

This classification, carried out in an inductive way, resulted in thirteen different categories which will be described below to explain the logic behind inclusion of articles in each category and the criteria for inclusion and exclusion.

- *Customer Support:* Includes all the articles that deal with any subject related with customer-facing segments of the supply chain, mainly in relation to remanufactured and repaired products, such as customer services, customer behaviours, claims, consumer perceptions; all of these interactions with the customers are based on examples in circular supply chains. Some examples for the mentioned category are the following: Warranty claims (Era et al. n.d.); consumers' behavioural attitudes towards remanufactured products, as dealt with in a case study from Malaysia (Jena and Sarmah, 2015); value of the remanufactured products as perceived by the consumers (Li, Wu and Deng, 2015); consumer perceptions of remanufactured consumer products in closed-loop supply chains (Abbey et al., 2015).
- *Risk / Security Management:* All articles that evaluate the financial risks and the courses of action to minimise negative effects or avoid financial risk in a supply chain. For example, the following articles: Supply risk sharing in a closed-loop supply chain (He, 2017); Perceived Quality Risk in Pricing Remanufactured Products (Abbey et al., 2017); Small and medium-sized enterprises closed-loop supply chain finance risk (Zhang 2016); Integrating

financial risk measures into the design and planning of CL SC (Cardoso et al. 2016); Incorporating risk measures in CL SC network design (Soleimani et al. 2014); Risk assessment to manage Global SC (Kumar et al. 2014).

- *Product Life Cycle Management:* All articles related with the management of the entire lifecycle of the products. The contribution of these articles is that they aid understanding of the different methodologies used to conduct LCAs in Circular Supply Chains as well as clarifying diverse themes through such as contrasting the life cycle impacts of "circular" products and "linear" ones. For example, The design of closed-loop networks for product life cycle management: economic, environmental and geography considerations (Accorsi et al., 2015); Life cycle assessment of advanced industrial wastewater treatment within an urban environment (O'Connor, Garnier and Batchelor, 2013); A proposed mathematical model for closed-loop network configuration based on product life cycle (Amin and Zhang, 2012); The effect of environmental parameters on product recovery (Georgiadis and Vlachos. 2004).
- *Material Handling and Raw Materials:* For this category, all the articles related with protection, storage and control of materials and raw materials in a Supply Chain were considered. Examples of these articles include the following: Recycling of gold from electronics (Hagelüken & Corti 2010); a case study to consider Production Planning and the application of reverse logistics to the use of gold in the jewellery jndustry (Yazıcı et al. 2016).
- *Manufacturing / Production:* For this category, all the articles are related to the exact moment when the raw materials are transformed into a final product, in other words all processes related to production or manufacturing. For instance, articles within this category include: optimal production-inventory plan (Salviano & Andres 2017); Control of Production-Inventory Systems (Ignaciuk 2015); articles related with the production capacity in the supply chain (Ouardighi & Erickson 2015); production/pricing policies in a closed-loop system (Mahmoudzadeh et al. 2013); evaluation of the production system (Li 2013).
- *Inventory management:* All the articles related with Inventory (Assets) and the movement of goods from manufacturers to warehouses and from those facilities to the point of sale. For instance, Ahmadzadeh & Vahdani (2017)

developed a location-inventory-pricing model in a Supply Chain. Iassinovskaia et al. (2017) focused on inventory-routing problems with the specific issue of returnable transport items; Dev et al. (2017) dealt with strategic design for inventory and production planning; Saxena et al. (2016) created an integrated production inventory model for repairable items with uncertain lead time; Inventory decision-making models (Yuan et al. 2015).

- *Stakeholder Perspective:* Articles in this category are mainly concerned with the identification and understanding of the objectives of the different participants in the supply chain. For example, Wang et al. (2015) discuss models of collaboration between remanufacturer and manufacturer in a Supply Chain; Lind et al. (2014) explore in a case study how the inter-organisational relationships in a supply chain are managed by remanufacturers of automotive components; Morana & Seuring (2011) describe the link between different levels (Society, chain and actor) in a closed-loop supply chain and clarify the challenges; Kumar & Malegeant (2006) illustrate how strategic alliances in a closed-loop supply chain work based on a case study taking as an example the relationship between manufacturer and an eco-non-profit organisation.
- *Planning and Forecasting:* This term is related with articles aimed at determining and detailing financial goals to anticipate the future business. This category explains the importance of using statistical information for making decisions in the long and short term in an organisation. For instance, Zeballos et al. (2014) and Steinke and Fischer (2016) deal with production planning in closed-loop supply chains, specifically the adaptation of classical models for aggregate forecasting. Kumar et al. (2014) focused on forecasting methodologies for return products in the reverse element of a closed-loop supply chain. Research by Yamzon et al. (2016) explains the factors that need to be taken into account in making better planning decisions when electronics are remanufactured, based on the quality of the recovered products; Kumar et al. (2014) deal with the forecast of return products considering the design and planning of the reverse supply chain; Krapp et al. (2013) explain how to improve a closed-loop supply chain by using forecast and financial information.
- *Sustainable Supply Chain Management:* This category involves articles integrating environmental and financial practices by considering the complete

SC lifecycle. Among these articles and topics are the following: Sgarbossa and Russo (2017) explain in a case study of the food industry a model to develop sustainable supply chain practices; Pandey et al. (2016) propose a system to develop in-door composting that allows food and waste to be turned into soil free of infectious agents; Galve et al. (2016) conducted case study analysis in Spain of the environmental impact of supply chain management, using a 2400 L waste disposal container in different disposal scenarios; Hu et al. (2014), based on the characteristics of fast fashion products, examined how to build sustainable rent-based closed-loop supply chains.

- *Business Process Analysis / Improvement:* This category included all articles related with recognition of business needs and establishing solutions to business problems. Improvements for processes, organisational structure change or strategic planning were also considered. Among the topics in this category are the following examples: The analysis and improvement of a system in a close supply chain where activities such as manufacturing, remanufacturing, transportation, warehousing should be taken into consideration (Turki et al., 2017); Shi et al. (2017) established a model to improve corporate sustainability by using an analytical network process method; Ramezani and Kimiagari (2016) examined financial and operational decisions in a company using different scenarios to optimise the closed-loop supply chain; Huaibo (2016) explained a model for the optimisation of the Closed-Loop supply chain of green fast consumer goods; Chung et al. (2013) analysed the energy consumption and life cycle cost of different products to recognise the optimal modular structure in a closed-loop supply chain.
- *Distribution Management:* All the activities related with the movement of goods from one place to a destination, which might include diverse activities and processes such as packaging, inventory, warehousing, supply chain and logistics. Articles talking about this topic include: Kang, Wang and Ma (2017) present a model for the optimisation of collection and distribution centre locations for the Chinese Beer Industry; Radhi and Zhang (2016) deal with finding the optimal matching of remanufacturing supply network with return quality decision; Ghadge et al. (2016) try to find the most favourable facility locations in a distribution network; Kalaitzidou et al. (2015) outline a mathematical model to improve a closed-loop supply chain network; Ashayeri

et al. (2015) examine the redesign of a warranty distribution network in terms of reverse logistics.

- *Information Management:* Refers to all the activities related with the collection of information from different sources and the distribution of that information. This concept deals with data to build the organisational strategy. Examples of articles included in this category are: De Giovanni (2017) explains how to use incentives to coordinate a closed-loop supply chain with asymmetric information; Han et al. (2015) analyse pricing decisions in a closed-loop supply chain; additionally, Wei et al. (2015) explain the use of symmetric and asymmetric information to take decisions on price and collection in a closed-loop supply chain; Zhang et al. (2014) explain how to plan contracts using asymmetric information; Toyasaki et al. (2013) discuss the importance of information systems in the management of recovered products.
- *Reverse Logistic:* Refers to activities associated with the reuse of products and materials from the point of consumption to the point of origin by trying to recover the value or disposal waste. Examples include: Heydari, Govindan and Jafari (2017) deal with the coordination of the reverse supply chain when the government is involved through offering different incentives; Shaharudin et al. (2017) consider the management of the return of products, linking different activities in the supply chain, as well as analysing management effectiveness; Liu et al. (2017) investigate supply chain choices based on the price and the reverse channel; Pedram et al. (2017) developed a mathematical model to integrate both a forward and reverse supply chain in a case study of tyres; Ivanov et al. (2017) compare the performance and the influence of diverse recovery policies on the reverse logistic process for the flow of materials.

2.5.3.5. Classification by Sector

It is important to understand the trends around sectors discussed in past literature on the circular supply chain and this classification makes it possible to understand the trends in different sectors and also to avoid saturation in some sectors while identifying other sectors where there is a lack of research. Figure 2.9 presents the classification of articles across the different sectors.

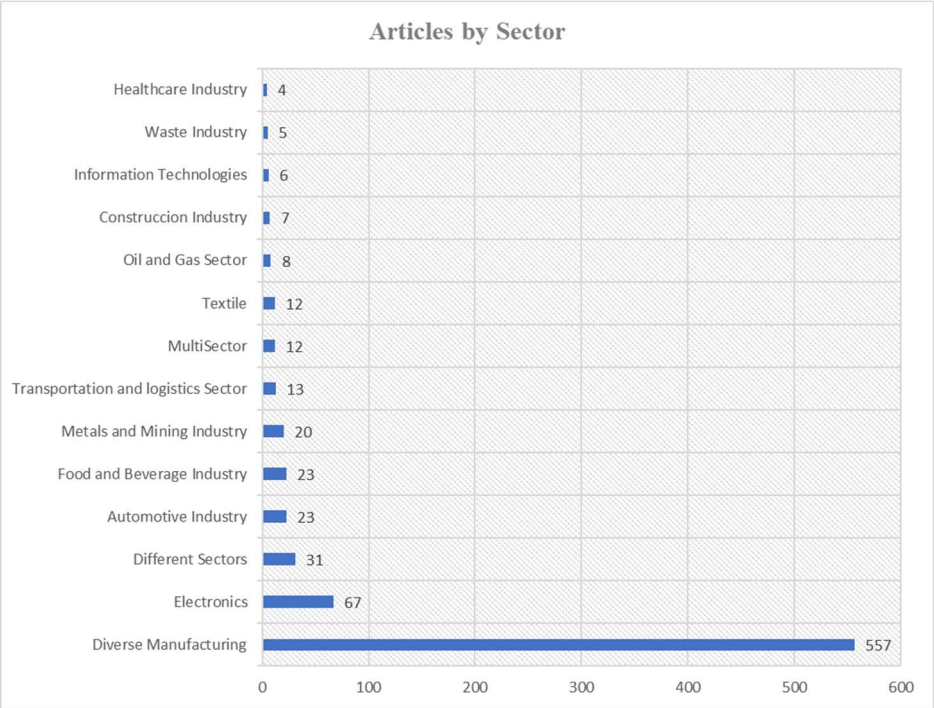


Figure 2.9: Classification of the Articles by Sector

Each of the above categories will now be considered in detail to explain the criteria used for the classification:

- *Diverse Manufacturing:* The manufacturing category includes all the papers focusing on the fabrication or preparation of products from raw materials and commodities. This category includes 557 papers due to the greater interest in studying the manufacturing process itself rather than any specific sector. There were few articles explaining how Circular Economy might be used as a tool for development at the national level. The majority of the articles found in this category were based on China, with Zhu et al. (2011), for example, discussing Chinese manufacturing industry. Other authors dealt with diverse themes such as: Retail services and pricing decisions (Zhang et al. 2015); environmental collaboration in a closed-loop supply chain (De Giovanni 2014); and Demirel et al.'s (2014) discussion of a genetic algorithm for optimising a closed-loop supply chain network.
- *Electronic Products:* In this category, all the papers refer to the topic of electronic waste. Chen et al. (2016), for example, propose a process for remanufacturing waste electrical and electronic equipment by exporting parts of the remanufactured products to less developed countries. Additionally, an article about the lifecycle of a consumer electronics product investigated the

complex interactions between different supply chain members and their decisions (Bhattacharjee and Cruz 2015). Diverse themes relating to this sector can also be found in other articles (Wang et al. 2015; Fleischmann et al. 2003; Gupta and Evans 2009).

- *Other Sectors:* This category covers all the other sectors in the classification for which four or less papers were found. Such sectors included: Tyres Industry (Amin et al. 2017), (Pedram et al., 2017; Subulan et al., 2015), Aerospace Industry (Hashemi et al., 2014); Military Sector (Wilhite et al., 2014), among others.
- *Automotive Industry:* All the articles related to the automotive industry were classified in this category. Olugu et al. (2010) dealt in their article with performance measurement in the automotive industry, whereas Kumar and Yamaoka (2007) focused more specifically on the relationships between reduce, reuse and disposal in the Japanese car market.
- *Food & Beverage Industry:* All the articles dealing with Food & Beverage as a topic were placed in this category. This category includes an article explaining problems such as valourisation of food waste (Mirabella et al., 2014) and Pagotto and Halog's (2015) evaluation of agri-food activity in different subsectors in Australia.
- *Metals and Mining Industry:* Articles related with the extraction of metals and minerals. Many articles talk about specific minerals such as Diamonds (Ali 2017), metals such as Aluminium (Niero and Olsen 2016) and Gold (Zohal and Soleimani 2016), while other authors talk about the recycling sector in general as in the case of Golev and Corder (2015).
- *Transportation and Logistic Sector:* In this category, all the articles considering transportation as the main topic were included, for example, some of the articles talked about routing problems, for example, for returnable transport items (Mehmet, 2016), while Zhalechian et al. (2015) discussed the sustainable design of a location, routing and inventory supply chain network.
- *Multisector:* This category includes all the articles covering two or more different sectors; as an example, Genovese et al. (2017) conducted analysis of two different industries: Food and Chemicals.
- *Textile Industry:* Regarding the Textile Industry, there were only three articles with case studies related to garments and textiles. One study focuses on the

links between different levels of the industry (Morana and Seuring, 2011), other deals with reverse logistics in a specific case study in India (O'Reilly and Kumar, 2016), whereas Miemczyk et al. (2016) explain how strategic resources influence different sectors to develop a thriving closed-loop supply chain design.

- *Oil and Gas Sector:* This category includes all articles related to the petroleum industry and its activities of exploration, extraction or refining. This category usually refers to oil, gas and gasoline. As examples, Paydar et al. (2017) used a mathematical model to develop an engine oil closed-loop supply chain design, while Gonela et al. (2015) proposed a mathematical model to design an optimal and sustainable supply chain of bioethanol.
- *Construction Industry:* Includes all articles related to the construction industry in terms of different activities such as construction, alteration, and/or repair. Articles in this category include a comparison by Nasir et al. (2017) between linear and circular economy, based on a case study in the construction industry, to demonstrate the benefits of using more sustainable practices; in addition, Yi et al. (2016) proposed a model for collection decisions for construction machinery.
- *Information Technologies:* These are articles related to Information Technology (computers and telecommunications) industries for the storing, collecting and sending of information. Some articles in this category deal with the telecom equipment industry (Guimarães et al., 2013), with Scavarda et al. (2009) analysing the evolution of RFID use in China and the current status.
- *Waste Industry:* All these articles discuss waste management, from its creation to its final disposal. Fry et al. (2016) provide an analysis of Waste Supply in diverse regions of Australia using statistical data; Winkler & Kaluza (2006) examine the administration of waste to find an optimal implementation of sustainable principles of the circular supply chain.
- *Healthcare Industry:* All these articles relate to activities involved in the treatment of patients, rehabilitation, or preventive care in medical industries. Articles within this category include research by Hasani et al. (2015) that proposed a model to improve the efficiency of global supply chains and increase profits after taxes, based on a case study of the supply chain for medical devices; Kumar and Rahman (2014) studied the use of RFID in the

healthcare industry to improve sustainable practices and reduce environmental risks.

This classification of the different sectors will help to understand the actual panorama and the current preferences regarding specific topics for research. Most of the articles relate to the process of product manufacturing and the transformation of raw materials into commodities rather than focusing on a specific sector such as the Textile, Food, Metals or Fashion industry.

It is worthwhile at this point to explore one sector in depth, since these sectors are also considered important areas for development of CE models.

2.5.3.6. Classification per Level of Implementation

Practices related to the Circular Economy can be implemented at different levels, namely micro, meso and macro levels (Geng and Doberstein n.d.).

Micro refers to specific cases based on individual factors through a model of consumption and production (single Company/ supply chain). At the Meso level, mutually beneficial interactions take place between many firms or industries, for example, raw materials may be acquired from a specific industry that can be reused in a different one; this term is commonly applied to Industrial Parks (Industrial Symbiosis.) Meso level interactions have been researched, for example, in China (Zeng et al., 2017), Spain (Ruiz Puente et al., 2015) and Australia (MacLachlan, 2013), where Industrial Parks were studied to understand the Industrial Symbiosis between companies located in a specific region.

Finally, Macro refers to application at the region or country level that is based on the interests of the society (Sauvé et al. 2016). Macro studies have been conducted, for example, in Spain (Noya et al. 2017), Brazil (Ghisolfi et al., 2017), USA Clark & Chester 2017). Figure 2.10 presents the classification of all the articles by level of implementation.

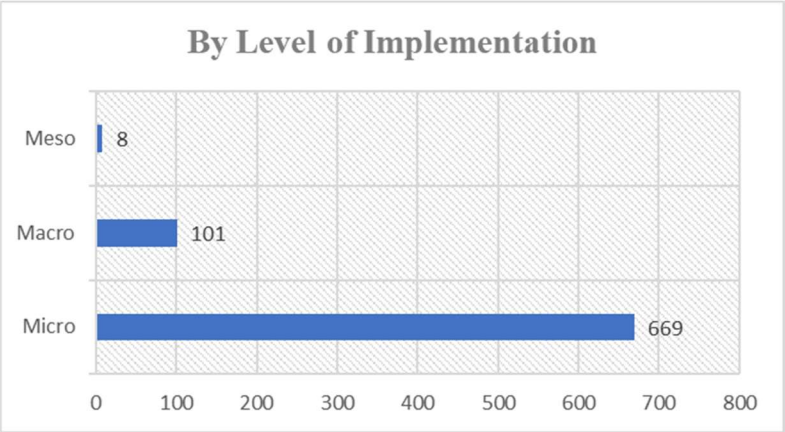


Figure 2.10: Classification of the Articles by Level of Implementation

This classification helps to understand the distribution of levels of application and the purpose of a clear majority of the research. Most of the articles were Micro implementations, which might be linked to the fact that study regions (Macro) or industrial parks (Meso) are fewer in quantity and require a more complex approach to planning the research.

2.5.3.7. Classification per Research Methods

It is important to understand the principal methodological tools used by the researchers to accomplish their goals in the different investigations. Different research methods can be used to collect appropriate data according to the research aim. If the aim is to understand the research problem in a more numerical way then Quantitative methods may be considered most suitable, whereas if the aim of the research is to understand participants' perceptions or opinions then a Qualitative method may be the correct one, and in other cases, where a more comprehensive picture is required, a mixed method approach may be preferred.

Quantitative methods can refer to statistical measurements, mathematical, or numerical analysis of data collected. Meanwhile, Qualitative data is collected from thoughts and opinions, usually using unstructured or semi-structured techniques such as focus groups, interviews, or observations. A Mixed Methods approach involves using both Quantitative and Qualitative methods.

Figure 2.11 shows that most of the research used numerical evidence for measuring the results, by means of different Quantitative methods.

A suggestion for future research would be to consider Qualitative and Mixed Methods to gain a wider range of perspectives and obtain more beliefs, values, feelings, and motivations in the industry that may help the implementation of more sustainable practices.

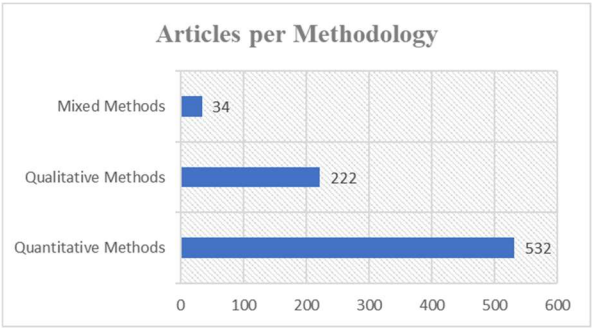


Figure 2.11: Classification of the Articles per Methodology

2.5.3.8. Classification per Principle of the CE

Anther classification used to understand from the main perspectives of the studied papers what actions are being implemented is based on the six principles of the CE. In Figure 2.12 it can be observed that the majority of papers studied the redesign stage of the SC (554 from 788 papers). As a suggestion for future research, studies could focus on the reduce, reuse, recycle, remanufacture, redesign, and recover stages.

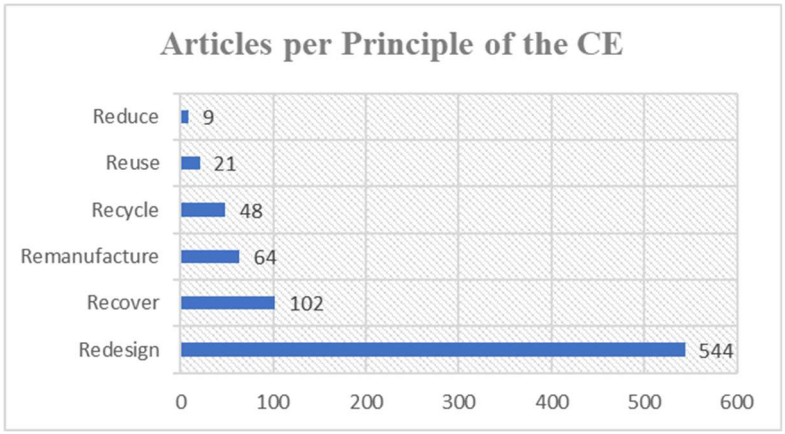


Figure 2.12: Classification of the Articles per Principle of the CE

Figure 2.12 lists the main principles of Circular Economy: reduce, reuse, recycle, remanufacture, recover and redesign (6 Rs). The following are brief explanations of these principles:

- *Reduce.* Concerns all the decisions that help to decrease the quantity of waste. Manzouri et al. (2014) deal with how to improve and reduce waste in halal companies.
- *Reuse.* Refers to how to extend as much as possible the life of products. Kim and Glock (2014) analyse the use of RFID in reusable containers to enhance their performance.
- *Recycle.* Involves the rescue of raw materials to use them again to manufacture products. Ran et al. (2016) review the process of recycling waste glass bottles to improve the profits of manufacturers and retailers.
- *Remanufacture.* Refers to the process of restoring/refurbishing previously manufactured products and reconditioning them for a new use. Subramanian and Subramanyam (2012) examine the principal points to consider in trading remanufactured products.
- *Recover.* Concerns returning a product to a previous condition or normal state. Grant and Banomyong (2010) considered how to deal with product recovery management in a case study on cameras.
- *Redesign.* Relates to making improvements in the process by doing it differently. Khatami, Mahootchi and Farahani (2015) studied the restructuring of a closed-loop supply chain network with uncertainties.

2.5.3.9. Classification per stage in the SC

The final classification in this systematic literature review is based on the SCOR model (Figure 2.13) which is a management model created by the Supply Chain Council and is a tool that helps to explain processes in a supply chain as well as to establish the basis to improve those processes.

Figure 2.13 shows how the articles are distributed across the various stages of the supply chain. These stages are listed below. Since most of the papers are explaining new procedures, it was to be expected that many of them would be based on the planning stage.

- *Planning.* Refers to future applications or innovations in the industry (492 from 788 papers).
- *Make.* The stage at which the products are being manufactured.
- *Source.* Concerns the sources of raw materials to produce the products.

- *Enable.* Refers to processes that include management of the business, data, SC network, risk management and everything else that facilitates the running of the company.
- *Deliver.* This category refers to transportation and movements of the merchandise from one place to another.
- *Returns*. Is about all the movements of products in the reverse SC.

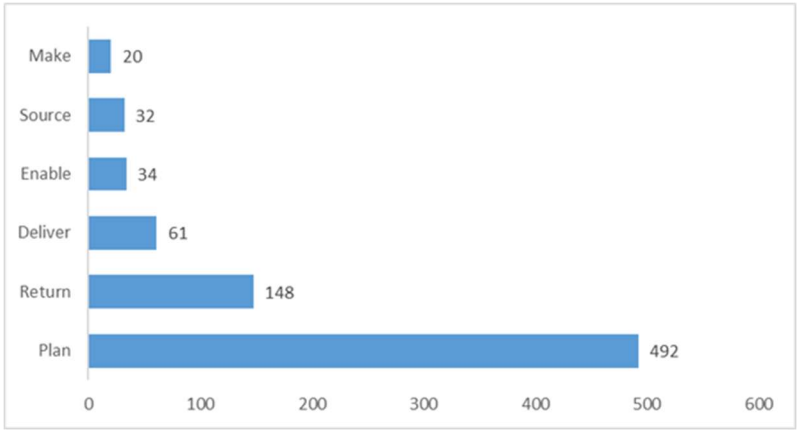


Figure 2.13: Classification of the Articles per stage in the Supply Chain

On the other hand, based on the results deriving from the classification of the journal articles and after a complete update and analysis of the literature review, the following gaps in the literature were identified:

Based on the classification by topic, it can be noticed that most articles deal with the Closed-Loop concept (686 articles from 788); therefore, it is recommended that more research is conducted on Cradle-to-Cradle, Industrial Symbiosis, Industrial Ecology and Circular Economy. This last idea is especially pertinent since it is considered the most updated idea about circularity in the SC, taking into consideration all the aspects relating to a more sustainable future.

In addition, most of the articles focus on micro implementations (669 from 788 articles); this means that more studies are required at the macro and meso levels of implementation to extend the literature and understand new perspectives. It could be useful to take into consideration the perspectives of different countries, for example, developed countries in comparison to developing countries, since such studies are completely lacking in the literature.

In reference to the sectors that require further study, it can be observed that the majority of articles are still referring to manufacturing processes (557 from 788 papers). These articles tend to refer in general to various actions across the supply chain.

Not many of the papers had researched a specific sector, with most of the articles dealing with general processes in different stages of the supply chain and many of these studies being based on mathematical and abstract numerical models. The most studied sector is the electronics and automotive industry, but even in this sector the number of articles is still insufficient to be representative of the whole sector; therefore, more research is recommended in specific sectors to increase the number of papers in relation to the number studying general processes. In terms of choosing a sector to study, considering the aims of this research and two particularly relevant factors: impact on the environment and influence over the society, the Textile and Food sectors were selected, since both factors are highly pertinent to these sectors. Furthermore, limited case studies have so far been conducted in those industries.

Concerning the methods used for the research, most of the studies employed Quantitative methods (532 from 788 papers) using different mathematical techniques, while few papers used Qualitative or Mixed Methods. In reference to the research methods, it can be suggested that a more exploratory design would provide a more in-depth understanding of the perspectives of different actors across the supply chain and a comprehensive understanding of the panorama based on a qualitative perspective. Lieder and Rashid (2016) suggested a complete analysis of the Supply Chain considering Stakeholders' perspectives, and the results of the classification conducted in this review seems to support their suggestion. Consequently, the advice is to use case studies, interviews and in general an exploratory research to comprehend different opinions, values and necessities of the different participants along the SC to try to create strategies that will help businesses to implement more circular practices.

In conclusion, based on the evidence from the literature review on the Circular Economy, a new research consisting of an exploratory study on the SC, conducted from a Qualitative perspective in specific sectors (It is suggested to use Textiles and Food for their impact on the environment and society), will be helpful in providing new in-depth knowledge. Additionally, considering the Macro level will be helpful since most of the studies have been conducted at a Micro level.

2.6. Research Gaps

Based on the results deriving from the classification of the journal articles and after a complete update and analysis of the literature review, the following gaps in the supply chain management literature were identified:

Based on the classification by topic, it can be noticed that most articles deal with the Closed-Loop Supply Chain concept (686 articles from 788). Articles from this strand are very much concerned with Operational Research and Management Science methods, which are aimed at optimising material flows and are seldom tested on real-world problems. Therefore, it is recommended that more research is conducted on Cradle-to-Cradle, Industrial Symbiosis, Industrial Ecology and Circular Economy. This last idea is especially pertinent since it is considered the most updated idea about circularity in the SC, taking into consideration all the aspects relating to a more sustainable future.

In addition, most of the articles focus on micro implementations (669 from 788 articles); this means that more studies are required at the macro and meso levels of implementation to extend the literature and understand new perspectives. It could be useful to take into consideration the perspectives of different countries, for example, developed countries in comparison to developing countries, since such studies are completely lacking in the literature.

In reference to the sectors that require further study, the majority of articles are still referring to manufacturing processes (557 from 788 papers). These articles tend to refer in general to various actions across the supply chain.

Not many of the papers had researched a specific sector, with most of the articles dealing with general processes in different stages of the supply chain and many of these studies being based on mathematical and abstract numerical models. The most studied sector is the electronics and automotive industry, but even in this sector the number of articles is still insufficient to be representative of the whole sector; therefore, more research is recommended in specific sectors to increase the number of papers in relation to the number studying general processes. In terms of choosing a sector to study, considering the aims of this research and two particularly relevant factors: impact on the environment and influence over the society, the Textile and Food

sectors were selected, since both factors are highly pertinent to these sectors. Furthermore, limited case studies have so far been conducted in those industries.

Concerning the methods used for the research, most of the studies employed Quantitative methods (532 from 788 papers) using different mathematical techniques, while few papers used Qualitative or Mixed Methods. In reference to the research methods, it can be suggested that a more exploratory design, with stronger empirical grounding, would provide a more in-depth understanding of the perspectives of different actors across the supply chain and a comprehensive understanding of the issues related to the implementation of CE practices based on a qualitative perspective. Lieder and Rashid (2016) suggested a complete analysis of the Supply Chain considering Stakeholders' perspectives, and the results of the classification conducted in this review seems to support their suggestion. Consequently, the advice is to use case studies, interviews and in general an exploratory research to comprehend different opinions, values and necessities of the different participants along the SC to try to create strategies that will help businesses to implement more circular practices.

In conclusion, based on the evidence from the literature review on the Circular Economy, a new research consisting of an exploratory study on the SC, conducted from a Qualitative perspective in specific sectors (It is suggested to use Textiles and Food for their impact on the environment and society), will be helpful in providing new in-depth knowledge. Additionally, considering the Macro level will be helpful since most of the studies have been conducted at a Micro level.

To support the gaps previously proposed, a review of CE studies presented by Lieder and Rashid (2016) stated that there is insufficient analysis of the SC that considers stakeholders' analysis as a tool to improve and apply CE practices. They suggested the need for a top-down and bottom-up assessments of the SC in order to understand the participation of all stakeholders and offer new ideas about how to coordinate them more efficiently.

More recent reviews show the strong lack of research showing multi-disciplinary perspectives (Pieroni et al. 2019). Despite the fact that some research has been initiated within some industries and regions, for the moment more analysis is required to enhance the research in industry supply chains considering lawmakers, practitioners,

and society. Furthermore, the adoption of CE practices among the employees of the organisations bearing in mind their cultural change.

Dey et al. (2020) highlighted the the need for research aimed at addressing challenges for SMEs in the implementation of CE practices, across industries and geographical locations; also, they highlight the need for enlarging sample sizes of CE-based research, which, in the management domain, has historically been focused on ad-hoc case studies.

2.7. Sectors proposed for this research.

The analysis of the articles showed that the most frequent stage in which CE is being implemented is at the manufacturing level. Within this stage, many different articles were designed for customers consumption and, as a result, for future waste. High and increasing levels of pollution and waste can be observed in all sectors; it is possible to find waste in construction, services, manufacturing, and others, reflecting different approaches and different problems to solve.

It is complex to determine the most damaging sector in which this research should focus to produce information that create a higher level of impact in our society. Nevertheless, there are some essential elements that needs to be deemed in the current pollution crisis in the world. To start, there are five core categories of contamination distressing our globe: air, water, soil, light, and noise. While all are vital, air and water pollution represent the highest danger to our world, this is because more deaths occurred due to the contamination of these two elements. Clean air and water are basic resources to preserve human life, unfortunately, some sectors are poisoning in a higher proportion than others. This is the case of fuel, fashion, agriculture, food retail, transport, construction, and technology sector (Howell, 2021).

For this research, the Fashion Sector and the Food Industry were chosen because they represent some of the basic aspects of life. The need to cover the body to adapt to ever-changing environmental conditions and the daily need to nourish the body through food. It was also showed in the analysis of the articles, the need to explore more these two sectors due to a shortage of research related. In the final analysis of the gaps in findings it was noticed that there could be many opportunities to explore in both sectors, since there is insufficient information in both sectors to provide a complete

map of the SC and the different views of stakeholders on creating incentives and improvement in the processes.

The textile manufacturing industry is considered one of the most polluting sectors in the world (Shirvanimoghaddam et al., 2020). The production process and disposal of textile fibres has critical ecological costs such as high level of energy and water usage. This manufacturing process is causing water toxic chemical contamination, soil degradation, greenhouse emissions, and generating high carbon footprint as well as large amounts of waste (Allwood et al.,2006). The textile and footwear industry are expected to duplicate its growth to 2020 in comparison with 2017 as per statements from the business analysts McKinsey & Co (Advanced Textiles Source., 2017). This is an exponential problem since the processes from raw material to garment supply generate nearby one third of the waste footprint, three quarters of the carbon impact and the majority of the water footprint. Several scientific reports corroborate that the disposal nature of fast fashion and throw-away society is causing a severe ecological, health, collective and financial difficulties (Fischer and Pascucci, 2017; Franco, 2017; Shirvanimoghaddam et al., 2020). There are several issues along the textile supply chain covering since the design, supply procurement, fibre fabrication, apparel production, packaging, delivery, usage and mending, and waste management (Clancy et al., 2015). In this respect, it becomes evident why to consider this sector as an intricate theme valuable to be explored.

For the food industry, the growing numbers in the population worldwide has risen the need for food, nevertheless, the ineffective use of resources and the inadequate food distribution has generated waste and impacting the environmental in a negative direction. There are several challenges to be explore in the food supply chain, from the production until the consumption and post-consumption. Potential stages to be considered to improve the surplus management and prevention of waste. According to WRAP, the UK causes 15 million tonnes of food waste and the food waste in the manufacturing and retail is estimated at £5bn. Most of this waste can be stopped or prevented.

2.7.1. Characteristics of the Textile & Food Industry

Textile Industry Characteristics. Textiles and clothing have special market characteristics, such as short product lifecycle, high volatility, low predictability, and

a high level of impulse purchases, making such issues as quick response of paramount importance (Bruce et al., 2004).

Globalisation plays an immense role in this sector due to the different prices of production around the world, the cost of transportation, the different requirements for apparel depending on the weather or the habits of the customers; therefore, many factors should be taken into consideration when planning the supply chain of a textile company. It can be very challenging to have to plan every step of the supply chain, but it is necessary.

The textile sector not only refers to the clothes themselves but also to a large chain of different stakeholders that need to be in coordination to produce different articles. Components including suppliers of detergents, artificial fabrics, chemicals for colouring the garments, accessories made of plastic, metal and so many others contribute to making this sector very long and complex. Moreover, the textile sector is a very volatile sector, tendencies cannot be predicted, and consumers' merchandise requirements must be satisfied within a short period of time due to the quick changes in fashion. Another main characteristic that influences this sector is the diversity among competitors, with different prices offered for similar garments, making the consumers, particularly those on low salaries, inclined to pick the cheaper option. Finally, it is very seasonal because it depends not only on the different weather conditions, but also on seasonal characteristics that create certain fashion trends that can be very short-lasting. Hence, the combination of lower incomes and diverse competitors who are constantly offering less expensive garments leads to many companies in this sector constantly striving to decrease the price of manufacturing and decrease the production time as well.

An effective strategy used by different companies around the world to reduce lead times and achieve quick response and at the same time reduce production costs is to outsource the production of the garments to countries with less expensive labour costs. By using this strategy, it is possible to offer garments at competitive prices in a highly aggressive marketplace. Due to the necessity for prompt responses, many companies have a backup local production base to enable them to respond to the most urgent requirements while waiting for products to arrive from the outsourcing countries, usually for basic collections of clothes that do not change drastically over the seasons.

Food Industry Characteristics. Food Supply chains (FSC) are considered the lifelines for human existence on the planet (Dani, 2015). FSCs can be local, national or international and it is essential that these supply chains have everything at the right time, in the right quality and right quantity. The lack of consideration of policies for dealing with waste is a huge problem since many statistics show that around a third of the food in the world just goes to waste.

According to Mirabella et al. (2014), the breakdown of food waste in developed countries is as follows: 42% is produced by households, while 39% of losses occur in the food manufacturing industry, 14% in the food service sector and the remaining 5% in retail and distribution. This information about food waste around the world is alarming, with several studies by organisations, academics and governments stating that the amount wasted along the supply chain accounts for one-third of the total, whilst 15% of the population in developing countries are believed to be suffering from starvation (FAO, 2012). WRAP (Waste & Resources Action Programme) is a charity that works with businesses, individuals and communities to implement circular economy practices by incentivising them to reduce waste, make better use of resources and create sustainable products. The 2013 WRAP report suggested that consumers are spending around £12bn on food that they are not consuming, and meanwhile local authorities are spending millions of pounds on collecting and landfilling food waste (WRAP, 2013).

Mirabella et al. (2014), in an interesting research about food waste, discussed the lack of information in the recovery process for food and mentioned the use of potentially polluting chemicals in this process. They also highlighted those excessive manipulations and modifications of food can create potential risks for consumers' health. It is, additionally, crucial to make a distinction between perishable and non-perishable food stuffs when considering post-harvest losses and the effectiveness of FSC infrastructure.

2.7.2. Circular Economy applied to Textile & Food Industry

Circular Economy in the Textile Industry. Due to the nature of the textile supply chain, waste is a constant, not only because of products used in the production process that

are very harmful for the environment but also because of the massive amounts of garments that are required and sold around the world. Industrialisation and fast fashion trends only increase the problem of pollution even more (Hu et al., 2014).

This problem is increasing since the quantity of clothes produced is increasing the pollution and waste from different products needed at the moment of the creation and manufacturing as well as at the end of the cycle of use.

Figure 2.14 represents the steps in the supply chain for textiles; the grey boxes illustrate processes related to every step in the SC in a linear economy.

After extensive research, a map was created (Figure 2.15) explaining the existing steps after the disposal of the waste to understand the current options in the continuation of the SC and to present the concept in a more circular form.

Finally, in the blue boxes, some general suggestions are provided for transforming a linear supply chain into a more circular model; all the suggestions are for pre- the waste disposal stage included in the normal steps of the linear SC.

Comparing Figure 2.14 with Figure 2.15 helps to understand the next steps and possibilities when a linear SC is transformed into a more Circular SC.

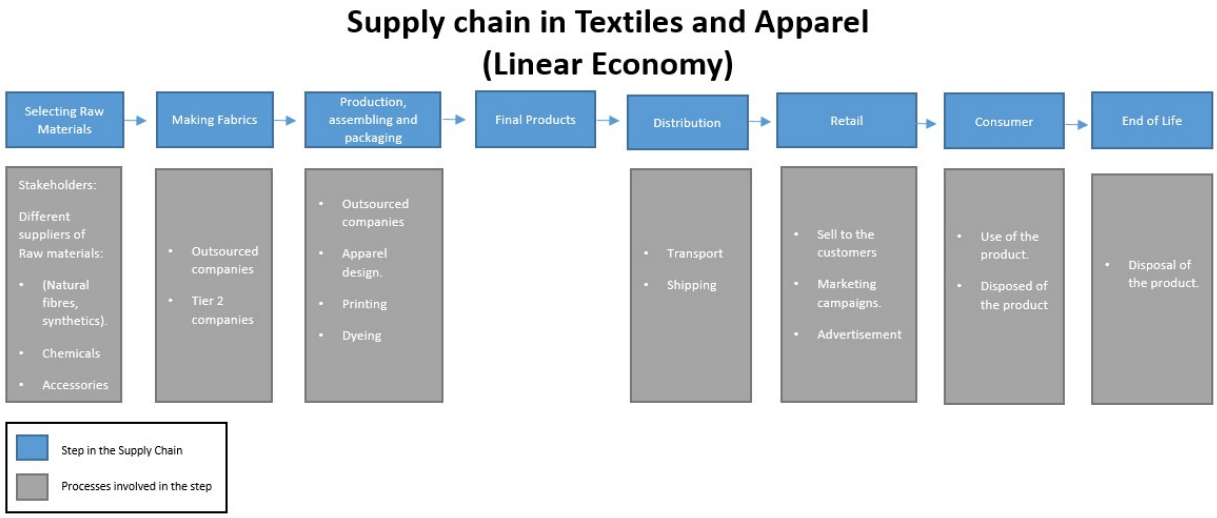
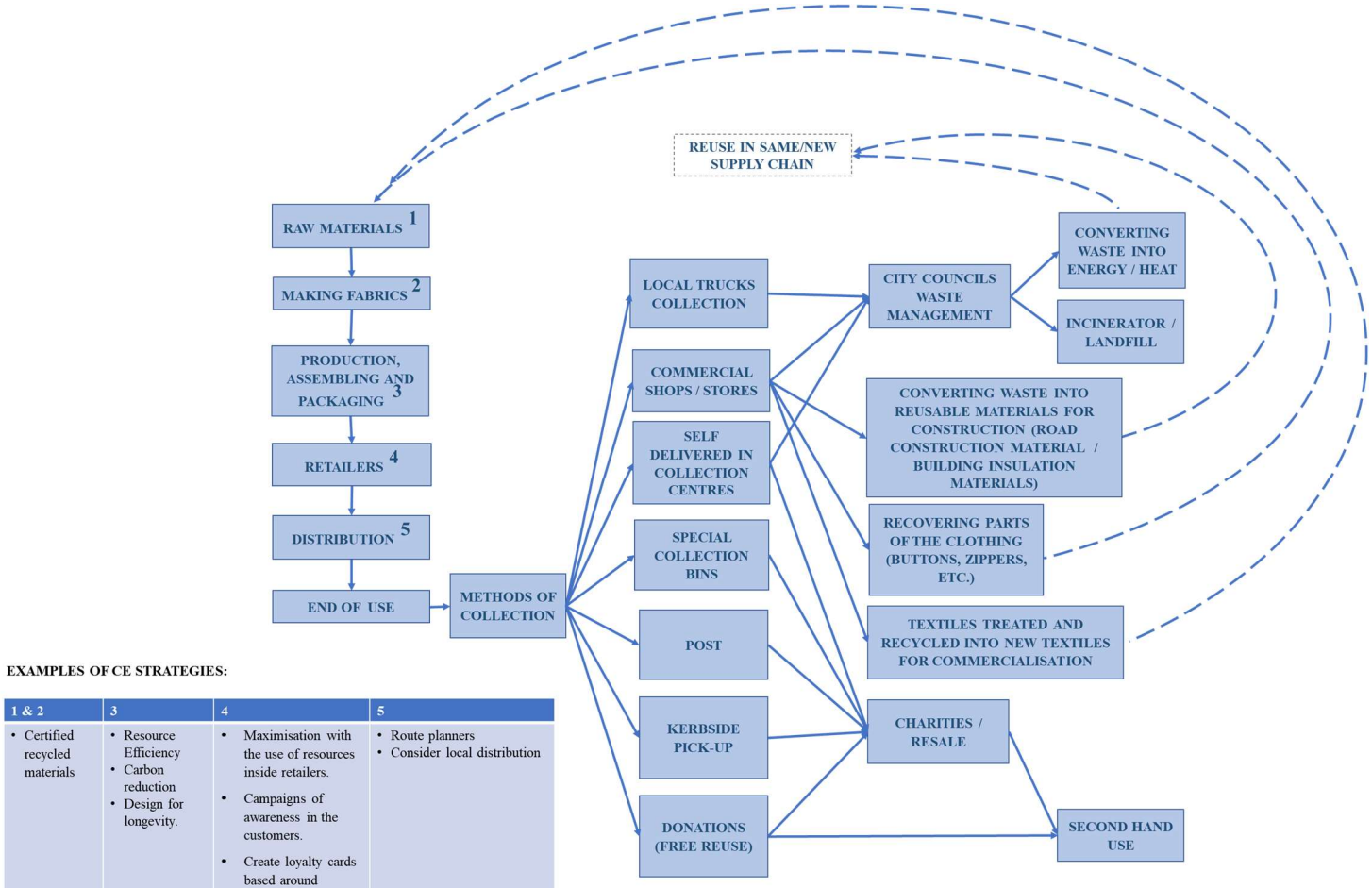


Figure 2.14. Supply Chain in Textiles and Apparel (Linear Economy)



EXAMPLES OF CE STRATEGIES:

1 & 2	3	4	5
• Certified recycled materials	• Resource Efficiency • Carbon reduction • Design for longevity.	• Maximisation with the use of resources inside retailers. • Campaigns of awareness in the customers. • Create loyalty cards based around (Cotton credits") (Return of clothes for recycling).	• Route planners • Consider local distribution

Figure 2.15. Implementation of Circular Economy in the Supply Chain of Textile and Apparel

2.7.3. Circular Economy in the Food Industry:

The food industry is an industry with a severe waste problem, according to the Food and Agriculture Organisation of the United Nations (n.d.); it is estimated that around a third of the food in the world is spoiled or wasted before it can be consumed by people. Since the main characteristic of the food industry is that it deals with perishable products, special effort should be made to preserve the food until consumption.

A CE for the food industry denotes preserving the value of resources (raw materials, water and energy) that go into producing food and drink products, as much as possible.

Figure 2.16 represents the steps in the textiles supply chain; the grey boxes illustrate processes related to each step in the SC in a linear economy.

The map for a Circular Economy in the Food Industry was also created after extensive research into possible steps after disposal (Figure 2.17). Suggestions for transformation to a circular model are within the green boxes.

Comparing Figure 2.16 with Figure 2.17 helps to understand the next steps and possibilities when a linear SC is transformed into a more Circular SC.

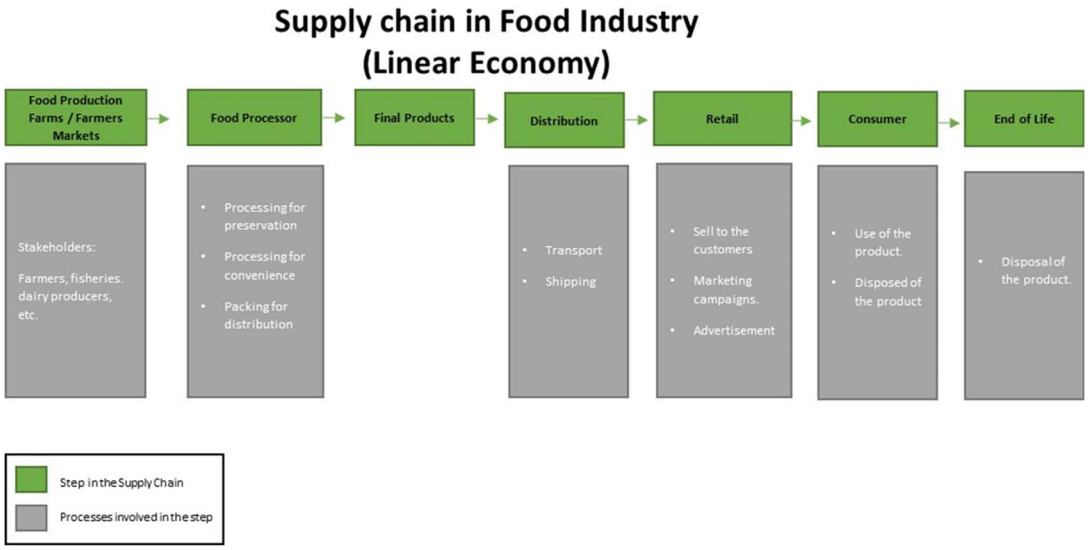
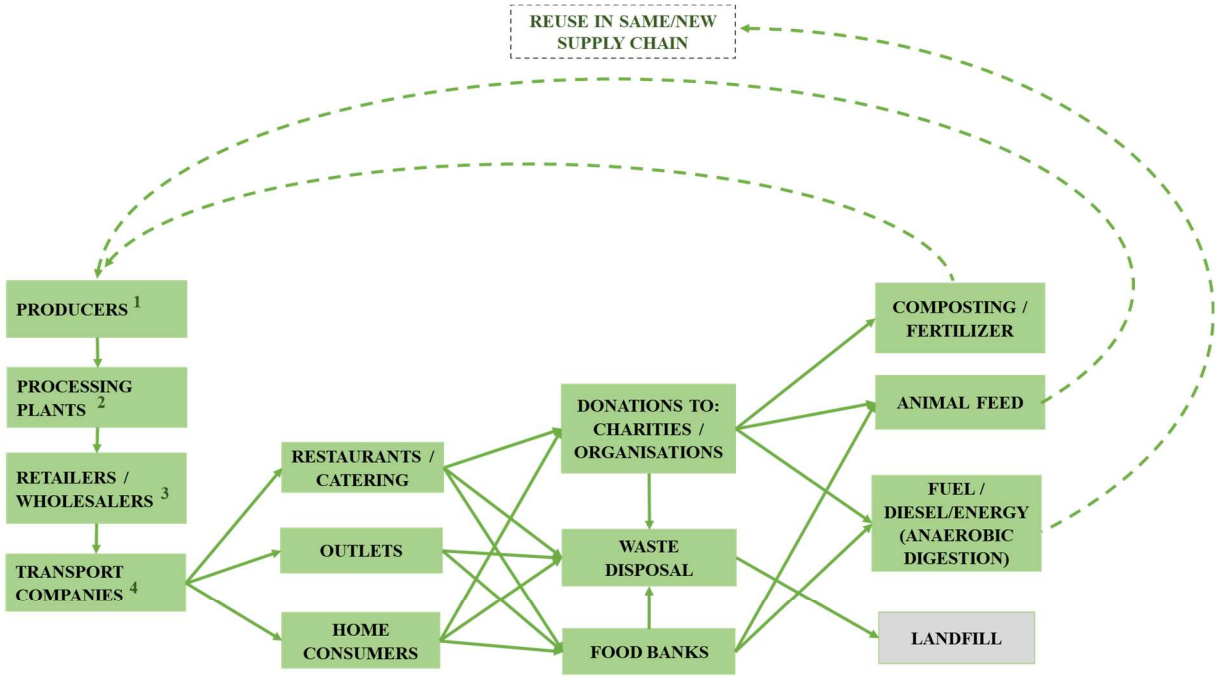


Figure 2.16: Supply Chain in Textiles and Apparel (Linear Economy)



EXAMPLES OF CE STRATEGIES:

1	2	3	4
• Sustainable Farming • Improved harvesting techniques	• Resource Efficiency • Carbon reduction • Reduction of waste for spillages	• Consumer awareness campaign • Environmental Friendly Packaging	• Route planners • Consider local distribution

Figure 2.17. Implementation of Circular Economy in the Supply Chain of Food

2.7.4. Importance of the Different Stakeholders in the Textile and Food Industries

Through the SC of the Food Industry and according to research conducted by the Food and Agriculture Organisation of the United Nations (FAO) in 2012, one third of the entire global production for human consumption is wasted. The last report from WRAP (2016) showed that over half of the waste generated by the UK could be avoided in the manufacturing and retail sectors. These shocking quantities are the reflection of poor planning and the lack of action around every event in the supply chain, which lead to losses along the chain during transportation, storage and processing, and this is where the role of stakeholders becomes important.

In a study by Pagotto and Halog (2015) that conducted extensive analysis of the agri-food industry in Australia, they concluded that in order to achieve eco-efficiency and resource efficiency, stakeholder engagement at every sector of the Australian food supply chain is highly essential. This is mainly because synchronising and engaging all sectors of the industry makes it easier to minimise the losses and to achieve better management of the resources. In a similar study of the textile industry, Bruce et al.

(2004) conducted a case study of four companies and the challenges they have to overcome in order to fulfil the demands of customers and meet short lead times. Since they have to use outsourced suppliers, they understand the importance of having good relationships with their suppliers, relationships that are essential in obtaining premium service from suppliers to meet the changing demands in a short time, based on collaboration that is beneficial for both parties. Moreover, better coordination between stakeholders can lead to raw materials being obtained at better prices.

2.7.5. Incentives for the Textile Sector to Implement Circular Economy

The major constraints that SMEs face in CE implementation include limited financial resources, a lack of personnel and time, little or no experience, and limited confidence in implementing new systems (Storey, 1994).

To make the circular economy a reality in the textile sector it is necessary to create incentives for the main participants and in order to do that it is necessary to understand the perspective of every stakeholder in the supply chain, and have a clearer idea of their habits, needs, expectations and motivations.

The problem is the lack of incentives and the need to change the actual behaviour and thinking of those actors. There are four principal stages in the supply chain in which incentives can be implemented. Figure 2.18 presents these four basic stages in an SC in which incentives can be implemented, while the possible incentives at each stage will be explained below.

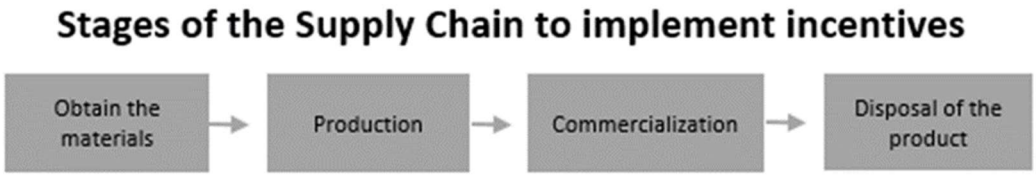


Figure 2.18: Stages of the Supply Chain to implement incentives

- *Obtain the materials.* This stage refers to the time when the company obtains all the materials for the production of clothes and textile products. This stage is important because it is the stage for planning to use materials that can be easily recycled in the future. Significant factors to consider at this point are keeping costs low and the ease of obtaining the materials. Hence, the main incentives to consider at this stage relate to obtaining low-cost raw materials

and achieving greater flexibility among the suppliers to deliver the product as quickly as possible in order to meet the tight deadlines that the dynamics of the textile market always require.

- *Production.* In this step of the supply chain many improvements could be made regarding such as the number of resources used to produce the products. By attending to the use of resources such as electricity, energy, fabrics, etc., the cost of the assembly can be reduced, creating more profit for each garment, and offering the incentive to buy it for a more affordable price. Also, reducing waste in their production process or reusing the waste created in the production process will create more profit for the company.
- *Commercialisation.* The fashion industry has become one of the most polluting industries in the world. Certain companies, known as "Fast fashion retailers", are causing major a pollution problem around the world since the production and consumption of clothes are creating huge amounts of waste every day. This in turn has led to social organisations, media and the society in general bringing enormous pressure to bear on such companies to create new ideas for planning and implementing better processes that will avoid the production of tremendous quantities of superfluous garments. One company that is leading the new era of implementation of circular economy in the textile sector is H&M, through marketing campaigns to educate the customers and inform them about the importance of recovering all their clothes as well as collecting clothes to recycle. Meanwhile, innovative companies with the necessary technology, such as Worn Again, are creating methods to process old clothes and produce new resources to create new ones, while other brands such as American Eagle Outfitters, Eileen Fisher, Levi-Strauss & Co, Nike, The North Face, Patagonia, and Zara all collect old garments (or shoes, in the case of Nike) for recycling.
- *Disposal of the product.* The final stage of the product, waste disposal, may present the greatest possibility to create incentives for application of CE. For the consumer, this stage could even represent recovery of part of the cost invested in the article or at least the benefit of securing better disposal of the waste. The H & M clothing chain, for example, encourages the recovery of textiles by offering customers coupons to make a discount purchase in their stores. Meanwhile, benefit for companies could accrue through creation of waste that can be used again in their supply chains, thereby lowering their costs

of production and the acquisition of raw materials or even creating alternative businesses to their current operation.

The benefits of implementing new processes related to CE are immense and the possibilities of increasing these with new ideas in the future are very plausible; hence, one of the main objectives of this investigation will be to find incentives to make it more viable to adopt these new perspectives in the industry.

2.7.6. Incentives in the Food Industry to Implement Circular Economy

The same stages of the supply chain as the four described for textiles can be applied to find incentives in the food industry.

- *Obtain the materials.* This is the stage in the SC where materials are obtained for producing food. Incentives that can be suggested at this point relate to new controls on how to cultivate and generate more product, without using more resources, in order to obtain better profits.
- *Production.* This is an enormous issue for the food industry since this is one of the stages in which most loss of products is being generated, in processes such as packing, transportation, and manipulation of the food. Hence, the main incentives here could be about creating more efficient techniques to avoid the waste caused by each activity.
- *Commercialisation.* Many supermarkets, such as Morrisons and Tesco, are publicising the importance of consuming just the right quantity needed to satisfy our needs in order not to generate more waste.
- *Disposal of the product.* This last step is important as well because good decisions about the waste will make it possible to recycle and reuse it for other products. Other ways to create incentives include letting people know about the different collection programmes and how they can help others avoid hunger.

In this chapter, a detailed and systematic literature review was conducted, the steps required to reach final conclusions were explained and research gaps were identified. A considerable number of articles were drawn on to support the research and the results showed good opportunities for contributing new knowledge.

For the focus of this research the food and textile sectors were chosen, since a lack of articles dealing with these industries was identified in terms of exploring and creating a complete SC based on CE practices.

The main purpose of this research will be to understand every activity throughout the SC in order to generate incentives that will encourage stakeholders to implement CE practices in their operations.

2.8. Chapter Summary

During the course of our history, the expansion of societies based on a linear economy model has risen the necessity for resources and the increase of economic activities has caused harmful alterations to the environment. The Circular Economy is an umbrella concept that suggest a more sustainable industrial economy in which the flows of materials, energy and by-products are re-utilised over and over again in an effort to reduce resource consumption and waste generation.

The CE model has been evolving from several school of thoughts and cannot be attributed to one single date or author. This chapter introduced a detailed review of the available academic literature, allowing the identification of some gaps in the knowledge. Specifically, the literature review has shown that most of the CE literature in supply chain management has been focused on quantitative and modelling approaches, with an insufficient analysis of the stakeholders' implications of the implementation of CE practices. Also, there is a lack of adopting a multi-disciplinary perspective, and a clear need for research focusing on a diverse set of actors (such as SMEs).

CHAPTER 3

SUPPORTING THEORIES

The previous chapter has presented an overall picture of academic literature on the circular economy concept using a systematic methodology. This chapter will explain general management theories that will support the development of data collection methods, as well as providing theoretical lenses to illustrate the results and analysis. An integrated theoretical framework is constructed to explain CE practices in organisations. Following on from the Research Process Map in Chapter 1, the function of this chapter is to strongly assist in the development of other different stages of this research by providing a theoretical lens to support the objectives previously stated in CH1, helping to design methods (CH3) as a tool for critical analysis (CH7), and to draw conclusions (CH8), as shown in the research map shown in **Error! Reference source not found.**.

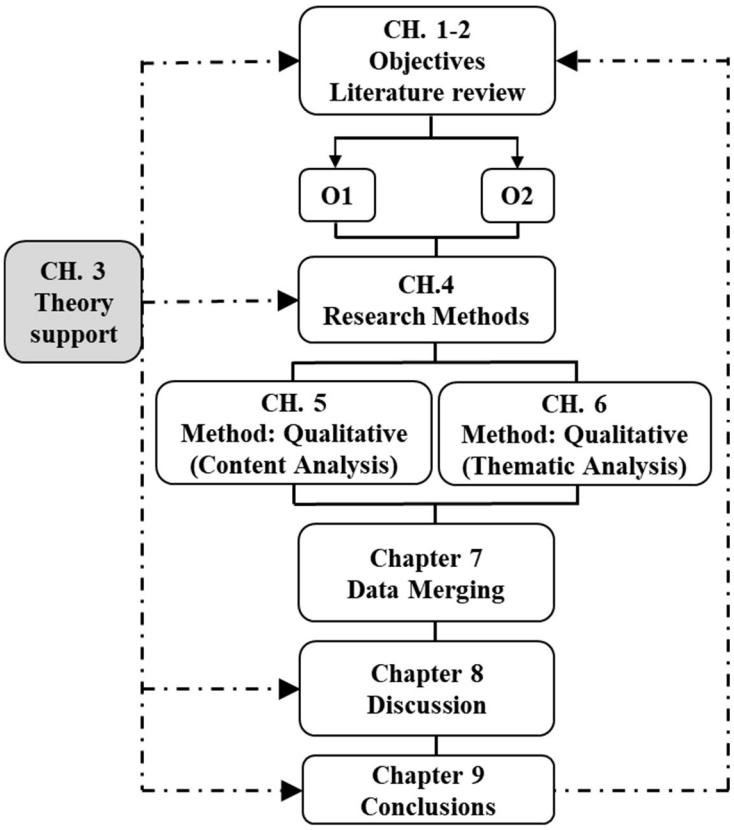


Figure 3.1. Research Map - Theoretical Framework

3.1. Theoretical lenses

Theories are constructed to explain, predict, and master phenomena (Royen et al., 2011). A theory is a model that represents a set of variables and the relation between them; they are used to understand reality through premeditated and anticipated theory models. Theories help to build conceptual context for research, depending on the purpose, content and aims. Figure 3.2 represents the process of theorising; within this course, the existing knowledge will be challenged through data collection and subsequently analysed to contribute new knowledge in the field.

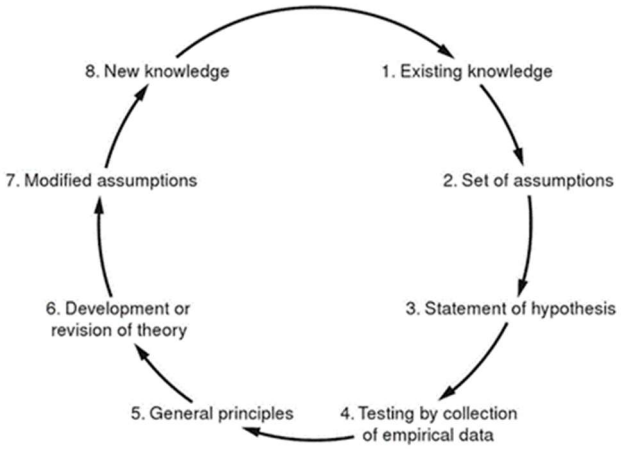


Figure 3.2: The Process of Theorising (Royen et al., 2011)

The objectives set out in chapter one help to specify the course of action to be taken and the research tools required for data collection and data analysis. Suitable theories to explore the objectives will be explained in the following section in order to understand how they will support this research.

As previously mentioned, theories are helpful to understand situations, clarify facts and predict outcomes. The use of strategic management theories and organisational theories can be beneficial to comprehend ordinary situations within an SC (Ketchen and Giunipero., 2004; Hitt., 2011). Several factors influence the choices inside an organisation, such as the people who work within and actors who act as intermediaries for their daily activities. Similarly, elements such as their available resources, together with internal and external pressures, influence their course of action.

This chapter explains the theoretical lenses chosen for this research, relying on the main frameworks which have been used, historically, in the operations and supply chain management literature. These are illustrated in detail in the following paragraph.

3.2. Relevant theories

The application of multiple theories is valuable to recognise unique patterns and forces in the Supply Chain. Relying on multiple theories is a necessity in the Operations and Supply Chain Management field, which has been originating as an applied field of knowledge (Ketchen and Giunipero, 2004); as such, there are no *complete* theories that can be utilised in isolation to understand the whole set of issues arising in supply chains. As such, numerous authors invite to adopt an eclectic approach to understand supply chain management issues from different perspectives, mainly relying on strategic management theories (Ketchen and Giunipero, 2004).

Strategic management theories (SMT) can be successfully applied to supply chain management, even if their application to this domain has been quite recent (Ketchen and Giunipero, 2004). Numerous social scientists have emphasised the need for more practical application of these theories (Shook et al., 2009; Stock, 1997; Ketchen and Giunipero, 2004; Halldorsson et al., 2007); the SCM domain can provide an ideal arene for this. Using SMT and SCM to support each other can assist organisations in the development of insight knowledge and thus help organisations to accomplish their objectives (Ketchen and Giunipero., 2004; Hitt., 2011). Strategic management theories have been studied in a substantial number of fields under theoretical lenses, because the SC within an organisation has many operational areas with a structure that can be explained through theories. Researchers and operations management (OM) professionals often consider their activity in terms of logical efficiency, which has been criticised by theorists who maintain that rational action is always based on a social approach (Rogers et al., 2017).

Shifting from the general to the specific, the four theories proposed to obtain a holistic view of the supply chain for this research are: Stakeholder Theory, Resource Based-view Theory, Agency Theory, and Institutional Theory.

The following sections will provide a brief presentation for every theory in more detail. This insight will assist to appreciate the value of the different perspectives in the development of the data.

3.2.1. Stakeholder Theory

The stakeholder perspective is a theory of Strategic Management that assists in understanding how organisations and people create value and trade between each other; likewise, it highlights the importance of building morals and values in managing the organisation by engaging each part (Freeman et al., 2010). Within this definition, we should refer to the Stakeholder as "any group or individual who can affect or is affected by the achievement of the organisation's objectives" (Freeman 1984, p. 46). Stakeholder Theory claims that there are different parties engaged that must be considered. Clarkson (1995) identified two groups of stakeholders: primary stakeholders, those which have formal contractual relationships with the organisation, for instance, clients, suppliers, employees, shareholders, among others, and the secondary stakeholders, those not holding such contracts, such as governments, media, environment, or even competitors.

R. Edward Freeman is generally referred to as "the father of stakeholder theory" and he identified various groups of stakeholders in an organisation (Figure 3.3). His book, *Strategic management: A Stakeholder Approach,* explains and recommends approaches which enable the management to give due account to those groups (Freeman et al., 2010). Freeman usually linked the development of this theory to different concepts in the literature, including corporate planning, strategic management, corporate social responsibility, system theory and organisation theory.

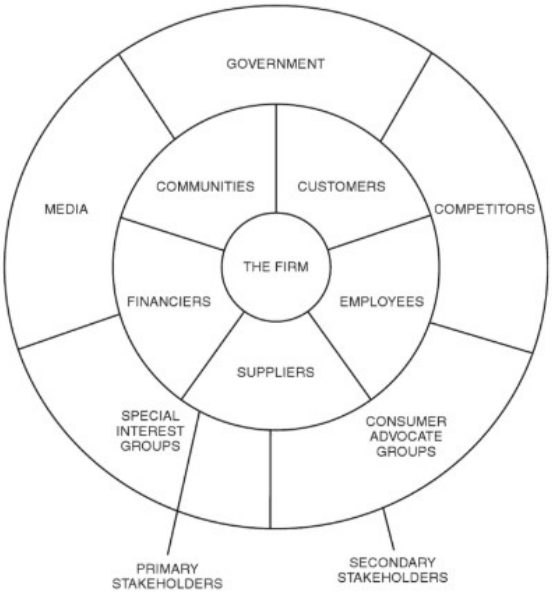


Figure 3.3: Creating value for stakeholders Source: (Freeman, 2010)

According to Friedman & Miles (2006), the organisation should be considered as a grouping of Stakeholders, and the aim of the corporations should be to administer their needs, interests and points of view. Ackermann & Eden (2011) suggested how the top management team might use Stakeholder Theory to increase the effectiveness of the strategies by incorporating important concepts from Stakeholder literature and applying them in a real situation. Ackerman and Eden (2011) concluded that the number of Stakeholders will rise proportionally as corporations begin to be more acquainted with the need to expand their corporate social responsibility and improve the regulatory structure, and the management of all the actors thereby becomes more complex. Donaldson and Preston (2020) argue that this theory should also consider aspects that are mutually supportive, such as the descriptive, instrumental and normative. The descriptive tool is utilised in research to describe and illustrate the characteristics and patterns in organisations, including how organisations are controlled, how top managers consider their constituencies, the way that directors consider how to manage, and the nature of the organisation itself. The instrumental consideration utilises observational information to explain the link between the control of stakeholder groups and the achievement of corporative goals. Finally, the normative approach refers to the identification of the organisation, its moral and philosophical guidelines.

Stakeholder Theory can be used to explain organisations in different contexts. The salience model classifies stakeholders according to three attributes: Power, legitimacy and urgency (Mitchell and Wood, 2020). In terms of the SC these three attributes determine the interaction among the parties involved (Co and Barro, 2009; Mitchell et al., 1997; Waxenberger and Spence., 2003). The first attribute is 'Power' and refers to the ability to generate influence, produce a determined outcome or direction. In this case, stakeholders in a position of power in an SC are able to dominate other organisations to implement strategies according to their interests rather than being cooperative. The second attribute of interactions is 'Legitimate' and relates to how stakeholders influence others in the SC by improving supply chain performance through concrete facts rather than commands. The third attribute is about 'Urgency' and how stakeholders adopt certain practices due to the importance and time sensitivity. This last attribute in an SC context refers to an organisation decision to invest in a certain opportunity but depending on the cooperation of their trading partners. Table 3.1 shows some examples of situations in which stakeholders can influence in a positive and negative direction the financial and operational performance or adoption of more sustainable activities within organisations.

Table 3.1: Stakeholders' Interaction in a CE Context

	Power	**Legitimate**	**Urgency**
Attribute	A relationship between actors in which one can get another actor to do something that would not have otherwise been done.	A general perception or belief that the actions of an entity are appropriate, correct, or suitable within some collectively built structure of customs, values, beliefs, definitions. Legitimacy can be individual, organisational, or societal.	The 'degree' to which stakeholder demands call for immediate attention'. The degree depends not just on time- sensitivity, but also on how 'critical' the relationship is with the stakeholder or the importance of their claim
Examples of how Stakeholders' interaction drives CE practices	• Suppliers implementing better practices because their client requests Environmental certificates as a condition to work with them. • The Government implementing regulations to ban	• Consumers preferring new share economies to interchange items that affect the sales of retailers. • People's negative perception on fast fashion reducing their amount of consumption.	• Environmental groups stressing the urgency of climate change to encourage companies to adopt CE practices.

	single plastic use in supermarkets.		
Examples of how Stakeholders' interaction hinders CE practices	• Manufacturers restricting the expiration dates for products, thereby forcing the customers to waste more.	• Householders' lack of indications about what type of plastics can be recycled.	• Environmental agencies urgently requiring the elimination of livestock due to disease (I.e. Foot-and-mouth disease)

The use of Stakeholder Theory will support not only the identification of the main SC Stakeholders but also gaining a full understanding of the core mechanisms in their relationships (Genovese, Lenny Koh and Acquaye, 2013). Based on the theory, this thesis explores the role of different actors and how the interaction between them is a component that can encourage or hinder the implementation of CE practices in organisations with different objectives. Finally, Stakeholder Theory will be employed to recognise the principles and moral guidelines for the operation and management of the organisations (Donaldson and Preston., 2020) and the basic concepts of managing numerous participants in the SC.

3.2.2. Resource-based View Theory

The Resource-based View (RBV) theory is a managerial theory employed to establish the strategic resources available in an organisation in order to build a sustainable competitive advantage. Some academics suggested the work of Barney (1991): 'Firm Resources and Sustained Competitive Advantage', was the pivotal moment for the emergence of the concept. Resources relate to all tangible assets (i.e. properties, equipment, machinery, land, capital, etc.) and intangible (i.e. brand reputation, trademarks, intellectual property. processes, information, etc.), which are within the control of the company and improve its efficiency and effectiveness (Daft, 2015). RBV claims that valuable, rare, inimitable resources and organisation (VRIO) lead to competitive advantage.

In particular, in the context of this research, RBV theory could help to formulate questions related with past and currently available resources in the organisations in order to understand how these resources were, are or will be utilised in order to create

a competitive advantage and also how these resources will help with the implementation of Circular Economy practices.

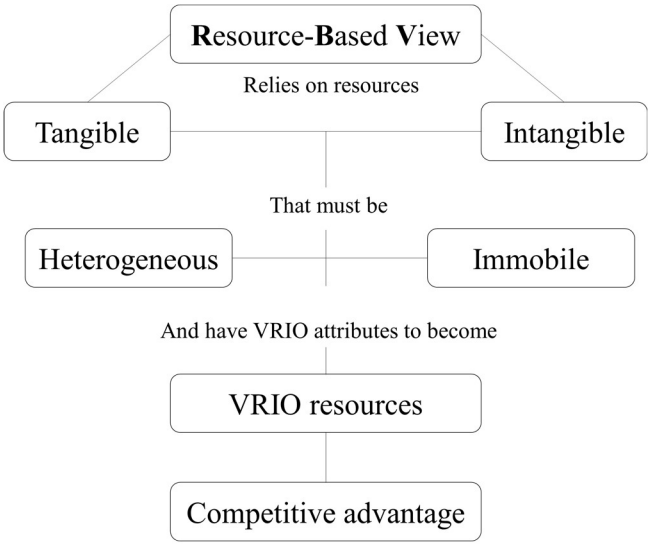


Figure 3.4: Resource Based View (Barney, 1991)

Organisations change their sets of resources to adjust to variations in requirements, trends, and conditions (Lahti, Wincent and Parida, 2018). Researchers suggest that organisations struggle to change their resources because their present resources and capabilities restrict directions for the new ones. Nevertheless, in terms of adjusting to a CE model and the regulatory frame, resource-based theory can help to provide a sustainable advantage by constantly assessing, measuring, and reconfiguring the organisation as a reaction to market and collective needs, social shifts, and industrial innovations.

For a circular business model to thrive, it is important that investments in financial, human, and physical resources are in line with the information technology used in the reverse logistics procedure to improve partner communications, integrate information across the organisation's actions, and expand receptiveness (Lahti, Wincent and Parida, 2018). The adoption of a circular business model can introduce sustainability-oriented behaviours such as redesigning the products, the use of bio-based materials, expanding the lifespan of a product, or enhancing recycling functionality as actions towards achieving an improved reputation and increased revenues.

Table 3.2. RVB Theory to create a competitive advantage in a CE Context.

Resources	Valuable	Rare	Inimitable	Organisation	Impact on Competitive advantage
Tangible: A Textile company using 100% recycled or other sustainably sourced materials to produce its garments	Yes	Yes	Yes	Yes	Sustainable competitive advantage
Intangible: Human resources trained to develop: Workplace methods and managerial environmental goals	Yes	Yes	Yes	Yes	Sustainable competitive advantage

Table 3.2. shows how RBV can help organisations to build a competitive advantage.

based on the present resources (Tangibles and Intangibles), but also to analyse what is necessary to consider in keeping this competitive advantage sustainable.

3.2.3. Agency Theory

The previous theory helps to identify the internal and external groups that influence an organisation as well as the importance of recognising the attributes of each stakeholder to plan strategies. Agency theory is a political and economic theory that aims to explain how people behave within a corporate environment (Slyke, 2007). Rules and regulations are expected to be built around the view of foreseen behaviours in a direction to obtain outcomes that can be beneficial for the parties involved. Agency theory has been used for different fields such as accounting, marketing, finance, political science, sociology among others (Basu et al., 1985; Demski and Feltham., 1978; Fama., 1980; Mitnick., 198; Spence and Zeckhauser., 1971; White., 1985). According to agency theory, the relationship between the agent and the principal is explained in order to resolve priority issues in their relationship. The term agent refers to executives in an entity, while principal refers to shareholders or owners. Principals entrust the decision-making power to agents on their behalf for reasons of cost and expertise (Van Slyke, 2007). Two key assumptions are postulated within the

theoretical model. The first assumption refers to the self-interest of both parties in regard to their benefit giving; this gives rise to the so-called principal-agent problem or agency dilemma. The dilemma suggests the difficulties in incentivising one part to act in the best interests of another rather than their own interest. The second assumption points out the different approaches to information on the parts of the agent and the principal. The second assumption refers to the agent as an influential figure because they can access sensitive information and are in a position to make decisions, enabling them to act for their self-benefit. The agency theory model shown in Figure 3.5 explains the relationship between the principals and the agents by showing how the principal delegates power to the agent to act on their behalf and, as a consequence, the agent performs work. This figure also shows the self-interest of each party and the problems that can emerge.

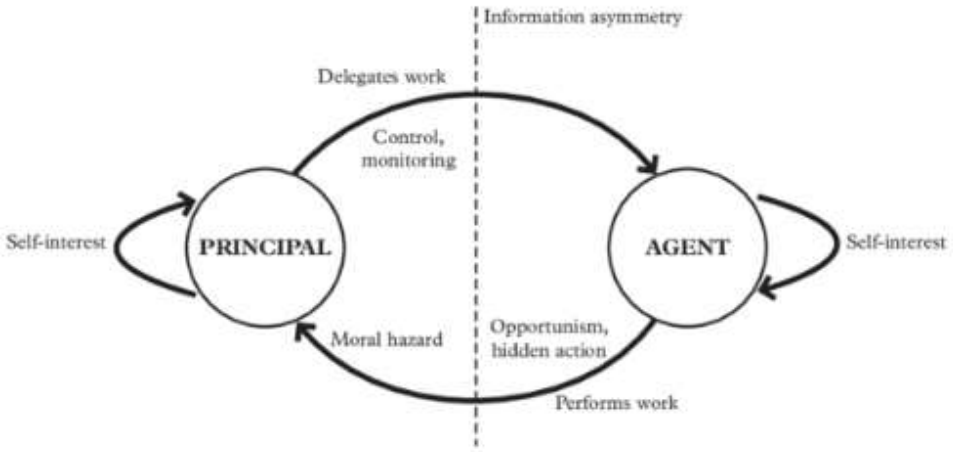


Figure 3.5: The agency theory model (Slyke, 2007)

Applying this theory helps organisations to put in place regulations and laws that protect the principal from agents' opportunistic use of asymmetric information for their own advantage, therefore Agency theory contributes with the awareness of the suppliers-buyer relationship (Eisenhardt, 2018). Fayezi (2012) broadly researched the connection between agency theory and SC and discovered that even though agency theory has been extensively used across diverse disciplines, there is a lack of effort to clarify how this theory might be used to explain relationships between different organisations within the SC. According to SCM literature, agency theory usually tends to be used for three different circumstances (Fayezi., 2012):

i. When there is considerable goal conflict between principals and agents (e.g. suppliers and buyers)
ii. There is sufficient ambiguity to trigger risk (e.g. new product development)
iii. Assessment of performances is difficult (e.g. high-tech intensive agents)

In terms of sustainability, Wilhelm et al. (2016) recommend considering the double role of the agent when, for example, in a supply chain a first-tier supplier acts as an agent implementing sustainability in its own operations (primary agency role), and also acts as an agent in spreading sustainability values to its contractors' procedures in the SC up-stream (secondary agency role).

Table 3.3. Examples of agency role in a supply chain context (Wilhelm et al., 2016)

	Agency factors (Primary agency level)	**Agency factors (Secondary agency level)**
Information Transparency	• Regular sustainability review meetings between lead firm and the plant management	• Quality control teams from buyer's firms regularly inspecting suppliers.
Incentives structures	• Sustainable farming justifies higher prices • Sustainability is an order-qualifying, not an order-winning, supplier selection criterion	• Cooperation structure aligns incentives for primary and secondary agency roles • T1 and T2 certification are interlinked as certificates are awarded at the plant level and require positive audits of all farmers

The examples from Table 3.3 were extracted from the cross-case analysis presented by Wilhelm et al (2016). In this cross-case analysis, the author examined the SC of agricultural products and how information transparency and incentive structures are transferred from the primary agency level (T1) to the secondary agency level (T2). Agency theory reminds us that organisational life is also based on self-interest (Eisenhardt., 2018), thus the importance of understanding those self-interests (Perrow, 1986).

This theory complements the previous Stakeholder Theory by understanding different groups and conflicts with their own interests. Agency theory can help this research

specifically to comprehend inter organisational problems in the relationship between principals and agents (Slyke, 2007).

3.2.4. Institutional Theory

Institutional theory (IT) refers to the deeper and more resilient aspects of social structure; it addresses the operations by which structures, including patterns, rules, regulations, norms, and habits, become established as the influential directives for social behaviour. (Scott, Smith and Hitt, 2004). There are many definitions available for Institution, the following being provided by Scott (1995):

> *"Social structures that have attained a high degree of resilience. They are composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life."*

Institutional Theory assumes that companies and organisations are under the influence of other corporations or entities. Therefore, this theory aims to understand how companies address these external pressures. Isomorphism is considered one of the main concepts of this theory and relies on the idea that over time they will become identical by embracing similar schemes and strategies in order to improve their own (Widmer and Prior., 2019). Under this concept three main isomorphic pressures are mentioned in the literature: coercive, mimetic and normative (DiMaggio and Powell, 1983) Figure 3.6.

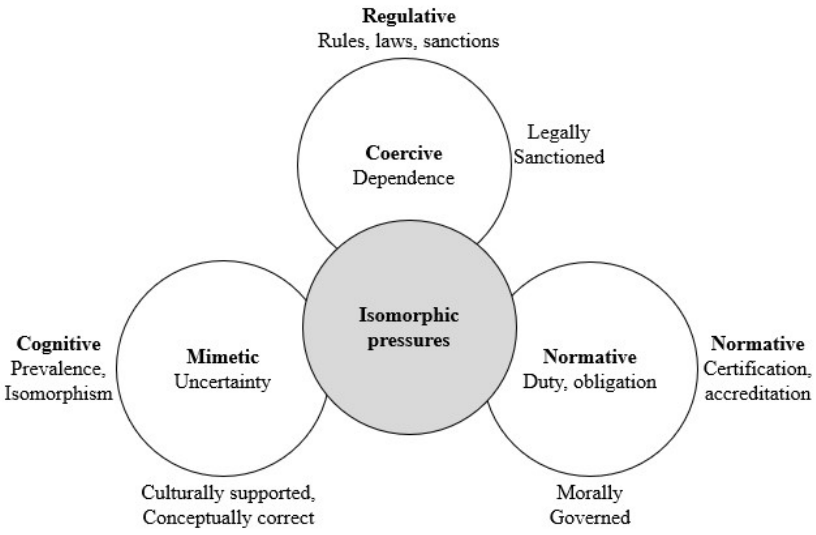


Figure 3.6: Institutional Isomorphism (DiMaggio and Powell, 1983)

Coercive isomorphism, for instance, refers to external pressures such as rules, law, regulations, or sanctions that an organisation faces in meeting customers' requirements. Mimetic isomorphism refers to the external pressure to adopt successful strategies from their competitors because they are succeeding with that scheme. Finally, Normative Isomorphism relates to the professionalisation of an organisation deriving from its increasing adoption of guidelines, for instance, certifications, accreditations.

Institutional theory has been recognised for its value in Organisational Management (OM) and SCM studies (Ketokivi and Schroeder., 2004; Liu et al., 2010). This theory aids in the understanding of organisations and the external pressures that affect the adoption of new models; for this reason, it is increasingly being used to support the understanding of CE adoption in different contexts. CE modelling is a fairly new concept and therefore only a few literature studies are available that consider the use of IT. At the same time, Widmer and Prior (2019) pointed out the increasing pressure that organisations have been under in the last decades to move towards circularity of their practices.

Technologies allows the customers to be closer to their practices and to explore their regulations, certifications; hence, transparency of the SC is becoming a more significant attribute. Table 3.4 introduces some illustrations of how IT pressures influence organisations in terms of CE drivers and barriers.

Table 3.4: Institutional Pressures in a CE Context (Widmer and Prior, 2019)

	(Coercive) Regulative	**Normative**	**Mimetic (Cultural-Cognitive)**
Pressure mechanism	Coercive pressures suggest following the regulative rules to avoid negative sanctions.	Normative pressures suggest a social obligation and binding expectation to social norms and rules.	Mimetic pressures suggest that taken-for-granted commonly shared beliefs exist.
Legitimacy	Organisations give in to the pressure of fear of being legally sanctioned and adhere to appropriate protocols and standard operating procedures.	Organisations obey morally governed normative pressures, so they will not be shamed, and get certifications and accreditations.	Organisations adapt due to mimetic pressures in order to be culturally supported and get certainty for their behaviour.
Examples of general institutional drivers for	• Legislation imposing producer responsibility	• Use of recycled materials is rewarded.	• Stakeholder pressure towards sustainable resource consumption in privately held firms.

circular economy	• Heavy limitations for landfilling through regulatory measures (e.g., landfill tax)	• Recycling services are preferred over inferior waste management processes	• Central role of circular economy is acknowledged.
Examples of general institutional barriers for circular economy	• Regulatory support towards increasing reuse activities is low • Inconsistent regulation and its enforcement in different countries and on different levels	• Lack of indications for normative support for circular economy outside of recycling • Reuse of materials is considered as waste and lacks normative support	• Customers prefer new products. • Low perceived role in activities of reuse and reduce

It is not uncommon to find IT being used to complement other theories in a research. Both Stakeholder Theory and IT suggest that the influence of actors outside the organisation in the supply chain has the power to determine the adoption of new models and practices within the organisation. IT and RBV can also be combined to explain if the regulatory and normative forces influencing decision-making in organisations are affected by the availability of resources. For this reason, the utilisation of this theory in combination with the previous suggested theories will be essential to understand the perspectives of the stakeholders involved in the supply chain.

3.3. The use of multiple theories

The application of multiple theories in a research is gaining more interest, due to the change in researchers' appeal with regard to identifying different dynamics in the Supply Chain (Halldórsson & Skjøtt-Larsen, 2006; Handfield & Bechtel, 2002; Knemeyer, Zinn & Eroglu, 2009; Peck, 2005; Zsidisin, Melnyk & Ragatz, 2005). Organisational theories assist academics to rationalise, illustrate and foresee complicated managerial patterns in the SC (for instance stakeholder selection, supply management or relationship management). Due to the multifaceted structure of the supply chain, the majority of research in this field employ single or multiple theories to deliver their conclusions (for instance Hartmann & Moeller, 2014; Vanpoucke, Vereecke & Boyer, 2014; Vanpoucke, Vereecke & Wetzels, 2014). The rationale for using multiple theories has been observed to be complementary, in which one theory's

flaws are counterbalanced by an additional theory's strength, without compromising the descriptive capacity resulting from their interaction. One example of the interactions between theories is mentioned by Halldorson et al. (2007) claiming that Resource-based view (RBV) completes for instance Transaction cost economics (TCE) and allows to precisely identify the borders for decisions in organisations. This declaration is based on the premise that TCE describes potential structures established on transaction attributes, whereas RBV evaluate resources and capacity of the organisation to partner in those transactions. As a result, the use of theories can enhance the SCM discipline (which has not yet developed a set of underlying theories) understanding by providing both interpretation and predictions.

The use of multiple theories in a specific research should be analysed to comprehend if whether they are competing theories or complementary theories according to the different variables in the research and objectives. The number of theories to be used will depend on the elements to evaluate. Their appropriated use in a research with particular purposes can help to build a new theoretical framework but using several theories does not necessarily mean the creation of a new model rather than focusing to obtain more details variables or hypothesis.

More examples of studies using multiple theory approach are shown in Table 3.5, which shows that the combined use of the theories mentioned in the previous subsection is becoming very common in the management field. Table 3.5 specifically presents a matrix with the combination of published articles for the specific theories.

For instance, agency theory has been employed in combination with institutional theory for a very long period of time, with Eisenhardt (1988) proposing the simultaneous adoption of the two lenses for evaluating the adoption of performance-based compensation policies by retail companies, stressing the need for both perspectives for a good description of compensation policies. A similar combination was employed, still in a quantitative study, by Goktan (2014), who looked at the relationship between Chief Executive Officer compensation and green management practices within the agency theory and institutional theory frameworks, confirming the potential of combining these theoretical lenses. Employing an interpretive approach, Doherty et al. (2014) use agency and institutional theory to make sense of interviews with franchisors and franchisees in nine franchise organisations operating in the retail

sector in China; the two theoretical lenses are employed to look at different dimensions (e.g., power, control, support, conflict) which regulate the franchise relationship in China. The tenets of institutional theory have also been combined with the resource-based view of the firm. The seminal paper from Oliver (1997) suggests that both resource and institutional capital are indispensable to sustainable competitive advantage of a firm. A firm's institutional context includes its internal culture as well as broader influences from the state, society, and inter-firm relations that define socially acceptable economic behaviour. Normative rationality, institutional mechanisms and institutional sources of firm homogeneity can extend resource-based explanations of sustainable competitive advantage. In recent years, the combination of the two theories has been proposed by several authors. Escobar and Vredenburg (2011), through RBV and IT, shed some light on the adoption of sustainable business models by big multi-national corporations.

For instance, Dubey et al. (2019) paper draws on RBV and IT in order to develop and test a model that describes the importance of resources for building capabilities, skills and big data culture and subsequently improving cost and operational performance. Similarly, Shibin et al. (2020) employed RBV and IT in order to explain the adoption of sustainable supply chain management practices, and their impacts on organisational performance.

Gillis and Combs (2009) incorporate resource-based theory with agency theory to offer a more complete explanation for firms' franchising decisions and performance.

In the context of agency theory in combination with stakeholder theory some interesting examples are presented, for instance Puyvelde et al (2012) use these theories to explore management of non-profit organisations. The use of a stakeholder perspective allowed them to differentiate distinct groups of external and internal non-profit principal-agent relationships and review all these interactions from an agency view to understand the conflicts between principal–agent. Likewise, Verstegen and Schneider (2003) use the mix of theories to present the agency relationship amid institutional stakeholders which identifies the institutions' market power, their intricate position as financial mediators, and potential participation in coincident and opposing agency contracts.

Miguel and Haugan (2019) applied both the resource-based view and agency theory approaches to test the make/buy decisions or performance outsourcing in maintenance service. They use agency theory to explain how performance-based contracts (PBCs) may have an advantage to innovation and RBV theory to examine how the capabilities and resources of maintenance firms affect the performance of medical device conservation. Duh (2010) also combines RBV and agency theory to explain the performance concerning family and non-family businesses since both theories have been considered in contemporary research related to empirical family business.

The paper proposed by Herold (2018) highlights the link between IT and stakeholder theory in the analysis of sustainability reports. The author emphasises the need to consider multiple institutional and stakeholder pressures, and anslyses how these pressures influence outcomes in sustainability reporting.

Nevertheless, the use combination of different theories in studies related to sustainability is also noteworthy with reference to the simultaneous adoption of RBV and stakeholder theory. Munodawafa and Johl (2019) found that resource-based view and stakeholder theory are frequently applied in describing eco-innovation. They explore the concept of how eco-innovation is a risky deal for firms and their stakeholders since these eco-initiatives involve the commitment of all stakeholder groups and eco-innovation is a competency that can be achieved from using resources of the firm. They also bring out the suggestion that a multi-theoretical standpoint can support to overcome the restrictions of one theory, in addition to assist to expose further managerial aspects which could hypothetically catalyse the eco-innovation and performance relationship.

Table 3.5. Matrix of published articles using combination of theories.

	Agency Theory	Institutional Theory	Resource Based View Theory	Stakeholders' Theory
Agency Theory		Eisenhardt (1988) Goktan (2014) Doherty et al (2014)	Gillis and Combs (2009) Miguel and Haugan (2019) Duh, M. (2010)	Verstegen and Schneider (2003) Shankman (1999) Puyvelde et al. (2012)
Institutional Theory			Yang and Konrad (2011) Dubey et al (2019) Oliver (1997) Escobar and Vredenburg (2011) Shibin et al (2020)	Herold (2018) Mar and Ramo (2006) Rodríguez-Fernández et al (2020)
Resource Based View Theory				Munodawafa and Johl (2019) Sodhi and ManMohan (2015) Idris et al (2003)
Stakeholders' Theory				

The theoretical framework will help to explain the phenomena in the organisations as well as to mitigate the existing gap between theoretical explanations and practice (Halldorsson et al., 2007). The theories presented in this chapter have been selected to achieve the objectives set out in chapter one.

3.4. Multiple theories in this research

Figure 3.7 illustrates how these theories interact with each other and have the ability to offer more significant evaluation and interpretation of the SC. Each theory will be explained in detail, as well as the main aim to achieve by each theory used.

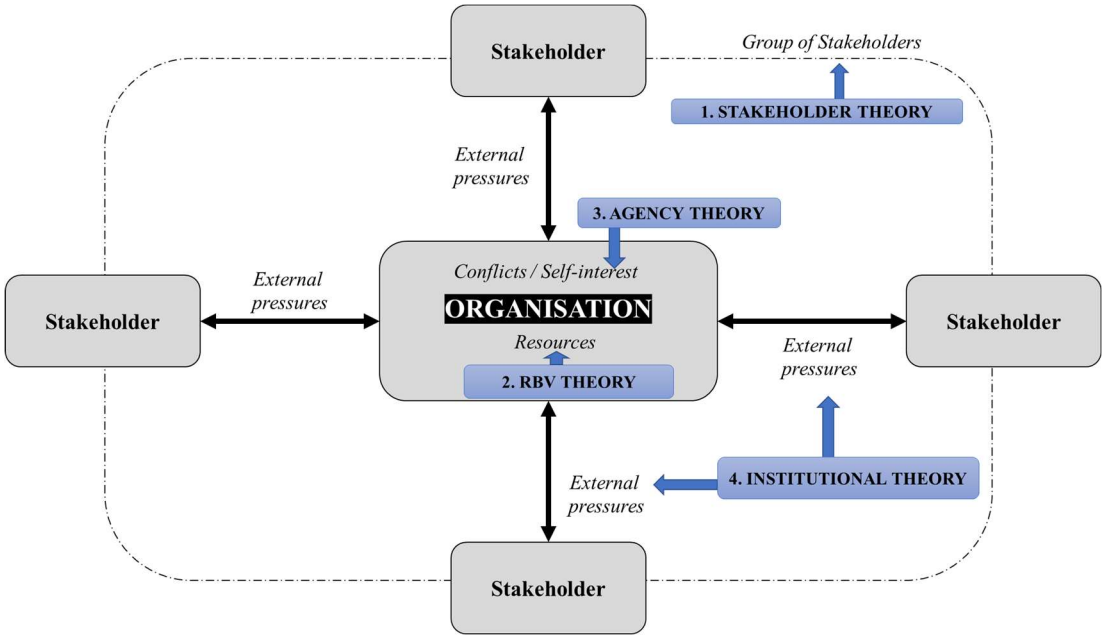


Figure 3.7. Suggested Framework - Supporting Theories

First, to get an overview of the supply chain, the internal and external stakeholder groups of the organisation must be identified and to achieve this aim, the suggested theory is Stakeholder Theory. This theory is used only as a support to map different stakeholders and participants in the study but will not be further used for analysis.

Second, tangible, and intangible resources in organisations are an essential part for future development because they support the creation of products and services. The use of the resource-based view (RBV) theory explains how the unique utilisation and combination of tangible and intangible resources could support firms to attain a sustainable competitive benefit (Grant, Review and Berkeley, 1991).

Third, Agency theory assist in the understanding about how people behave within organisations and the conflicts that arise between them deriving from their mutual interests. Likewise, this theory contributes to identify and map conflicts with suppliers.

Finally, organisations also receive external pressures that lead them to adopt specific models, which we can understand as Isomorphism explained by Institutional Theory. The combination of the suggested theories allows a broader view of both internal and external factors and provides the crucial means for the development of data collection methods.

3.5. Chapter Summary

Theories can assist to develop conceptual frameworks for research, depending on the purpose, content and aims. The use of multiple theories in a research is gaining more importance in academia to validate dynamics in a Supply Chain that otherwise cannot be cover with one single theory. This chapter aimed to provide an overview of the main models and theories suggested to answer the research objectives from Chapter 1.

Figure 3.7 illustrates the four main theories suggested to support the design of the data collection and the analysis and discussion. These theories were strategically chosen to consider all details, from the general to the specific, in the supply chain in order to comprehend important aspects influencing the application of CE systems in the organisations. The theories were suggested to address some of the following aspects:

- *Stakeholder Theory.* Help to identify different groups in the supply chain to understand their perspectives and interests in order to consider strategies for future implementation of the CE practices in the supply chain.
- *Resource-Based View*. This theory will help the organisations to analyse their present resources (Tangibles and Intangibles) and consider how these resources build competitive advantage in a CE model.
- *Agency Theory*. Will aim to explain how people behave within a corporate environment and how regulations must be place in the organisation to avoid conflicts between the agents and the principals that derive from self-interest. This theory will help to understand the dilemmas that emerged within the organisations and will serve as a complement to the Stakeholder Theory.

- *Institutional Theory*. This theory seeks to understand how organisations address the external pressures that affect the adoption of new models (Isomorphism).

The data collection for this research will be divided in two stages being the first stage the collection of secondary sources (databases, news, reports) and the second stage primary resources through semi-structure interviews. The complete details about every stage will be explained in the following two chapters.

CHAPTER 4

METHODOLOGY

The processes used to collect information and data from different sources as a support for decision making in business or research are known as research methods. According to Ghauri and Gronhaug (2005), research methods can be seen as "tools or ways of proceeding to solve problems"; Clough and Nutbrown (2012) explained the Methodology as a particular research "recipe". This section explains in detail the structure used and the methods planned for this research as well as the tools proposed for data collection. It will also describe the research philosophy and provide an explanation of the selected Methodology. Figure 4.1 contains the research map for this chapter and the link showing the connection with the previous chapter as support to develop this chapter.

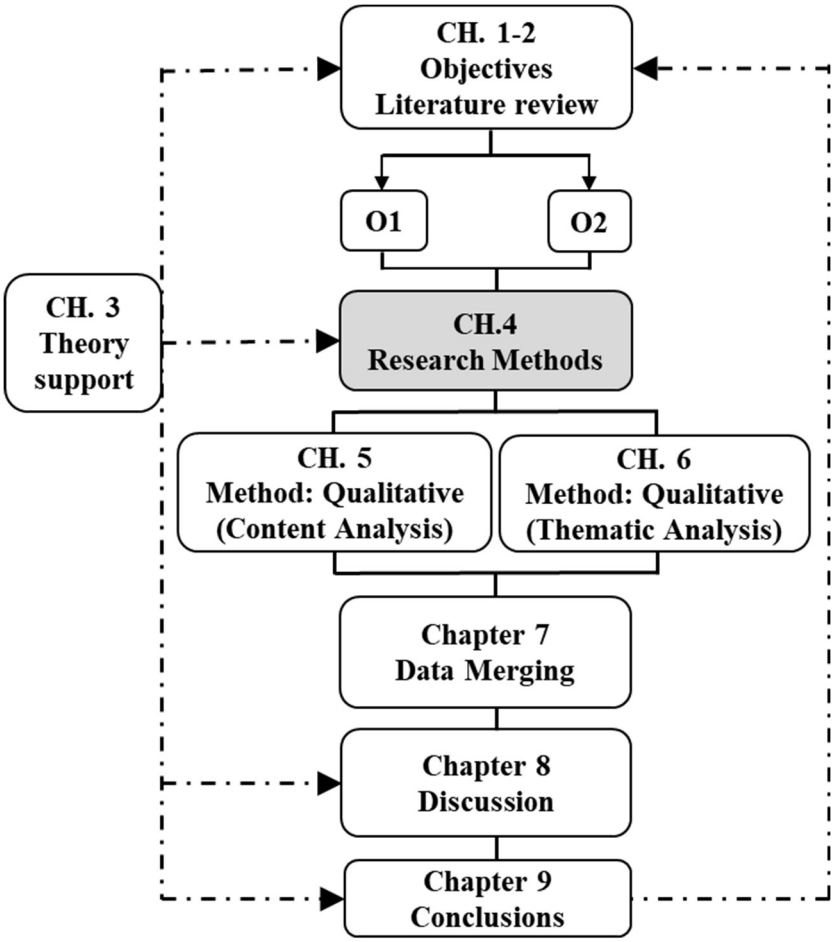


Figure 4.1. Research Map-Research Methods

4.1. Epistemology, Ontology and Research Approach adopted

Research Philosophy refers to the development of knowledge and the nature of that knowledge; it is the beliefs about how the data should be collected, examined, and used. The research onion (Saunders et al. 2009) is a representation of the potential choices of data collection methods, research philosophies and research approaches. Saunders et al. (2009) designed the research onion in order to explain all the stages which researchers must go through when planning the design of the Methodology. Each layer of the onion describes a particular stage and provides an overview of all issues that need to be considered before starting on the research.

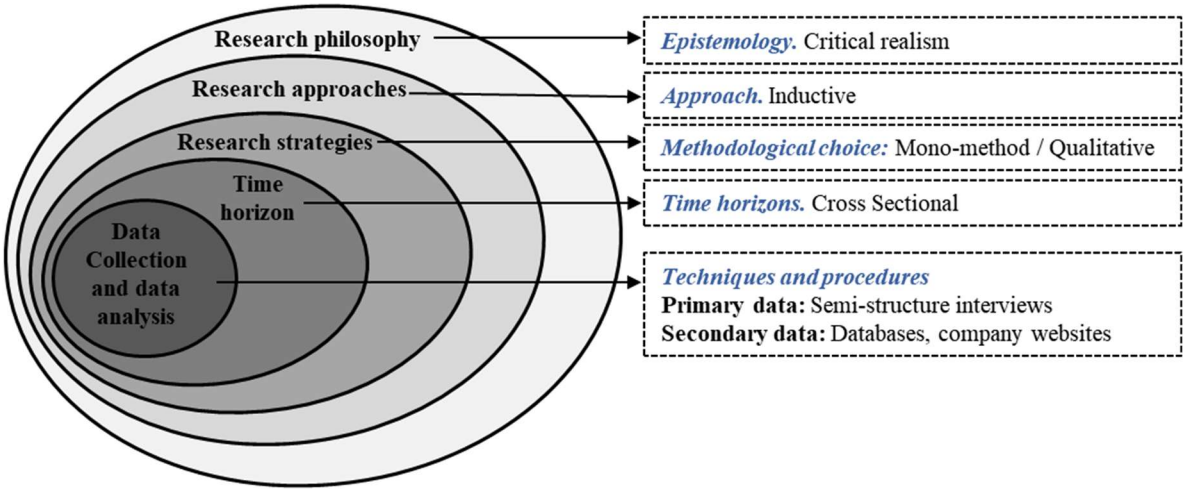


Figure 4.2. Summary of adopted methodology

For all research, theoretical questions will emerge from different conceptions and interpretations of social reality. The Paradigm encompasses the beliefs, assumptions, values, and practices shared by a research community (Kuhn, 1962). Hesse-Biber and Leavy (2004) defined a paradigm as the basic belief system or worldview that guides the researcher, considering not only the methodology but also the ontological and epistemological points of view. Guba (1990) mentioned that paradigms can be characterised through their: ontology (What is reality?), epistemology (How do you know something?) and methodology (How do you go about finding out?).

First, Ontologies help to deliver a formal familiar language for humans and automatic agents on the given sphere of information (Erez, Zhitomirsky-Geffet and Bar-Ilan,

2015). *Ontology* defines the reality based on how the world is perceived and this term is divided into *subjective* and *objective* (O'Gorman and Macintosh, 2015). Ontology put in the simplest terms; is how we view reality. While *objective* might be explained as "looking at reality as made up of Solid Objects that can be measured and tested"; *subjective* is instead the perceptions and interactions of living subjects in the reality. The objectives set for this research will be better accomplish through a subjective ontology, since it is beneficial to explore facts evolved from behaviours, attitudes, experiences, and interpretations (O'Gorman and Macintosh, 2015).

Secondly, the further factor to consider in the research philosophy is the Epistemology. Epistemology is concerned about the nature of knowledge (Bryman and Bell, 2015). It is used to answer the question: What and how can I understand reality - Knowledge? (Crotty, 1998). According to O'Gorman and Macintosh, (2015), there are many epistemological positions; four principles are defined: Positivist, critical realist, action research and interpretivist. *Positivism* as a philosophy assumes that only "facts" obtained from the scientific process can make genuine knowledge assertions. This epistemological position sees noticeable evidence as the only basis for defensible scientific findings. *Interpretivism* is a description in terms of meaning and meaningful action; purposes, rules, (historical) narratives. Interpretivism and positivism are opposed positions, because interpretivism allows personal interpretation and participation by researchers to describe elements in the study. *Critical realism*, on the other hand, is a paradigm which combines general philosophy of science with Social Science philosophy to describe an interface between the natural and social worlds. Critical realism stresses the necessity of not only using empirical realism or personal interpretation and beliefs, but also having guidelines about how research might be done, and the theory can be built. Finally, *Action Research*, as Lewin (1946) suggested, is an epistemological approach that is concerned with two main topics: "the study of general laws and the diagnosis of a specific situation". After the consideration of the different paradigms in relation to the nature of the research, *critical realism* is considered as the appropriate philosophical stance for fulfilling the objectives of the present investigation. The decision is based on this approach combining general philosophy with the means to understand social problems. Given the exploratory nature of the study, this approach will help to understand in depth why things are as they are. *Critical realism* is in general well suited to case study research where a

particular situation needs to be explored and interpreted to produce conclusions and recommendations on a determined topic.

Lastly, there are two main approaches to reasoning in research analysis: *deduction* and *induction*. With *deduction*, a theory and hypothesis (or hypotheses) are developed, and a research strategy designed to test the hypothesis. With *induction*, data are collected, and a theory developed as a result of the data analysis (Saunders et al., 2009). Given the nature of the objectives set in Chapter 2, it will be appropriate to adopt an inductive approach for this research. By implementing an inductive approach, the research will provide a broader understanding of the phenomena, since the aim is to explore the proposed topics and obtain as much details as possible instead of trying to formulate hypothesis.

4.1.1. Research strategy

Research strategy describes step-by-step the appropriate plan of action to conduct a research systematically. There are two main types of research strategies: quantitative and qualitative. The terms quantitative and qualitative are used in research to differentiate both data collection techniques and data analysis procedures. Quantitative refers to data collection techniques that generate or use numerical information, while Qualitative methods use non-numerical data (Saunders et al., 2009). Given that this research will adopt an inductive approach, the data will be generated in an explorative methodology with a flexible structure that allow to obtain as much information as possible, qualitative method appears to be the most suitable method for data collection. The use of qualitative research can aid in the creation of different case studies for analysis. The objectives are aiming to understanding the perspective of stakeholders in the supply chain of selected regions likewise determine challenges, opportunities, and practices. In the next sub-themes, the approach and methods proposed to develop the data collection will be explained in detailed.

4.1.2. Data Collection

In order to address the research questions, it is critical to consider whether to collect new information or to reanalyse the available data. Data collected specifically for a new research study is referred to as Primary data, while data previously collected for other purposes is known as Secondary data (Saunders et al., 2009). This research will

use both primary and secondary data to complement findings. To answer the research questions in this study both forms will be needed. The design of this thesis will be divided in two stages.

The first stage of this research corresponds to the use of secondary sources of information (databases, company websites, annual reports, and news) to recognise the present state in firms inside the planned regions in relation to CE implementations. Secondary data is used in some research as a primary data source strategy or in a supplemental method in combination with different methods. The data obtained will assist to plan the outline of the firms and activities in the regions, it can also help to understand the main CE practices stated for each sector. The sample of firms will be methodically obtained using the trade record databases FAME in the UK and DENUE for the Mexican sample. These databases will help to find the sample of companies in the regions with the target number of companies that was set at 50 per industry in each country, meaning that 200 firms were analysed in total. The full details of how this companies were collected and analysed will be fully explained in Chapter 5.

The second stage is planned to complement the first exploratory research and demonstrate the patterns and practices in the region. The suggestion for this stage is to continue the exploration with an in-depth conversation with individuals engaged in the implementation of CE activities inside organisations. This in-depth knowledge can be obtained using semi-structured interviews with experts and central stakeholders at senior positions in the supply chain. The full rationale about how the interviewees were contacted for this stage, the map of the interviewees and all full details about this stage will be explained in a complete detail in chapter 5.

4.2. Chapter summary

Research methods are considered instruments to solve problems. The Methodology proposed for the research, is explained within this chapter. The epistemological position selected for this research is critical realism, as a result of the study being exploratory in nature, aimed at getting in-depth information about a situation not previously researched. Critical realism helps to understand why things are as they are. The approach will be inductive and qualitative methods will be used to collect information.

CHAPTER 5

CONTENT ANALYSIS AND FINDINGS

Previous chapters have presented detailed discussion about the circular economy framework and research methodology adopted. This chapter presents the preliminary analysis process conducted before data collection in the field. The rationale behind this initial study is to obtain a preliminary overview of the contemporary status of CE practices in Textile and Food firms in the targeted countries. Furthermore, this chapter provides detailed descriptions of the specific methodology used in the content analysis to obtain the outcomes.

As a reminder of the objectives set in the first chapter, the purpose of this thesis is to understand how CE practices are implemented within SCs and the role of stakeholders in promoting or hindering their diffusion. In conformity with the objectives, the data was obtained from secondary sources for a preliminary overview, and then complemented with primary data (**Error! Reference source not found.**). This chapter will refer to the related secondary data and preliminary overview results.

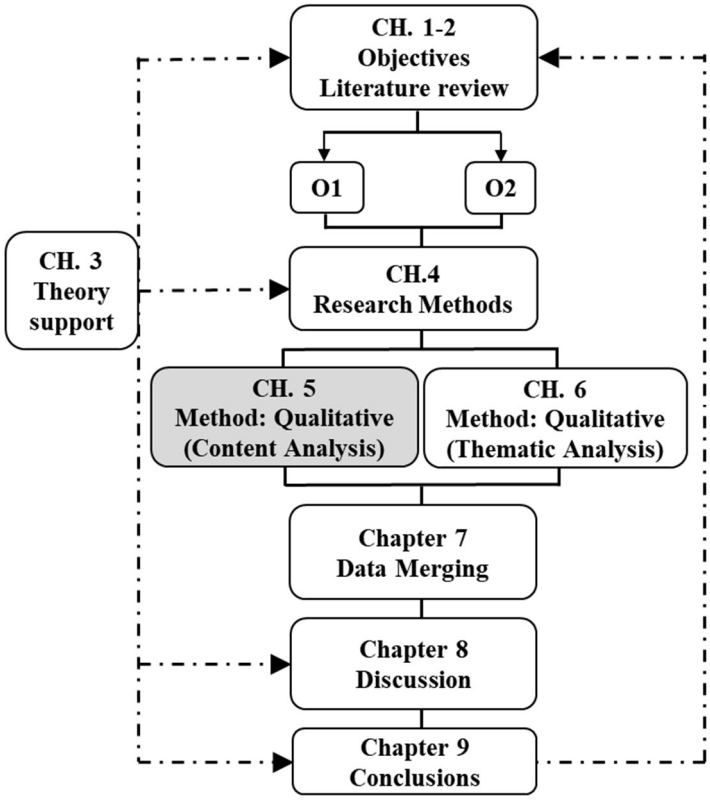


Figure 5.1. Research Map - Content Analysis

5.1. Content Analysis: Procedures and Criteria

In the first instance, this research needed to conduct an exploratory search using secondary data to identify the up-to-date status of the companies. Walliman (2011) stated that studies need secondary data as a background to obtain a notion about theories and present ideas about the subject. Content analysis is potentially one of the most noteworthy methods for social science (Guthrie and Abeysekera, 2006; Neuendorf and Kumar 2015). The significant advantages of using secondary data are the cost-effectiveness and convenience; this information has been previously collected by experts in their fields, allowing us to gain a quick overview and reducing the length of fieldwork (Cheng and Phillips, 2014; Cowton, 1998; Waliman, 2011). The objective of content analysis is to compact and organise a large volume of data into main outputs (Erlingsson and Brysiewicz, 2017), and provide inferences about communications, messages and symbols (Krippendorff, 2013). In accordance with Krippendorff (2013), content analysis comprises of six steps that define it procedurally: design, unitising, sampling, coding, drawing inferences and validation (Figure 5.2).

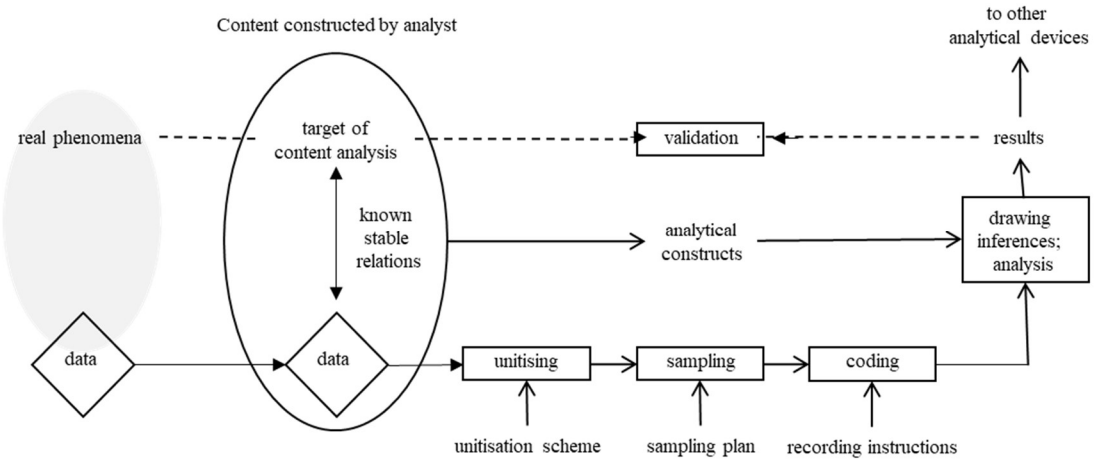


Figure 5.2: The content analysis research process. Diagram by Klaus Krippendorff (1989)

The present research project proposes the use of secondary sources (e.g., databases, company websites, annual reports, and news) of information to understand the current situation in companies within the explored regions in relation to CE implementations. The information obtained assisted to map the profile of the companies and activities in the regions and sectors studied, along with the main CE practices stated. The sample of companies listed for this study was systematically built using corporate register databases as FAME and DENUE to find the most representative companies in the

regions with the target number of companies that was set at 50 per industry in each country, meaning that 200 companies were analysed in total.

Numerous authors have expressed their interest in creating mechanisms that contribute to the development of knowledge in reference to the supply chain domain (Cheng and Phillips, 2014; Cowton, 1998; Ellram and Tate, 2016; Roth and Rosenzweig, 2020). Thus, secondary sources have grown in importance and relevance in recent years in the field of purchasing and supply chain management research as a tool that can provide supplementary data through available sources. Moreover, secondary data has become a progressively widespread method of enhancing the complete efficiency of corporate research (Cheng and Phillips, 2014).

The usage of secondary data can be found in research as a primary data source strategy or in a supplemental way in conjunction with other methods. Secondary sources have become effective for areas of study such as sustainability, financial performance analysis, statistical data among others; this is mainly due to the increase in the supply of public data by private and public organisations. This information has become accessible through annual financial reports or website and has been steadily updated. Simultaneously, Journals have been more reluctant to publish research using surveys due to concerns related with the reliability of the information (Ellram and Tate, 2016). Surveys have been considered inappropriate to obtain solutions for specific research, as the main problems is the accuracy and integrity of the data obtained given that comes from one single party). The question, particularly in SCM field, is how to achieve consistent data on a wider sample that can provide insightful information of the complete structured system.

The design of this research using secondary data additionally is based in contemporary CE research where the information was obtained and coded using information available in corporate reports and databases to understand current CE practices in organisations (Stewart and Niero, 2018).

5.1.1. Design

The design of the content analysis refers to the framework. In this phase is decided what we want to know. Within the first step, the structure of the research is proposed

to create accurate and considerate planning about the expected aims, methodology, target, sampling, and coding.

The initial phase of the content analysis is about identifying the purpose of the preparatory examination (Erlingsson and Brysiewicz, 2017). With this compendium, the idea is to illustrate a preliminary picture of the current situation of firms in Mexico and the UK in the food and textile industries. Two preliminary aims were created to achieve the initial study:

A1: Identify the current practices implemented in the top leading companies for the two sectors and countries studied.

A2: Cross-comparison and analysis of CE practices between industries, and countries.

With these two purposes in mind, it is possible to know more about the current status of CE practices in the two targeted countries.

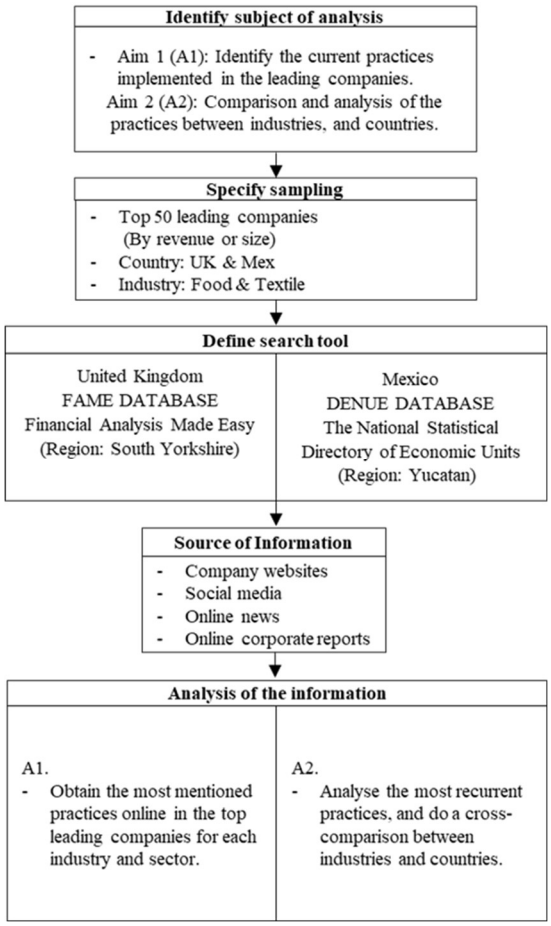


Figure 5.3: Content analysis procedure used to analyse the current CE practice implementation. (Stewart and Niero, 2018)

Figure 5.3 illustrates the complete process of content analysis, step by step, for this research using secondary data.

In light of these aims, the methodology might trigger thinking about the best resources to get the foreseen results. Regardless of the methodology chosen, the process of CA acts as a guide to generate inferences about different narratives not explicitly mentioned in the evidence.

5.1.2. Unitising

During this phase, the unit of analysis is determined. A unit is an established message or part of a message, which acts as the basis or foundation to recognise the target population and design a sampling (Carney, 1971). The variables of the units enable measurements and create the foundation to create analysis.

5.1.3. Sampling

Sampling is the operation of selecting a subset of units from the larger population. This can either be random, meaning that every element has an equal chance of being selected, or non-random.

The sample of companies listed for this study was systematically built using corporate register databases. The database used to locate the most valuable companies in Mexico for the mentioned industries is The National Statistic Directory of Economic Units (DENUE by its name in Spanish: Directorio Estadístico Nacional de Unidades Económicas) from the National Institute of Statistics and Geography (INEGI by its name in Spanish: Instituto Nacional de Estadística y Geografía) in Mexico, which is the primary source of national information produced for the Mexican government by census. Regarding the UK, the database used was FAME (Financial Analysis Made Easy), which contains financial and historical information for companies in the UK and Ireland.

To achieve both preliminary (e.g., sampling: 50 Textile companies in Mexico, 50 Textile companies in the UK, 50 Food companies in Mexico and 50 Food companies in the UK). The search of companies was delimited by geographical location (Yucatan in Mexico and South Yorkshire in the UK) and sector.

5.1.3.1.Geographic delimitation

The first limitation used for the search was the geographic and sectoral distribution of companies.

Regarding the companies in Mexico, the first filter used to refine the search was limitation of the geographical location to provide around the same population as the sample in the UK.

The Mexican state of Yucatan, located in south-eastern Mexico, has a population of around 2.102 million and an area of 39,524 km2 (Instituto Nacional de Estadistica y Geografia, 2015). The area of Yucatan is divided into 106 municipalities, with Merida its capital city and giving a density of 53 residents per square kilometre (Figure 5.4).

Figure 5.4: Map of Yucatan and its geographical divisions (Inegi, 2015)

Meanwhile, the South Yorkshire region of the UK has a population of around 1.402 million, with an area of 1,552 km2 (Office for National Statistics, 2018). South Yorkshire is divided into four metropolitan boroughs: Barnsley, Doncaster, Rotherham, and Sheffield (Figure 5.5) this last one being the largest settlement in the region. Although the population number is the main attribute to take into consideration for the comparison between the two regions, it is also important to highlight for future analysis that while South Yorkshire has a smaller area in comparison with Yucatan, the population density is higher per square kilometre, giving as a result 898 residents. This information can be used in the future to analyse whether that factor affects in any way the implementation of practices in highly populated areas.

Figure 5.5: Map of South Yorkshire and geographical divisions. (ONS, 2018)

5.1.3.2.Sectoral delimitation

The second delimitation to reduce the number of companies is a search by sector. Having previously established the sectors to explore (Food & Textile), the table below (Table 5.1) shows all the categories of economic activities selected from each database for each sector.

Table 5.1: Economic activities selected from the databases.

Industry	Economic activities related - Search strategy
Mexico - Yucatan (Textile Industry) Database: DENUE	- Industrias Manufactureras (Manufacturing industries): (313) Fabricación de insumos textiles y acabado textil (Manufacture of textile supplies and textile finishing) (314) Fabricación de productos textiles, excepto prendas de vestir (Manufacture of textile products, except clothing) (315) Fabricación de prendas de vestir (Garment Manufacturing) (316) Curtido y acabado de cuero y piel, y fabricación de productos de cuero, piel y materiales sucedáneos. (Tanning and finishing of leather, and manufacture of leather and substitute materials). **Total No of companies: 14,871 companies (Search: 14 June 2018)**
Mexico - Yucatan (Food Industry) Database: DENUE	- Agricultura cría y explotación de animales aprovechamiento forestal, pesca y caza. (Agriculture, animal husbandry and exploitation, logging, fishing and hunting) - Industrias Manufactureras (Manufacturing industries)

	(31-33) Industria alimentaria (Food Industry) (312) Industrias de las bebidas y del tabaco (Beverage and tobacco industries) **Total No of companies: 5,655 companies (Search: 14 June 2018)**
UK – South Yorkshire (Textile Industry) Database: FAME	(13) Manufacture of Textiles (14) Manufacture of wearing apparel (15) Manufacture of leather and related products **Total No of companies: 2,913 companies (Search: 14 June 2018)**
UK – South Yorkshire (Food Industry) Database: FAME	(10) Manufacture of food products (11) Manufacture of beverages (56) Food and beverage service activities **Total No of companies: 133 companies (Search: 14 June 2018)**

The total numbers of companies per sector after the first two filters were as follows:

i. Mexico (Textile Industry): 14,871 companies
ii. Mexico (Food Industry): 5,655 companies
iii. UK (Textile Industry): 2,913 companies
iv. UK (Food Industry): 133 companies

The first exploration helped to find out the total number of companies per sector in each region and to obtain an overall picture of the ongoing status and development of the industries.

5.1.3.3.Size of the companies

Given that the study seeks to understand the top leading companies and their up-to-date CE practices, the next imperative step is to select the most relevant companies. The size of the companies was taken into consideration in creating the list of the most significant organisations, choosing the top 50 biggest companies by the number of employees. Both databases provided different information. DENUE Database for Mexico contributed a list of companies showing name, size, economic activity but not financial information for all the companies, whereas FAME provided operating revenues. Since it was necessary to standardise the comparison of leading companies across the two countries, size of the organisations by the number of employees was

considered as the most appropriate indicator ain the two databases for designating the top 50 leader companies.

To avoid any differences in size classification of the industry by the number of employees across the two countries, the standard classification provided by the Organisation for Economic Co-operation and Development (OECD, 2019) was the scale used for both countries (Figure 5.2).

Table 5.2: Classification of companies according to the number of employees (OECD)

Organisation Size	No of Employees
SME	<10 Employees
Small	10 to 49 Employees
Medium	50 to 249 employees
Large	> 250 employees

In some cases, companies appeared two or more times for the reason that they conduct economic activities in different categories; all the repeated inputs were deleted.

Once the final 50 companies for each sector were allocated for analysis, an intense online search was conducted using the website of each organisation as a first approach. On the websites, CE practices, sustainability, ethics, good practices and other activities related were looked for to create a list of the existing applications. Corporate reports, social media, online news and any other information online was also utilised to create a classification of the level of implementation ranging from no practices towards complete circularity. The list of companies analysed can be found in Appendices I to L.

5.1.4. Coding

Qualitative content analysis is a method used to analyse informational content in a systematic manner with the aim of inferring substantial meaning from communications (Mayring, 2002; Guthrie and Abeysekera, 2006). Using the example of Stewart and Niero (2018) to code the data obtained from the websites and corporate reports online, a deductive category coding system was derived from previously established frameworks of CE core principles, strategies, and parts of the value chain. The pre-established codes will help to identify the existing systems in the supply chains that

will be analysed, this is linked with research question number one: Understand how CE practices are implemented within Supply Chains.

The use of pre-determined codes will assist to create the foundations to explore in a more inductive approach the recognition of the CE practices in the organisations studied. It should be noted that the identification of this practices will be completely inductive, even though we are using as a support codes already available in the literature. The codes will be divided in the following categories which are linked with fundamental values of Circular Economy.

Code 1 and 2: **Circular Economy Strategy Database according to the stage of the supply chain**

This coding is based on the list from the Circular Economy strategies database compiled by Kalmykova et al. (2018) showing diverse strategies at different stages of the supply chain. The CE strategy database was created by synopsis of CE methods described in the existing literature.

Code 3: Core Principles **– 9R Framework**

9R Framework: Recover, Recycle, Repurpose, Remanufacture, Refurbish, Repair, Reuse, Reduce, Rethink, and Refuse (Potting et al.2017; Van Buren et al., 2016). This is one of the most recent updates of the initial 3R core principles (Reduce-Reuse-Recycle).

Code 4: **Sustainable development aims.**

Some of the practices referring to sustainable development and its sub-dimensions were continuously mentioned online.

Table 5.3. presents the condensed codes for each category.

Table 5.3: Coding Framework

Code 1	Code 2	Code 3		Code 4
Part of the Value Chain / CE Strategy Database (Kalmykova et al, 2018)		Core Principles 9R Framework (Potting et al., 2018)		Sustainable Development aims
Part of the Value chain	Circular Economy Strategies Database	Level of Circularity	Strategy	Strategy
	Diversity and cross-sector linkages	Increasing Circularity ↑		Economic
	Energy production/ Energy autonomy	R0	Refuse	Environmental
	Green Procurement	R1	Rethink	Social
	Life Cycle Assessment (LCA)	R2	Reduce	
	Material Substitution	R3	Reuse	
	Taxation	R4	Repair	
1. Material Sourcing	Tax credits and subsidies	R5	Refurbish	
	Cuztomization/made to order	R6	Remanufacture	
	Design for disassembly/recycling	R7	Repurpose	
	Design for modularity	R8	Recycle	
	Eco Design	R9	Recover	
2. Design	Reduction			
	Energy Efficiency			
	Material productivity			
3. Manufacturing	Reproducible & adaptable manufacturing			
	Optimised packaging Design			
	Redistribute and resell			
4. Distribution & Sales	Sustainable Fleet			
	Community Involvement			
	Eco-Labelling			
	Product as a service or Product Service System			
	Product Labelling			
	Re-use			
	Sharing			
	Socially responsible consumption			
	Stewardship			
5. Consumption and use	Virtualise			
	Extended produced responsibility (EPR)			
	Incentivised recycling			
	Logistics/Infrastructure Building			
	Separation			
6. Collection and disposal	Take-back and Trade-in systems			
	By-Product use			
	Cascading			
	Downcycling			
	Element/Substance recovery			
	Energy recovery			
	Extraction of bio-chemicals			
	Functional recycling			
	High quality recycling			
	Industrial symbiosis			
	Restoration			
7. Recycling and Recovering	Upcycling			
	Reburbishment / Remanufacture			
8. Remanufacture	Upgrading, Maintenance and Repair			
9. Circular Inputs	Bio-based materials			

5.1.5. Drawing Inferences

The process of making inferences is what gives meaning to the data collected. Inferences are phases in interpretation, going from grounds to logical outcomes. Once the results of the data collection are available, then researchers can make assumptions about the messages within the results, the sample, and the context of the data analysed.

By making inferences, the data collected can be discussed to see patterns within the data. The results will be presented in a later section of this chapter in order to clarify the main findings from the different industries and regions. As previously mentioned in the Coding section, the pre-established codes will support the investigation of

practices in the supply chain which is aligned with the first research question about the understanding of current practices in the Supply Chain. The process of drawing inferences therefore has an essential part in the assessment of the information collected and inductively classified. Drawing inferences facilitates the insight about how these practices can be used and what this data reveals about the current condition of CE in the firms.

5.1.6. Validation

Lastly, a critical step in the content analysis is to make sure that the data collected and the inferences about this data have legitimacy. To create valid inferences from the content, it is important that the classification process is trustworthy in the sense of being coherent. Since the information varies according to different perspectives, it is suggested to have a second coder to provide validation for the information. Reliability of human coding is regularly assessed using a statistical rate of inter-coder reliability which refers to the extent of agreement between two coders. Distinguishing the measurement of inter-coder reliability is a way to provide strength to the results.

5.2. Content analysis results

The analysis was first completed by industry to compare different practices implemented in the different countries and then a global analysis was completed.

With the data obtained in the databases, it was possible to understand the profiles of the companies in both regions and classify them according to the number of companies in the different sub regions, the size of the firms, and the activity they carry out. Below are the results obtained from the classification of the companies for later analysis.

5.2.1. Food Industry – Descriptive analysis

Distribution of the top 50 food companies by location

The first results show the distribution of companies in the compared areas (Yucatan-Mexico & South Yorkshire-UK). The below graphics (Figure 5.6 and Figure 5.7) provide the distribution of the Top companies studied as would be expected the majority of companies are located in the capital city of each region (Merida-Yucatan

& Sheffield-South Yorkshire). The city of Mérida has a population of 830,732 (INEGI, 2010) compared with Sheffield's population of 582,506 (ONS, 2018).

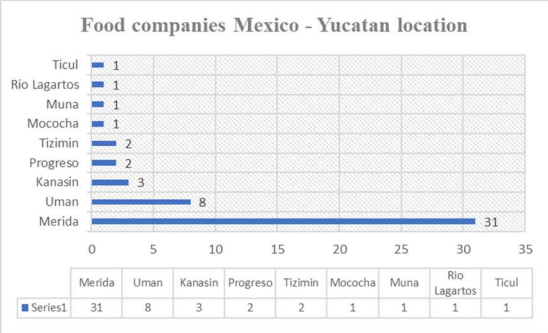


Figure 5.6: Distribution of the top 50 leader Food companies in Yucatan

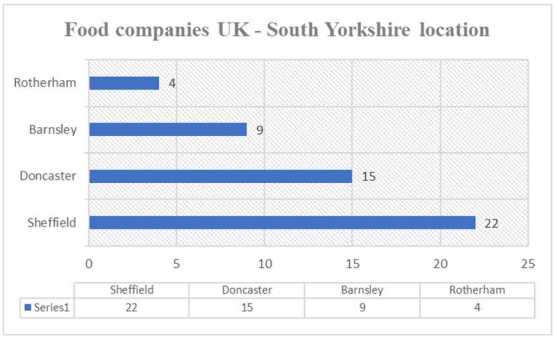


Figure 5.7: Distribution of the top 50 leader Food companies in South Yorkshire

Size of the top 50 food companies. Comparison between South Yorkshire region (UK) and Yucatan Peninsula (MX)

Concerning the size of the companies, in both countries the leading companies are predominantly micro and medium companies (Figure 5.8). The majority of the firms in the country of Mexico are Micro, Small-to-Medium enterprises (SMEs) and these constitute around 99.8 per cent of the totality (Instituto Nacional de Estadística y Geografía, 2012).

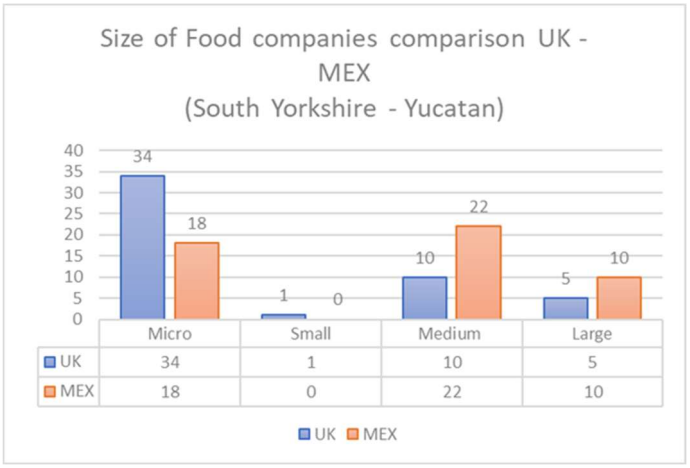


Figure 5.8: Size comparison of the top leading food companies in South Yorkshire & Yucatan

Activities associated with the top leading food companies in South Yorkshire region (UK) and Yucatan Peninsula (MX)

The economic activities in the food industry in the analysed regions are very similar, with bakery, food processing for animal feed and production of meat & poultry ranking highest in both areas, as can be seen in Figure 5.9. These similarities are considered for further analysis, as other factors could influence the implementation of more circular practices and it will be important to study these factors in detail.

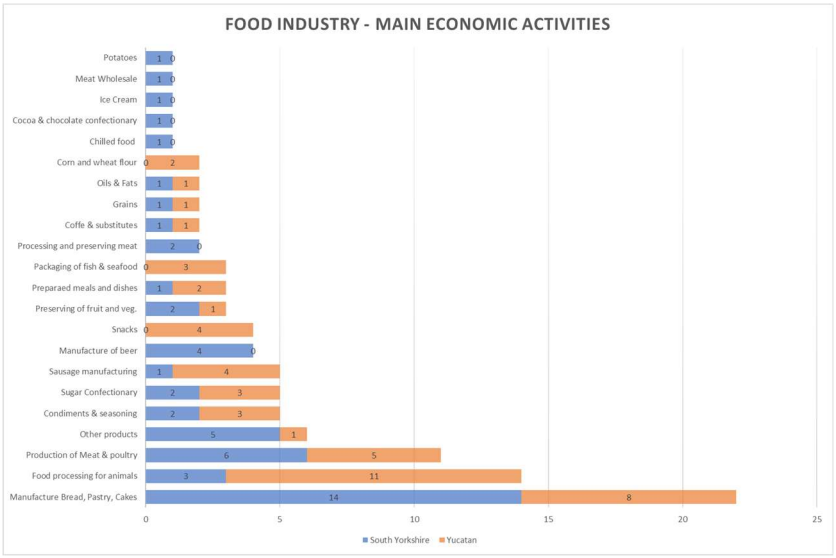


Figure 5.9: Main economic activities of the top leading food companies in South Yorkshire & Yucatan

At the moment, only the comparative data of each industry (food and textiles) are presented for further analysis of the practices in each sector and drawing conclusions about the content found online.

5.2.2. Textile Industry – Descriptive analysis

Distribution of the top 50 textile companies by location

In terms of the textile industry, similarly, the great majority of leading companies are located in the capital city. In the case of Yucatan, companies are more dispersed throughout the state compared to leading food companies, this may be because in the interior of Yucatan there is a great tradition of handicraft textile work in some municipalities. In regard to South Yorkshire companies, there is similar dispersion throughout the boroughs (Figure 5.10 and Figure 5.11).

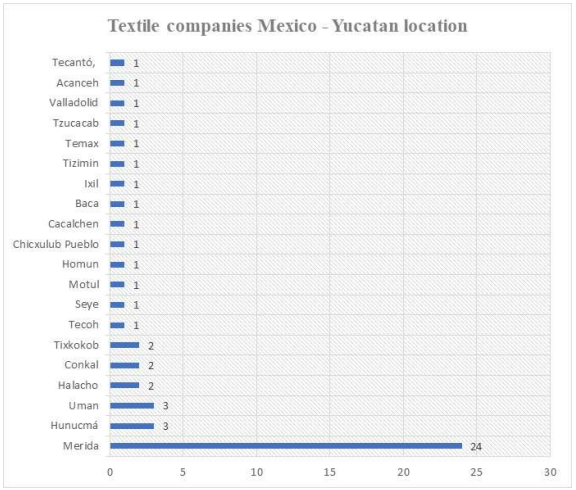


Figure 5.10: Distribution of the top 50 leader Textile companies in Yucatan

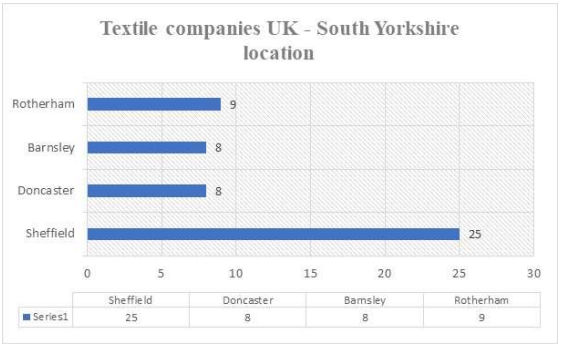


Figure 5.11: Distribution of the top 50 leader Textile companies in South Yorkshire

Size of top 50 textile companies. Comparison between South Yorkshire region (UK) and Yucatan Peninsula (MX)

In terms of size of the companies in the textile industry, there is a small difference compared with the food sector, because while the predominant company size is generally micro in both regions, in the specific example of the textile industry in Yucatan the top leading companies are concentrated in the medium and large categories. In the case of South Yorkshire region, the trend is still one of micro companies (Figure 5.12).

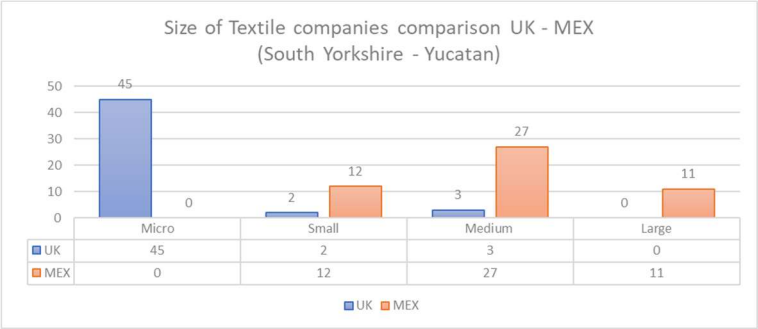


Figure 5.12: Size comparison of the top leading textile companies in South Yorkshire & Yucatan

Activities associated with the top leading food companies in South Yorkshire region (UK) and Yucatan Peninsula (MX)

The principal activity for both countries is related to Confection in series of other outerwear of textile materials. It is relevant to consider that this graphic is based on determination of the top leading companies by number of employees since the access to financial information is limited in both databases. Confection of textiles usually requires more people to be involved in the process, and in this respect, the assumption is that these companies are producing a more significant amount monetarily (Figure 5.13).

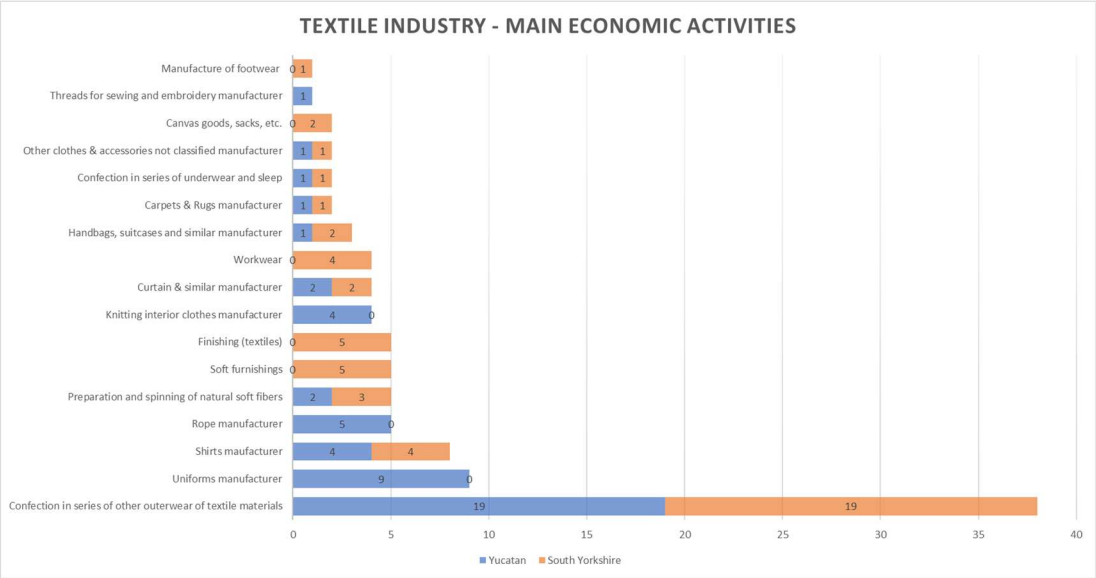


Figure 5.13: Main economic activities of the top leading textile companies in South Yorkshire & Yucatan

5.2.3. Content analysis – Results

The previous graphs presented the current view of the leading companies in the analysed regions in terms of location, predominant size, and principal economic

activities. According to the revision of the web pages and following the coding proposed in Figure 5.3, the results are as shown Table 5.4.

Table 5.4 contains the most mentioned practices found on the websites of the leading companies for both industries. In order to obtain the practices of different companies, information has been obtained exclusively from online news, information on social media or others which mention what is currently being done in terms of more circular practices.

Table 5.4. Circular economy strategies mentioned in the top companies online.

					FOOD		TEXTILE	
	Practices found online	1) Circular economy strategies database	2) Part of value chain	3) 9R Framework	YUC	SY	YUC	SY
ECONOMIC	Compliance with local legislation & certifications	Diversity and cross-sector linkages	Material Sourcing	-	2	1	3	1
	Implementation of circular business models	Bio-based materials	Circular Inputs	Rethink			1	
	Improve Supply chain efficiency & constant evaluation	Energy Efficiency	Manufacturing	Rethink	5	1	1	
	Local sourcing	Green Procurement	Material Sourcing	-			1	1
	On-Site waste management	Separation	Collection & disposal	Recycle	6	2	2	1
	Reduce Energy Consumption	Energy Efficiency	Manufacturing	Reduce	2	1		
	Supplier evaluation & supervision	Diversity and cross-sector linkages	Material Sourcing	-		1	2	2
	Sustainable Fleet	Sustainable fleet	Distribution & sales	Rethink	1			
ENVIRONMENTAL	Eco Friendly Packaging	Optimised packaging design	Distribution & sales	Rethink	4			
	Environmental awareness campaigns	Community Involvement	Consumption & use	-	3			
	Minimise carbon emissions	LCA	Material Sourcing	Reduce	3	1	3	
	Monitor environmental performance	LCA	Material Sourcing	-		2	1	1
	Preservation of natural areas	Stewardship	Consumption & use	-	3			
	Product (easy to recycle or made of recycled materials)	Eco design	Design	Rethink	1	1	3	1
	Raw material free of chemicals	Green Procurement	Material Sourcing	-			1	1
	Reforestation	Stewardship	Consumption & use	-	4			
	Support climate pledge actions	Diversity and cross-sector linkages	Material Sourcing	-	1		2	
	Sustainable Farming	Green Procurement	Material Sourcing	Rethink	1			
	Take-back Programs	Take-back and trade-in system	Collection & disposal	Repurpose	1		1	
	Use of renewable energy	Energy Efficiency	Manufacturing	Rethink	3	1	2	
	Water treatment	Downcycling	Recycling & recovery	Recycle	5		1	
SOCIAL	Antislavery & Human trafficking	Diversity and cross-sector linkages	Material Sourcing	-		1		
	Corporate social responsibility	Diversity and cross-sector linkages	Material Sourcing	-			1	
	Donations to charities	Sharing	Consumption & use	Repurpose	2			
	Ethical Trade (Fair Salary, not child labour, working conditions & hours)	Diversity and cross-sector linkages	Material Sourcing	-	3		1	2
	Help to develop communities around the plants	Community Involvement	Consumption & use	-	6		2	
	Partnership with academic & industry to develop environmental research	Diversity and cross-sector linkages	Material Sourcing	Rethink	1	1		
	Promotion of healthy lifestyle	Socially responsible consumption	Consumption & use	-	4		1	
	Stakeholders involvement	Diversity and cross-sector linkages	Material Sourcing	-			1	

1) Circular economy strategies database (Kalmykova et al., 2018)

2) Part of value chain (Kalmykova et al., 2018)

3) 9R Framework (Potting et al., 2018)

The strategies in Table 5.4 are divided into 3 different columns, each column representing the coding framework previously suggested. The findings are explained for each column as following:

Sustainable Development dimensions. The first column refers to the three dimensions of sustainable development (Economic, Environmental and Social). The methodology followed for group practices in the Sustainable Development dimension consisted of taking all the practices from the websites and placing them according to the following definitions:

Economic: Applies to efficiency of economic and technological activities, productivity, and economic results.

Economic

- Implementation of circular business models
- Compliance with local legislation & certifications
- Improve supply chain efficiency & constant evaluation
- Local sourcing
- On-site waste management.
- Reduce energy consumption.
- Supplier evaluation & supervision.
- Sustainable fleet.

Environmental

Environmental: the power to use natural assets without destroying the balance and integrity of ecosystems, activities to diminish the negative impact on the environment.

- Eco friendly packaging
- Environmental awareness campaigns
- Minimise carbon emissions
- Monitor environmental performance
- Preservation of natural areas
- Product (easy to recycle or made of recycled materials)
- Raw material free of chemicals

- Reforestation
- Support climate pledge actions
- Sustainable farming
- Take-back programmes
- Use of renewable energy
- Water treatment

Social: This dimension refers to all activities related with equality of opportunities for people, welfare, social rights and sustainable human development.

- Antislavery & human trafficking
- Corporate social responsibility
- Donations to charities
- Ethical trade (Fair salary, no child labour, working conditions & hours)
- Help to develop communities around the plants
- Partnerships with academia & industry to develop environmental research
- Promotion of healthy lifestyle
- Stakeholders' involvement

5.2.3.1.Key Findings – Content Analysis

5.2.3.1.1. Food-Yucatan

Data from the National Statistical Directory of Economic Units were used to locate 5,655 companies in Yucatan dedicated to the food industry. Some of the most common narratives in the Yucatan food industry cover issues such as concern for the environment through reforestation and water treatment but also show concern for the community in which they are located and more significant concern to help to promote healthier eating habits. Similarly, on the websites, they tried to focus less on purely economic issues relating to the company. Each narrative will be explained in detail:

- *Inclination to show concern for the environment.* The result of the analysis of the content of the web pages showed that in the case of the food industries in Yucatan, of the Top 50 companies studied, the majority chose to demonstrate on their website that they are committed to performing practices that are friendly to the environment. Twenty-nine mentions were found on the websites in reference to the use of greener technologies and environmental protection.

The most mentioned practices on websites are about reforestation and water treatment. This seems to be a constant concern among companies in Yucatan because in recent years there has been excessive logging due to the increase in population in the region. In recent years, insecurity in different parts of Mexico has caused a significant number of the population to move to this region, which is considered the safest in the country. The high temperatures have been a constant problem for the population of Yucatán; in recent years there has been an increase in the average temperature, which has led to other problems in the region. The population has experienced health problems due to extreme heat; logistics operations have been affected by the rapid decomposition of food and high prices to keep food fresh using refrigeration equipment. On the other hand, there is a constant concern about the use of water and the regulation of companies to avoid soil contamination. Some companies that are in the sample list have presented public problems in reference to the misuse of water and soil pollution.

Given the present circumstances, and the current problems of this region, it can be understood why companies have been demonstrating more efforts to publicly disseminate those practices considered sustainable for their organisations. Not only have these problems affected public opinion in recent years, but also that it is a way for companies to show that they are not being harmful to the community.

On the environmental side, they have also mentioned the use of environmentally friendly packaging, awareness campaigns, use of renewable energy, minimisation of carbon emissions, sustainable farming among others.

- *Tend to focus less on purely economic practices.* Regarding the economic issue, the companies manifested in the web pages that they were implementing separation of waste in their facilities as the main activity of circular practices. They also said they are working to make their operations more efficient, use less resources, less energy, waste less, and make their transportation sustainable.
- *Concern for the community.* Regarding social practices, the actions demonstrated online focused on support to the community that is located around the manufacturing plant, campaigns for the promotion of good eating

habits, ethical actions with their staff, joint participation with academic organisations to develop research, and donations to charities.

- *Promote healthier habits.* As an interesting fact, the promotion of healthier eating habits was only mentioned as part of sustainable practices in the region, which is because much of the population of Yucatan is overweight due to lack of sports activity, as well as a diet rich in fat and sugars.

  There were much fewer mentions of economic and social actions, with only 16 mentions each against the 29 environmental actions that companies are reportedly implementing in the region.

5.2.3.1.2. Food-South Yorkshire

For the South Yorkshire region, greater interest in showing practices that are focused on the productivity and efficiency of companies could be observed in their websites.

- *Efficiency and legality***.** Among those practices they showed, for instance, efficient waste management being a priority, importance given to having control of suppliers and having transparent knowledge of their supply chain; on the other hand, it was important for companies to mention compliance with the certifications and laws with which they operate day by day. This means that companies in the South Yorkshire region are focused on showing legality, excellence in operations and providing confidence to the customers. This in measure may be due to certain cases in which some scandal has arisen regarding unethical practices in the supply chain. There is the case of horse meat being sold in supermarkets due to lack of monitoring and transparency in the supply chain, also, modern slavery, and poor conditions of workers in other countries. Equally because the British Government established the Modern Slavery Act in 2015 which introduced more robust controls towards Transparency in Supply Chains to avoid human trafficking or modern slavery in organisations.
- *Advance environmental performance.* On the other hand, they showed in an almost equal proportion their concern for the environment and practices with sustainability. However, regarding their interest in environmentally friendly practices, they focus equally on having more efficient operations since they mention performing environmental performance monitoring, minimising

carbon emissions, using renewable energy and similarly focusing on the design of the products to make them easier to recycle at the end of their useful life.

- *Ethical and research.* Finally, the companies showed, although to a lesser extent, practices with reference to the society. They mentioned special interest in promoting online practices where their commitment to ethical practices is demonstrated and, in the same way, based on their relationships with academic entities, they indicated being interested in generating research in conjunction with academia to find better practices and improve their organisations.

5.2.3.1.3. Textile-Yucatan

For the textile industry in Yucatan, it was found that most of the businesses are located in Merida, Yucatan. Corporations tend to be large and medium-sized and only a few are micro. The vast majority of companies are engaged in the manufacture of textile garments for export and in a large part for the manufacture of textiles and clothing typical of the region. The textile industry in Yucatan is one of the most important in the country and has the international appeal of being able to make garments for internationally known companies. Similar to the food industry in Yucatan, the practices mostly mentioned online by textile companies are those where the environmental factor is the most important. Practices such as minimising carbon emissions or designing a product that is easier to recycle are more often mentioned online by these companies.

- *Use of few greener energies.* To a lesser extent, other practices such as using renewable energy, monitoring environmental performance, avoiding the use of toxic or harmful materials to the environment, reforestation and water treatment were mentioned.
- *Resource Efficiency.* On the other hand, practices that economically improve organisations, such as improving efficiency and constant evaluation, supplier evaluation, implementation of more circular practices, and local sourcing, were also mentioned.
- *Helping closest communities.* The social dimension was ranked lowest in importance for companies in terms of practices around helping the community living around the factories, having an ethical code, promoting healthier lifestyles, involving their stakeholders in their practices, and donations to charities.

5.2.3.1.4. Textile-South Yorkshire

Regarding the practices shown online for the textile industry in South Yorkshire, the information provided was the most limited among all the cases studied for this investigation.

- *Few practices shown online.* There was a total of only 10 mentions, among which practices with a focus on the economic dimension were highlighted. As in the Yucatan region, practices that enhance organisations' efficiency, such as increasing productivity and continuous assessment, supplier appraisal, application of more circular practices, were mentioned.
- *Transparency SC*. There was a special concern among companies for showing the importance of knowing their supply chain and the transparency of their suppliers. In the same way as in the food industry in the region, more importance was given to showing online practices that refer to legality, transparency, ethics and fair local sourcing.
- *Environmental free materials.* Regarding the environmental dimension, they also referred to environmental performance monitoring, designing the product to make it easier to recycle, and using materials free of products that are toxic for the environment.

The social dimension, as in all cases, was the least mentioned, only covering ethics and fair trade.

5.3. Chapter summary

Secondary data can be used in research as the main source or as a complementary data. During this chapter, the detail of how secondary data was used as an initial exploratory study was provided. A preliminary analysis of the state of the Yucatan and South Yorkshire regions in terms of implementation of circular economy practices. This preliminary analysis was obtained by exploring websites of top companies in the region for the food and textile industries. The companies chosen to provide an overview of the situation were obtained from statistical databases in the countries where this research was carried out. The content of each page was analysed, and all practices found on the websites were listed. Once all the practices were obtained, they

were classified according to a previously established codification related to the principles of the circular economy. In this way, it was possible to obtain an initial understanding of the most accepted practices in each region. For example, the key findings in the regions were:

- *Food/Yucatan.* The practices found in this region for the organisations in the food supply chain, were related with good environmental practices, promotion of healthier habits and a big concern for the wellbeing in their communities.
- *Food/South Yorkshire*. In this region for the food supply chain, was more important to show their commitment with legality and ethics as well as showing technological advancements to implement sustainable practices.
- *Textile/Yucatan*. In the same way as the food industry in this region, the good practices were related to the improve of their communities and surroundings, but for this sector, showing technological advances in the protection of the environment was also important.
- *Textile/South Yorkshire*. This region and sector were with the least information available online, this can be due to the fact that South Yorkshire is not considered a textile region. Nevertheless, the main key findings are that the few companies are looking to show to the public their dedication to adopt a more transparent supply chain.

Although a good amount of information was extracted from the websites of the organisations in the regions, the information was insufficient due to the fact that the vast majority of the companies studied do not have a website or the information contained in their pages is insufficient to understand the region. Therefore, this chapter remains as a basis and a more in-depth exploration of each region is recommended through semi-structured interviews with actors in the supply chain of each region.

CHAPTER 6

THEMATIC ANALYSIS AND FINDINGS

In chapter five, a detailed explanation of the content analysis was provided. Through the analysis of secondary data, a more precise conception about the practices that the most prestigious companies have been applying was introduced. Nevertheless, only 10% of companies mentioned CE practices online, and some of the information was not clear in terms of CE methods used inside the organisation. Accordingly, the need to seek further information is imperative to integrate stronger scrutiny and secure better outcomes. This, therefore, urged an in-depth conversation with people involved in the implementation of such activities within firms. This in-depth knowledge can be obtained using semi-structured interviews with experts and central stakeholders at different levels of the supply chain to obtain a transverse examination.

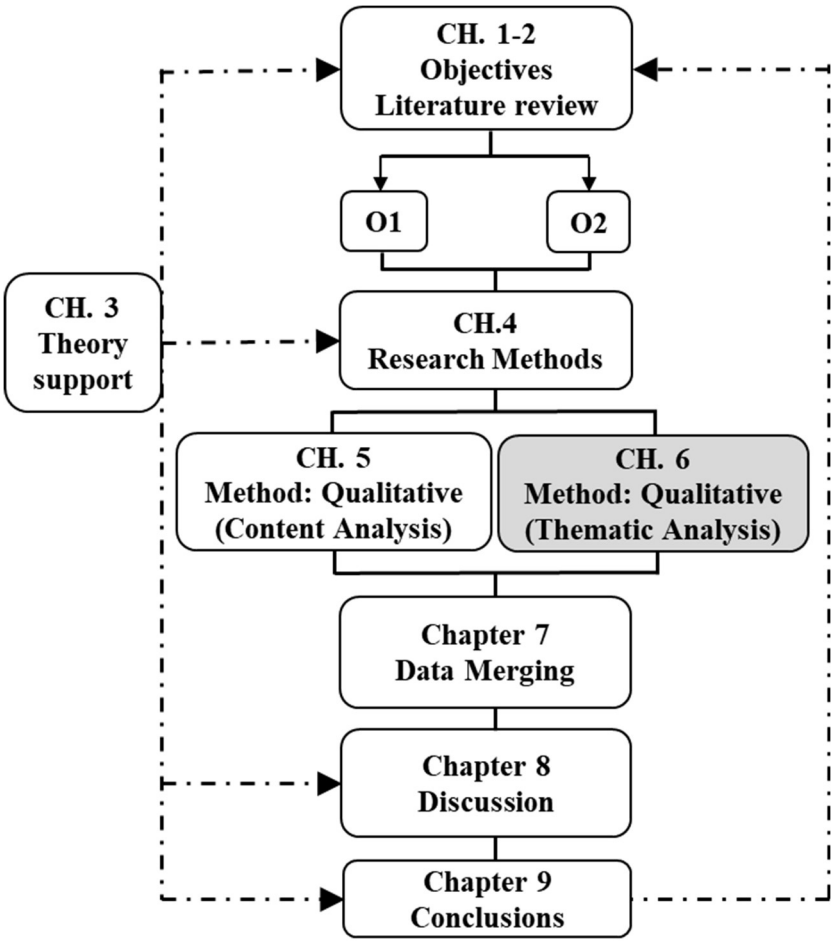


Figure 6.1. Research Map - Thematic Analysis

6.1. Determination and criteria for selection of Stakeholders

The criteria to design the appropriate sample and profile of stakeholders was based on the aims and objectives mentioned in chapter one. The second objective of this thesis refers to the factors can drive or hinder the implementation of CE in the selected multi-tier and multi-stakeholder supply chains. According to this objective, a general view of different practices is suggested to comprehend the principal ideas behind the execution of the CE operations in different organisations. Consequently, a sample comprising a variety of different stakeholders throughout different tiers of the logistic network was suggested to collect diverse scenes and scrutinise factors that might influence the application of CE practices. Chapter two worked to identify two different industries with the idea in mind of understanding if there are elements in common between industries that facilitate or hinder CE implementation. The selected target industries are the Food and Textile Industries.

The first objective concerns with the significance of the different circumstances in multi-tier and multi-stakeholder supply chain. For this reason, this research will explore in terms of geographic location and human development in contrasting regions and how they are addressing the circularity proposals. Chapter two also defined two different regions for examination that would allow this comparison: South Yorkshire region in the United Kingdom and Yucatan region in Mexico. Kirchherr and Santen (2019) addressed this point in their most recent study where they analysed 160 papers on CE published from 2006 to 2019. They identified a need to explore less developed countries since most of the current literature consists of studies of developed countries, accounting for 95 per cent compared to only 5 per cent set in developing countries.

Objective one also mentioned in Chapter one, suggested the need to look throughout the distribution chain for diverse categories of collaborators, starting from the sourcing of the raw materials, through production and distribution, until their disposal and reintegration in the supply chain. Analysing different parts of the value chain will enrich the understanding of the challenges and opportunities for each actor and will help to provide solutions for forging better connections between the different parties.

According to the characteristics explained above, it was decided that the selection of stakeholders will be carried out based on the following criteria:

i. Stakeholders based in the region of South Yorkshire for the Food and Textile Industry.
ii. Stakeholders based in the region of Yucatan for the Food and Textile Industry.
iii. Stakeholders in the different stages of the supply chain.

Following the same considerations as in chapter four, both industries were preliminarily investigated, in order to continue the exploration of the data analysed in the previous chapter, and complement the results obtained.

Finally, the results from studying these objectives will serve to inform objective for that aims to find and suggest incentives based on the evidence presented.

The following section will explain in more detail the dynamics applied to contact the participants and the size of the sample that was determined for this purpose.

6.2. Stakeholder's sampling

The sample selected for applying the semi-structured interviews was retrieved from the list of companies previously collected from the databases used for the content analysis in chapter four (DENUE database for the companies in Mexico and FAME database for those located in the UK).

The sample for this study is composed of 10 semi-structured interview participants for each industry in each country, to provide a total of 40 interviews. In order to determine the organisations that would be interviewed, the organisations mentioned in the lists previously used for content analysis were contacted.

Since the objective is to explore different moments during the supply chain, the selection of the participants was achieved by choosing key actors throughout diverse stages of the SC. The consideration was to conduct at least five of the ten potential interviews, which represents 50% of the total number of potential interviews per sector and country, to ensure that the objective was covered, and the data collected was sufficient to provide diversified perspectives. Snowball sampling was used to contact firms related to the organisations that were to be interviewed, to have consistency in the information regarding the relationships with their stakeholders.

Additionally, the potential candidates were selected according to the following criteria.

i. Stakeholders holding high executive to senior positions in the organisation (i.e., Owners, C.E.O., General Managers, Directors, Senior executives, Manager of the department, etc).
ii. The person must be responsible or have power in the decision making for activities related with departments with possible CE activities (Such as operations, production, manufacturing, planning, procurement, logistics, etc).

The candidates were contacted by email, followed by a phone call to confirm their participation as well as the most convenient day, time and place for the interview. The information sheet referring to the study was included in the email, and all possible doubts that participants could have about agreeing to participate were clarified. The information sheet provided to the candidates included the average time for the interview, 45-60 minutes, as well as the research objectives. In view of the fact that participants are located in countries with different languages, the information sheet was created to inform the actor accordingly. This can be consulted in Appendices E (English version) and F (Spanish version).

6.3. Semi-structured interview design

The design of the interview was created using as a support the lenses of Agency Theory, Resource-based view (RBV) theory and Stakeholder Theory. These theories were used only as pillars to create questions that would help to explore a more complete perspective for the organisations; nevertheless, the final results would only be analysed using Institutional Theory and Stakeholders Theory to achieve the objectives set in the first chapter. Table 6.1 is a brief illustration of how the interview was developed and, the themes expected to be covered according to the theoretical lens support. The complete semi-structured interview with the set of questions can be found in Appendix G (English version) and H (Spanish version).

Table 6.1: Theory lenses used in the elaboration of the semi-structured interview

Semi-Structured Interview Design	
Theoretical lens	**Themes covered**
Agency Theory	i. Interaction between principal and agents within the SC ii. Challenges due to unaligned goals iii. Self-interests of individual businesses or organisations iv. Attitudes, views, and coordination between different parties in the SC in the accomplishment of their own goals.
Resource-based view (RBV) theory	i. Current resources in the organisation (assets, processes, information, capital, equipment) ii. Current and past practices in terms of waste management. iii. Future plans for the organisation iv. How resources are used to create competitive advantages in terms of CE
Stakeholder Theory	i. Collaboration with Stakeholders ii. Involvement of stakeholders in objectives iii. How stakeholders can help in their goals iv. Help to identify internal and external stakeholders
Institutional Theory	i. Understand external pressures in the organisations. ii. Identify coercive and mimetic mechanisms.

Stakeholder Theory informed the drawing up of all the questions related to different contributors in the value chain to complement Agency Theory. Stakeholder Theory contributes by asking about the collaboration between them in all different stages of the supply chain along with helping to identify internal and external groups of stakeholders in a specific supply chain. This theory also aided the previous drawing of the map of different stakeholders throughout the SC.

The Resource-based view (RBV) theory operates as a guideline to identify the current resources and practices within the organisations that provide them with a competitive advantage. Resources, with regard to this theory, refers to all the assets, processes, information, capital, equipment which are within the control of the company. RBV theory helped to formulate questions related with past and currently available resources in the companies/organisations in order to understand how these resources

were, are or will be utilised in order to create a competitive advantage and also how these resources will help with the implementation of CE practices.

The Agency Theory worked as a framework to formulate questions about the bond between actors and the problems that can come to light in the interconnection linking principals and agents inside supply chains and the conflicts between them due to unaligned goals or self-interest when trying to adopt more CE practices.

Finally, Institutional Theory helped to formulate questions about the different pressures that the organisation experiences and how this influences the adoption of coercive and mimetic actions.

To ensure an optimal amount of information would be obtained for gaining an in-depth understanding of the main topics, 19 semi-structured questions were devised to allow the interviewees to explain thoroughly the position of their organisation in terms of circularity.

To achieve coherent development of the interview, the questions were planned in such a way as to enable the participant to move forward from the more general information to more in-depth themes, ensuring the interview flowed naturally but keeping to a structure and the expected goals.

The key issues to be discussed in the interview in order to meet the objectives are listed below:

i. Interviewees' Knowledge about CE. (Opening questions)
ii. Main objectives of the organisation (General Information)
iii. Past, current, and future practices related with CE (Theory: Resource-based view)
iv. Main impediments for the organisation to carry out CE practices (In-depth perspective)
v. Stream of information and relationships with their stakeholders (Theory: Agency Theory and Stakeholder Theory)
vi. Benefits and opportunities they observe in their organisation for the implementation of CE practices (In-depth perspective)

6.4. Semi-structured interview procedure and ethical considerations

As soon as the candidates' participation in the interview was confirmed, a process of collecting information from the company online was initiated in order to have a prior introduction to the organisation and thus ensure that the interview would be efficient in the collection of information.

In the course of the interview, the participants were informed about the ethical considerations involved with their participation in the study, and the participant signed a research consent form that gave permission to record the interview for subsequent analysis (Appendices A and C in English version, and Appendices B and D in Spanish). It was agreed with all participants that the name of the company and the interviewee would not be mentioned in the study to maintain their anonymity and the protection of the information they would provide. This was done in order to obtain a higher degree of information, and to avoid as much as possible false or inaccurate data being provided to protect the image of the organisation.

Data utilised for this research was obtained through 40 semi-structured interviews obtained between December 2017 and March 2019 during the fieldwork in two countries: Mexico and The United Kingdom.

6.5. Descriptive analysis of the interviews

To understand the profile of data collected, Table 6.2 includes the global information of the people interviewed as well as the following details:

i. Industry: Food (FD) / Textile (TX)
ii. ID: Corresponds to the small code for easy identification between participants. The first two digits refer to the country in which the interview was done (MX for Mexico / UK for United Kingdom), the third letter the Industry (Food/Textile) and the last digit the number of interviews realised.
iii. Stakeholder type: This category explains the category of stakeholder interviewed and the position in the supply chain.
iv. Date: Date scheduled for the interview

v. Interview duration: The shortest interview lasted 11.44 minutes and the longest one 103 minutes, 46.14 minutes being the average length of the 40 interviews.

vi. Size: Size of the company according to the number of employees: SME (Less than 10 employees) / Small (S) (From 10 to 49) / Medium (M) (From 50 to 249) / Large (250 or more).

vii. Mission: Profitable (P) / Non profitable (NP)

viii. Sector: Public (PU) / Private (PR)

ix. Type of firm: This category gives a better description of the type of organisation interviewed and whether it has local, national, or international branches or links.

x. Production in house or Outsourced: Refers to conducting an activity or operation within a company (In House -I) or hiring an outside organisation to complete specific tasks (Outsourced – O).

xi. Sales: Target of the organisation for commercial sales. Local (L), National (N) or International (I).

xii. Position: ML (Middle Level: Junior manager, area coordinator) / SL (Senior Level: General Manager, Owner)

xiii. Age: Age of the participants.

Table 6.2: Global Analysis – Profile of Interviewees (Data Collection)

Interview details					Organisation Profile						Interviewee Profile	
Industry	ID	Stakeholder type	Date	Duration (Minutes)	Size	Mission (Profitable/ Non-Profitable)	Sector (Public/ Private)	Type of firm	Production (In house/ Outsourced)	Sales (Local/ National/ International)	Position	Age
FOOD INDUSTRY (YUCATAN, MEXICO)	MXF1	Food Processor	29/12/2017	72.16	Medium	P	PR	Local	I/O	L, N, I	Junior Manager	18-35
	MXF2	Food Processor	30/12/2017	45.4	Medium	P	PR	Local	I	L, N, I	General Manager	36-55
	MXF3	Catering service	21/03/2018	32.59	SME	P	PR	Local	I	L	Owner	18-35
	MXF4	Retailer	19/04/2018	21.58	Small	P	PR	Local	O	L	Junior Manager	18-35
	MXF5	Food bank	19/04/2018	72.47	Small	NP	PR	Local	I	L	General Manager	36-55
	MXF6	Catering service	19/04/2018	38.12	Small	P	PR	Local	I	L, N, I	Area Coordinator	36-55
	MXF7	Regulator - Government	19/04/2018	25.51	Medium	NP	PR	Local	I	L	General Manager	36-55
	MXF8	Catering service	01/06/2018	12.13	SME	P	PU	Local	I	L	Owner	36-55
	MXF9	Organisation Fighting Food Waste	01/06/2018	31.47	SME	NP	PR	Local	I	L	General Manager	36-55
	MXF10	Wholesaler - Distributor	02/06/2018	58.08	Small	P	PR	Local	I	L	Junior Manager	36-55
TEXTILE INDUSTRY (YUCATAN, MEXICO)	MXT1	Manufacturer	27/12/2017	46.23	Large	P	PR	Local	I	I	General Manager	>55
	MXT2	Retailer	19/04/2018	43.57	Medium	P	PR	Local	O	L	Junior Manager	18-35
	MXT3	Manufacturer / Retailer	19/04/2018	64.29	Small	P	PR	Local	I	L, N, I	General Manager	36-55
	MXT4	Regulator - Government	19/04/2018	57	Medium	NP	PR	Local	I	L	General Manager	>55
	MXT5	Retailer	19/04/2018	35.4	Medium	P	PR	Local	O	L	Junior Manager	36-55
	MXT6	Manufacturer	17/05/2018	43.2	Small	P	PR	Local	I	L, N, I	Owner	36-55
	MXT7	Manufacturer / Retailer	18/05/2018	34.24	SME	P	PR	Local	I	L	Owner	>55
	MXT8	Second hand - Charity	22/05/2018	23.6	SME	P	PR	Local	I	L	Coordinator	36-55
	MXT9	Manufacturer	25/05/2018	51.27	Large	P	PR	International	I	L, N, I	Junior Manager	18-35
	MXT10	Manufacturer	29/05/2018	87.02	Large	P	PR	International	I	L, N, I	General Manager	>55
TEXTILE INDUSTRY (SOUTH YORKSHIRE, UK)	UKT1	Second hand -Charity	17/02/2018	11.44	Small	NP	PR	National	O	L, N	Coordinator	18-35
	UKT2	Second hand -Charity	17/02/2018	16.13	Medium	NP	PR	National	O	L, N	General Manager	36-55
	UKT3	Social enterprise	22/02/2018	38.54	SME	P	PR	International	O	L, N, I	Junior Manager	>55
	UKT4	Second hand -Charity	12/07/2018	18.4	Medium	NP	PR	National	O	L, N	Area Coordinator	>55
	UKT5	Second hand -Charity	20/07/2018	34.33	Medium	NP	PR	National	O	L, N	Junior Manager	18-35
	UKT6	Second hand -Charity	23/08/2018	49.49	Small	NP	PR	National	O	L	General Manager	>55
	UKT7	Clothes Swap Organisation	30/08/2018	38	Small	NP	PR	Local	O	L	General Manager	18-35
	UKT8	Regulator - Government	02/11/2018	103	Medium	NP	PU	Local	I	L	Junior Manager	>55
	UKT9	Rag Merchant	24/01/2019	98.12	Small	NP	PR	National	O	L, N, I	General Manager	>55
	UKT10	Second Hand - Vintage Clothing Boutique	28/03/2019	15.22	SME	P	PR	Local	O	L	Owner	36-55
FOOD INDUSTRY (SOUTH YORKSHIRE, UK)	UKF1	Catering service	24/02/2018	25.49	Small	P	PR	National	I	L, N	General Manager	18-35
	UKF2	Organisation Fighting Food Waste	06/03/2018	95.48	Small	NP	PR	Local	I	L	General Manager	36-55
	UKF3	Food Processor	08/03/2018	67.24	Medium	P	PR	Local	I/O	I	Area Coordinator	18-35
	UKF4	Catering service	16/03/2018	62.38	Small	P	PR	Local	I	L	Area Coordinator	36-55
	UKF5	Retailer	21/03/2018	34.4	Medium	P	PR	National	O	L, N	Area Coordinator	18-35
	UKF6	Catering service	05/07/2018	22.14	SME	P	PR	Local	I	L	Owner	36-55
	UKF7	Catering service	11/09/2018	23.29	Medium	P	PR	National	I	L	Area Coordinator	18-35
	UKF8	Catering service	27/09/2018	24.13	Small	P	PR	Local	I	L	Owner	18-35
	UKF9	Regulator - Government	02/11/2018	103	Medium	NP	PU	Local	I	L	Junior Manager	>55
	UKF10	Organisation Fighting Food Waste	23/11/2018	70	Medium	NP	PR	National	I	L, N	General Manager	>55

* Circular Economy Knowledge: 1-No Knowledge / 2- Basic Knowledge / 3-High Knowledge

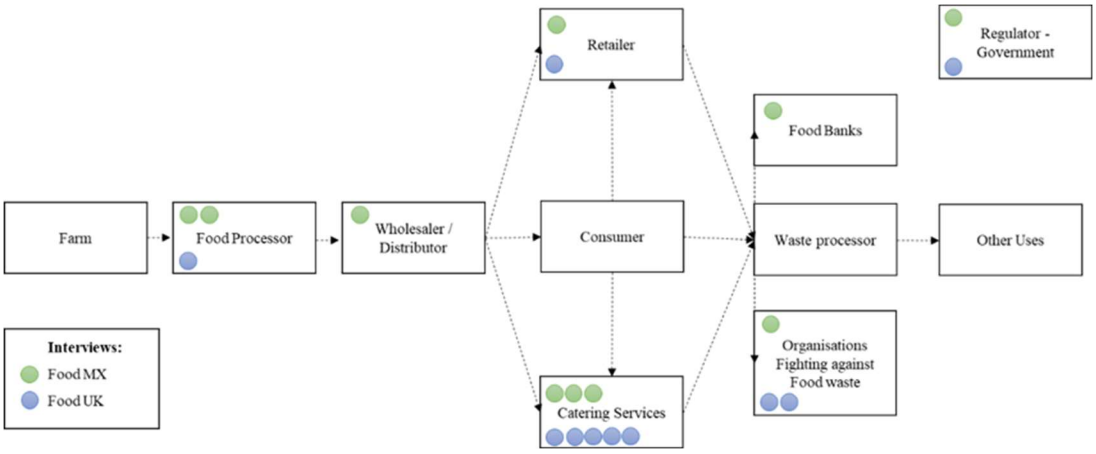


Figure 6.2: Supply Chain Food Map – Global Interviews (Mexico & UK)

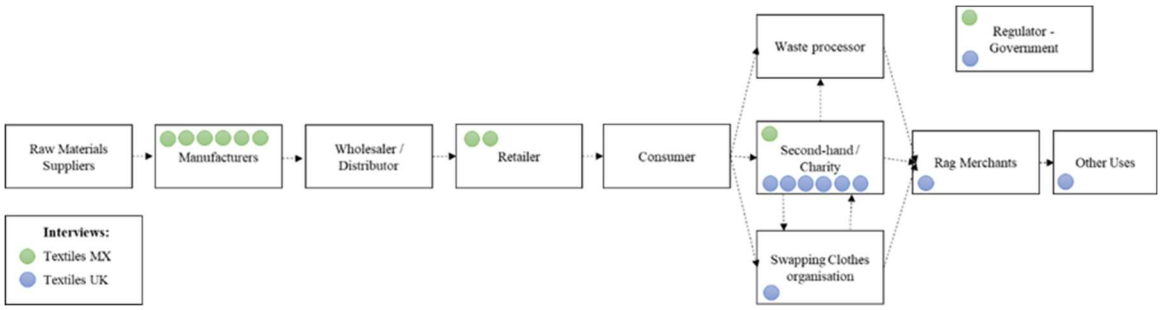


Figure 6.3: Supply Chain Textiles Map – Global Interviews (Mexico & UK)

6.6. Computer-assisted analysis

All interviews were documented using voice recording software on a portable computer to ensure that they would remain securely under a password due to the sensitive nature of the information provided by participants. Subsequently, the interview was transcribed using the exact words expressed by the participants to ensure the reliability of the information, and finally it was coded using an inductive approach making sure that every important issue was coded in the correct category.

The coding of the interviews was in the first place done manually using templates with a copy of the interviews and highlighters to distinguish between the relevant information for the research. Afterwards, the interview was added to the NVivo V12 software to verify for the second time that the codes were assigned correctly or to reassign them to a more suitable category. NVivo V12 software was convenient for managing the substantial amount of information collected from the 40 interviews, which produced in total 30 hours and 46 minutes of interview data. To carry out the

coding of the information, we proceeded to systematically order each piece of information relevant to the objectives within the basic topics covered in the interview.

A very large variety of different codes that were classified inductively accumulated in the folders of the general subjects of the interview. The next step was to group them according to more recurrent topics among the interviewees to make more visible the sub-themes that were causing a greater impact. The next section will present in an orderly manner the explanation of the most recurrent themes.

6.7. Emerging themes from the Interviews

In this section, the themes and sub-themes that emerged from the data are reviewed.

Figure 6.4 present the condense NVIVO coding structure with main themes, sub-themes and number of nodes classified for each one (The complete figure with all the information from the nodes is also included in Appendix M).

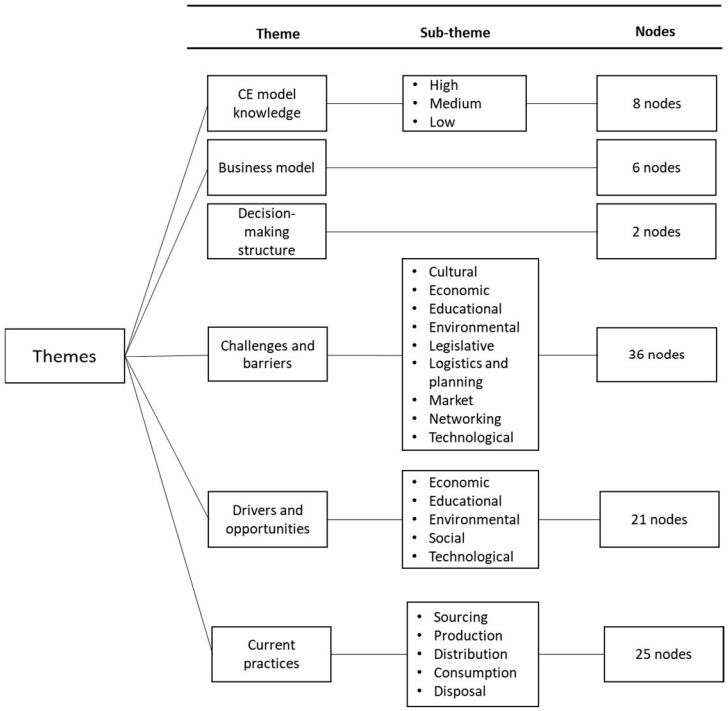


Figure 6.4. Condense NVIVO coding structure

Six different themes were coded based on the structure of the interviews and the objectives of this research (The complete. It should be noted that first the nodes were created inductively to each theme and then, once the nodes of each theme were created, subthemes were created to group the nodes in a clearer way. The sub-themes that were subsequently created for the nodes were inspired according to classifications

previously studied in Chapter 5 (Table 5.4.). This does not mean that these sub-themes were used deductively, all nodes were freely created for each theme inductively.

To further understand each theme with its respective sub-theme and nodes, the following sections will present details of the nodes contained in each sub-theme and examples of the participants' statements in order to understand the logic used to group each statement into a node.

The findings are presented in different themes corresponding to the following main topics discovered in the analysis:

i. ***Understanding of the CE Model.*** This theme aims to explain the interviewee's level of comprehension of the relationship between knowledge and level of implementations in the organisation. Figure 6.5. present the themes, sub-themes and nodes coded inductively in NVIVO. The nodes were classified according to the participants statements and were divided in three main sub-themes containing eight nodes depending on their level of understanding about the CE concept.

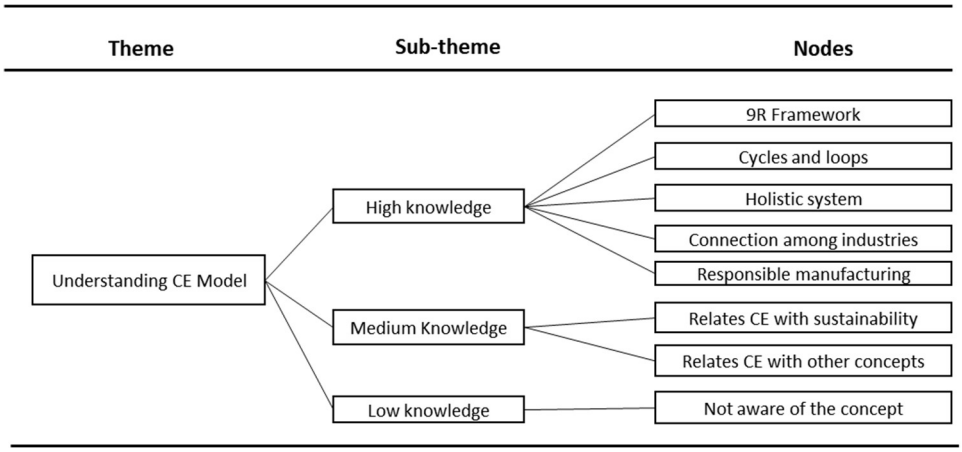


Figure 6.5. Understanding CE Model Nodes

ii. ***Different business models.*** A theme that emerged from the interviews is the way in which different business models developed strategies to achieve the same objective. Figure 6.6. present the main nature of the business found among the participants. This concept is a creation of what type of business it is and what the business does. For this theme no sub-themes were classified and six nodes containing the different business model were noticed.

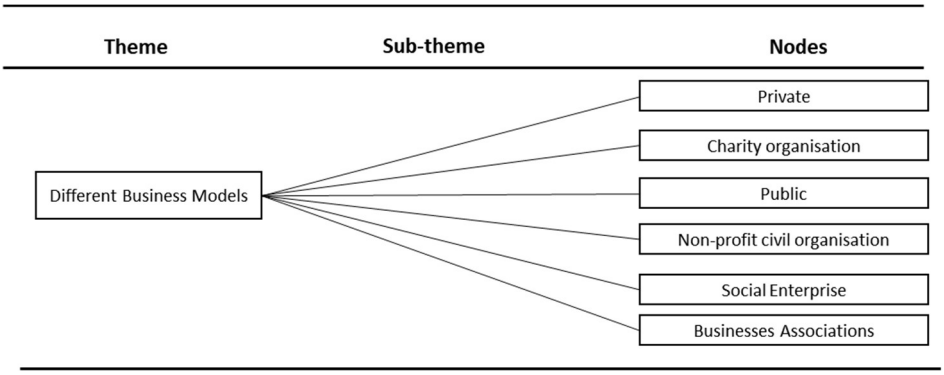


Figure 6.6. Different business model nodes.

iii. ***Decision making structure.*** Understanding the structure in which decisions are made in organisations, also complements theme one, as it provides the tools to make an analysis of the implementations but considering the level of power of the actors in the organisation. Figure 6.7 shows the degree to which authority is reserved within an organisation. The classification of this structure was basically divided into two nodes without any further sub-theme.

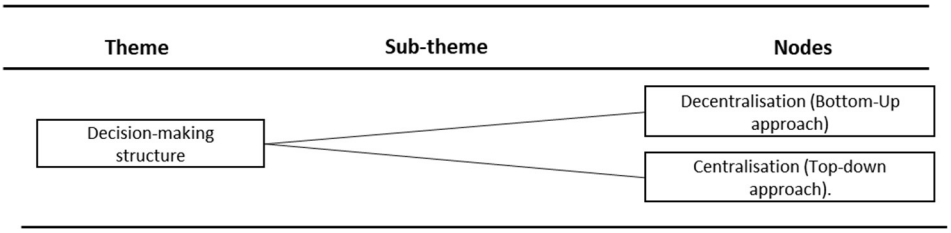


Figure 6.7. Decision-making structure nodes.

iv. ***Challenges and barriers.*** One of the objectives proposed in chapter one was to gain understanding of the main barriers and obstacles to the implementation of practices. Figure 6.8. introduce the main challenges and barriers that participants highlighted. The statements were classified into nine different categories according to the sub-theme relating with cultural, economic, educational, climate, legislative, logistics and planning, market, networking and technological. Thirty-six nodes were identified.

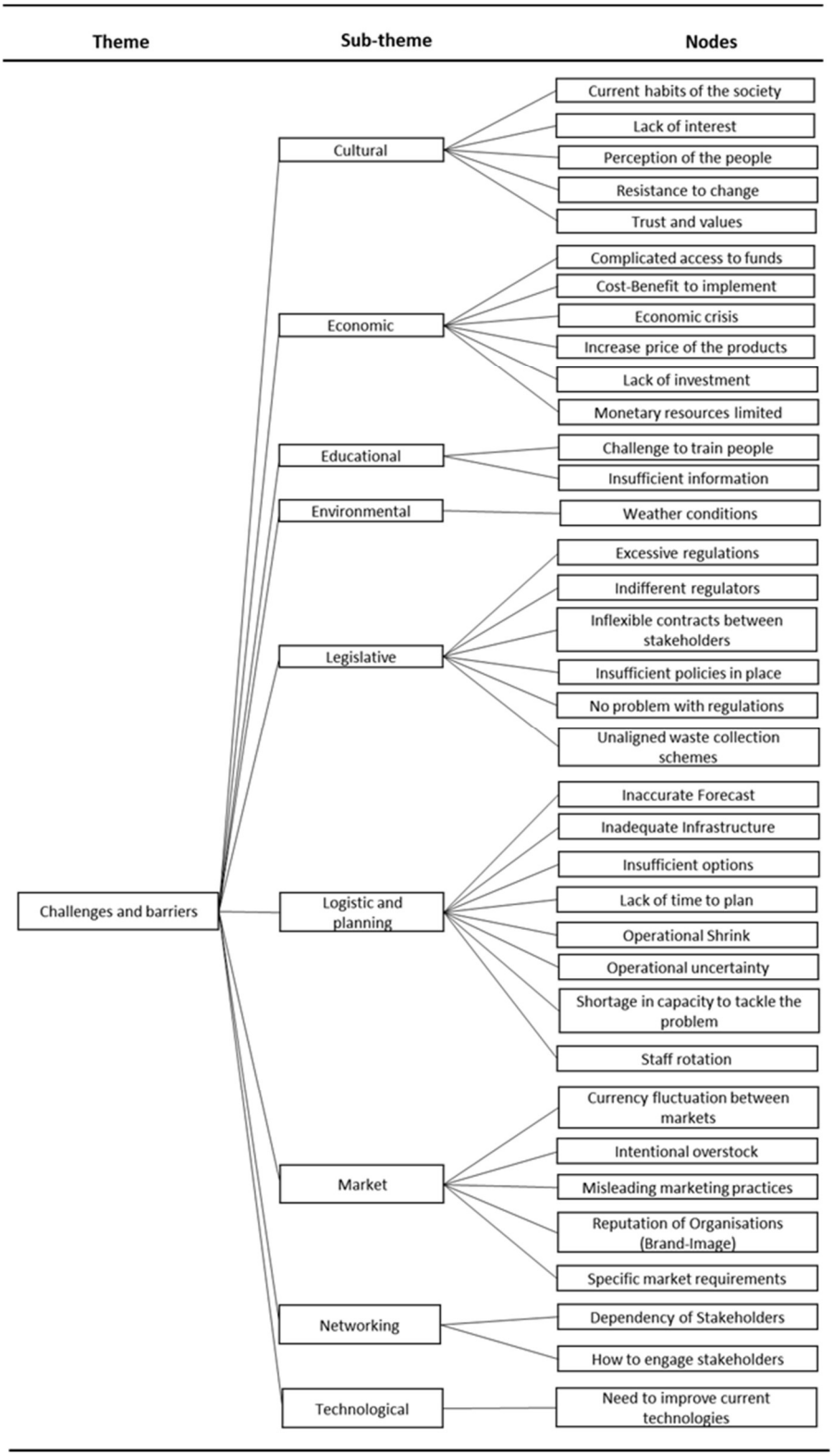


Figure 6.8. Challenges and barriers nodes.

v. ***Key drivers and opportunities.*** The participants shared likewise their points of view about what they, in their experience, considered as opportunities or the keys that could help implement more actions. Figure 6.9. present twenty-one nodes divided into five sub-themes according to their nature being the sub-themes related with economic, educational, environmental, social, and technological issues.

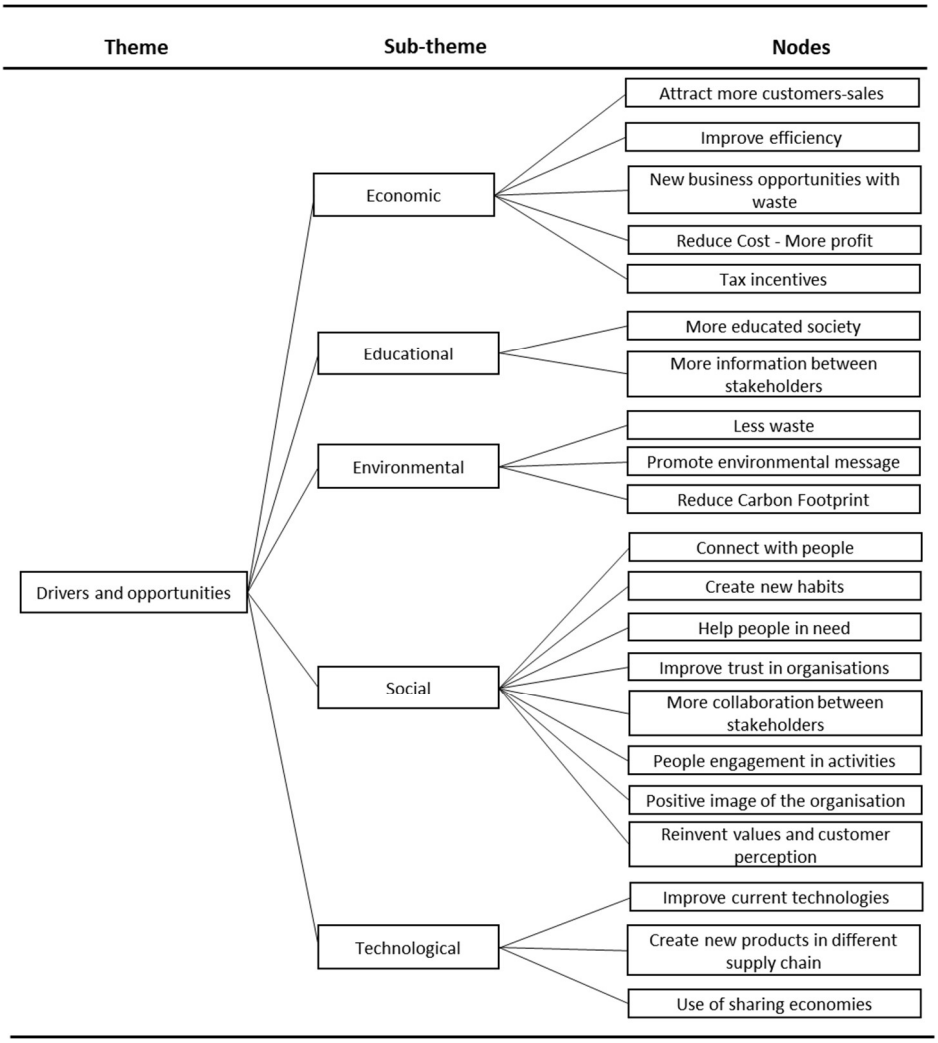


Figure 6.9. Drivers and opportunities nodes

vi. ***List of Main Practices.*** Different CE practices currently implemented in the organisations of the participants were mentioned. The practices were classified in different sub-themes according to the stage of the supply chain where the participants stated to be occurring. Since all the practices from food and textile were classified together, is also included in the nodes if this practice was mentioned in a food or a textile organisation. Figure 6.10.

present twenty-five different nodes divided in five stages of the supply chain.

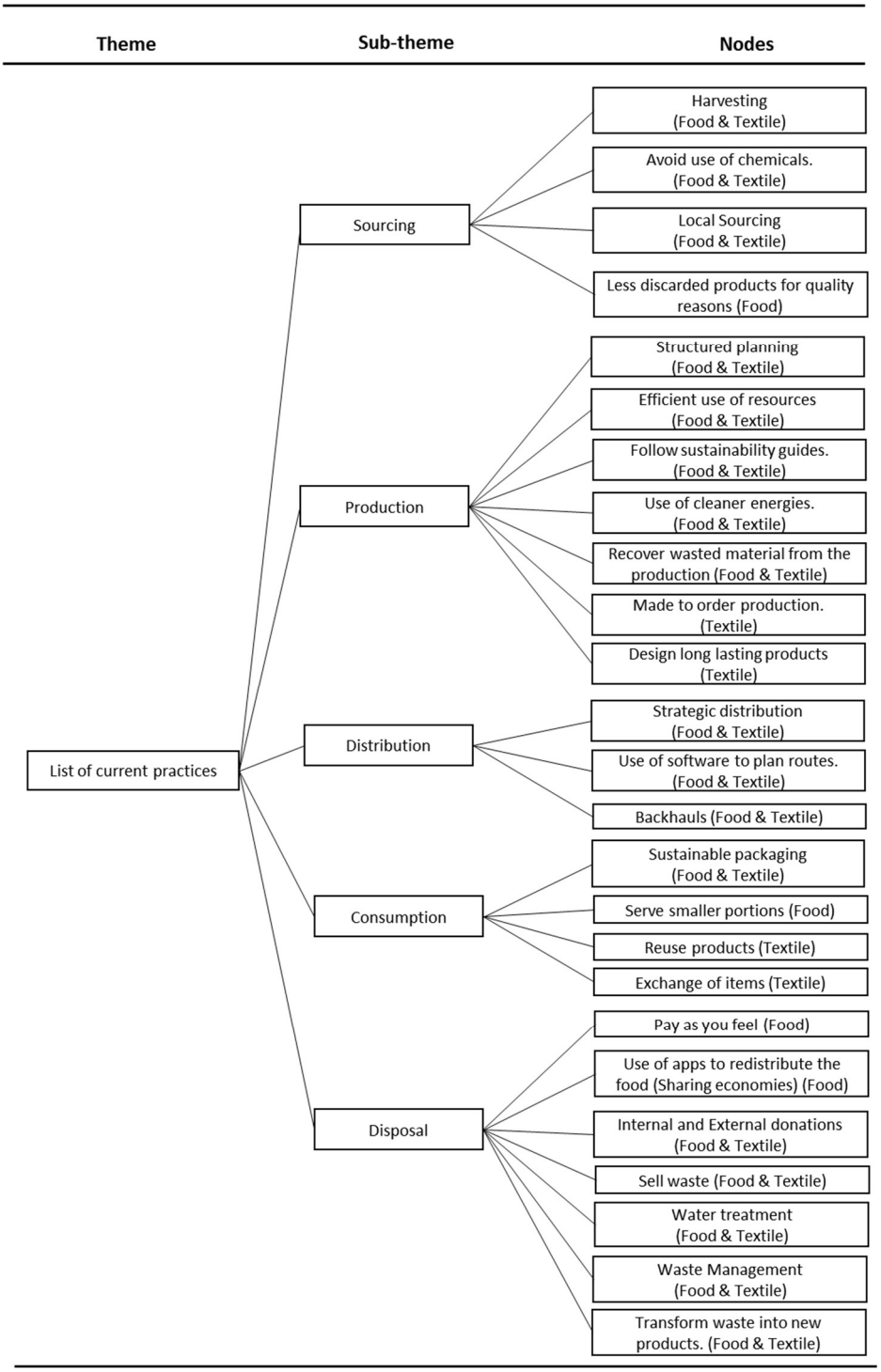


Figure 6.10. List of current practices nodes

In the following sections, every theme is explained in detail to show the main statements of the stakeholders. Exact quotations from stakeholders are presented in

tables to show the most frequent statements recognised. For better identification, the first letters of the ID identify the country in which it was made, the third letter corresponds to the country and finally the figure at the end corresponds to the interview number. Having the identification of the stakeholder in the subject and sub-theme would facilitate later analysis of the industries studied.

6.7.1. Theme: Understanding CE Model

This theme connotes to the level of awareness and knowledge of the participants regarding the Circular Economy model. This category analyses their perceptions, notions and the degree of comprehension about this model. One of the present challenges of the CE framework is the ample ground to conceptualise the notion and the lack of consensus about the concept among diverse actors, for example, think tanks, academics and practitioners. By reviewing the understanding of different stakeholders about CE as well as their level of acknowledgement, the relationship with the implementation of practices in the different organisations and the people managing the organisation can be analysed. Table 6.3 shows the different nodes for the topic 'Understanding CE'. This theme was divided into three basic subthemes to demonstrate the participants' level of knowledge:

i. ***High knowledge.*** This refers to participants who demonstrated a high knowledge level in terms of the definition of CE. They referred to this model by giving concrete examples of some of the practices considered as part of this framework, such as the 9R Framework, Cycles, loops, or any practice at any stage of the SC.
ii. ***Medium knowledge.*** This applies to participants that referred to concepts that do not match entirely the concept of CE or who use the concept of Sustainability erroneously as a synonym.
iii. ***Low knowledge.*** This category is for participants that claimed not to know about or have heard before of this framework.

Within these sub-themes were several interesting narratives that are explained below:

Among the participants that showed a high level of knowledge, the main concepts they related with CE were:

i. ***9R Framework:*** This code includes all references by the participants to the 9R Framework (Recover, Recycle, Repurpose, Remanufacture, Refurbish, Repair, Reuse, Reduce, Rethink, and Refuse).
ii. ***Cycles and Loops:*** This code represents all the references in the definition of the interviewees to CE as a circle, cycle, or closing of the loop.
iii. ***Holistic system:*** Includes all remarks referring to CE as a complete system, efficient at all stages of the SC.
iv. ***Connection among Industries:*** This category is considered to represent a high level of knowledge about CE, since the participant knows about the problem of how circularity can affect the use of materials between industries.
v. ***Responsible Manufacturing:*** This code connotes the idea of being aware of how the products are being manufactured, considering materials used.

Among the participants that showed a medium level of knowledge, the main concepts they mentioned in relation to CE were:

i. ***Sustainability.*** Participants who describe CE as "sustainability or green practices". This is considered as a medium knowledge level because, even though they have an idea, it is not completely clear, and sustainability is usually mistakenly used as a synonym.
ii. ***Other concepts.*** All participants that mention concepts in the SC that are not part of the CE.

Participants that showed a low level of knowledge:

i. ***Not aware of the concept:*** All interviewees that mentioned having no knowledge of the concept or related it with something else.

Table 6.3: Emerging nodes– Theme: Understanding CE

Sub-theme	Nodes	Examples of participant statements	Stakeholder ID
Theme: Understanding CE Model			
High knowledge	9R Framework	*"What I understand is the 3R's. Means that all products are converted back into products, a product that becomes a waste, the waste is used to the fullest, reused, reused, recycled, and then you take advantage of that to make a product again"* [MXF7] *"I think in Circular Economy you can make things that can be recycled but what you need to do is to get people to understand what can be recycled and what is most suitable for recycling, you know"* [UKF9]	Frequency: 7 - MXF7 - UKF7, UKF9 - UKT5, UKT6, UKT7, UKT8
	Cycles and Loops	*"Circular Economy is knowing about finding local feedback loops rather than losing resources and energy, you find ways to reuse something in a next process or all the way back to the initial cycling like composting your food or growing food from composting, feeding pigs from food waste or, so, yeah emm that probably".* [UKF2]	Frequency: 4 - MXF4 - MXT5 - UKF2, UKF8
	Holistic system	*"It is practically a complete production process, where companies are responsible for the entire production chain as a whole. Starting from where the resources are extracted, from where the resources are obtained, up to what happens with the finished product with the client, and what happens once the client has already used that product that we provide. The main objective with that waste is the reduction and with that to be aware in terms of the use of raw materials, because every production process uses resources, then because of the situations in which we now find ourselves where resources are more limited and scarcer. We need to start the 'Circular Economy', to become aware of what resources we have, how much we exploit them and how we can lessen our impact to make the process more sustainable".* [UKF3]	Frequency: 2 - MXT3 - UKF3
	Connection among Industries	*"CE is about this conflict of usage of land because it seems like people are very blinkered and we need a basic plan for the food stream, but what happens on the textile side?, and we are not sustainable enough yet to say ok we won't grow any more cotton, we'll keep recycling what we've got in use now. In the hope that we don't need the land anymore so we can grow crops and nobody seems to have this conversation and both industries are going very very narrowly down their own roads"* [UKT10]	Frequency: 1 - UKT10

	Responsible Manufacturing	*"Circular Economy is when you have a product and you care about how it is manufactured and what ingredients are in the supply chain, and you want to be sustainable and environmentally friendly, and you want to be sure that when you make something you are responsible for it until its death"* [UKT3]	Frequency: 1 - UKT3
Medium knowledge	Relates CE with sustainability	*"I know the concept in general, because really sustainability here in the company is divided into two parts: the environmental and the safety and hygiene. We see the safety and hygiene part. We know part of the environmental"* [MXT1] *"Yes, it is sustainability in all aspects"* [MXF10]	Frequency:11 - MXF5, MXF6, MXF9, MXF10 - MXT1, MXT2, MXT4, MXT6 - UKF4, UKF6 - UKT9
	Relates CE with other concepts	*"Integral businesses, value chains in which the client, supplier or I manage it as a value chain, who participates in the value chain in which we are and in what way we help or benefit each other"* [MXF1] *"Not with that name but surely speaking in another way: sustainability, sustainability, green logistics, reverse logistics and all those weird words. I guess it must be something like that"* [MXF2]	Frequency: 2 - MXF1, MXF2
Low knowledge	Not aware of the concept	- *"No, I have not heard".* [MXT8] - *"Maybe in some University class, but not something I learned recently"* [MXT9]	Frequency:9 - MXF3, MXF8 - MXT7, MXT8 MXT9, MXT10 - UKT2, UKT4 - UKF1

6.7.2. Theme: Different business models' approaches to CE

An interesting theme that emerged from the interviews related to how businesses with different models are tackling the problem in their industries.

Table 6.4 present the list of business models per organisation interviewed. Some organisations share the same objective, for instance, reduce food waste; nevertheless, it was noteworthy how they addressed it according to their business model. For the moment, the information is presented in a descriptive way to show the outcomes from the data, but in the following chapter a more in-depth discussion will explore these results.

The following definitions should be understood as different business models:

i. Private model refers to business models from the private sector that are driven by profit. The mission of this type of business model is to retribute benefits for the private owners, investors or shareholders.
ii. Charity organisations include all non-profit organisations with the principal aims focused on philanthropy and social well-being.
iii. Public organisations comprise entities owned and managed by the government for the benefit of its citizens.
iv. Non-profit civil organisations include a collective body of organisations set-up on a non-profit basis.
v. A social enterprise is a commercial organisation with particular community objectives. This type of organisation pursues increased income while expanding benefits for society and the environment.
vi. A business network is a form of business association with the objective of benefiting the various business partners.

For the moment this chapter will just illustrate the main findings from the data collection, but further discussion about the findings will be provided in Chapter 6.

Table 6.4: Emerging nodes - Theme: Business model per interview

Sub-theme	Nodes	Examples of participant statements	Stakeholder ID
Theme: Business models			
	Private	*"We have a commercial focus, we are a private company, we have certifications that help us to position the brand"* [MXF1] *"We sell our product in different markets, national and international. The owners of the company promote the company and the funds are private"* [MXF2] *"We have 21 restaurants only in the UK, the management is private, and the head office control the suppliers"* [UKF1] *"The management is always trying to implement improvements since they have a good reputation, and the owner wants to open more businesses"* [UKF7] *"The owner is in charge of the decisions from the four branches"* [UKF8]	Frequency: 23 - MXF1, MXF2, MXF3, MXF4, MXF6, MXF8, MXF10 - MXT1, MXT2, MXT3, MXT5, MXT6, MXT7, MXT9, MXT10 - UKT9 - UKF1, UKF3, UKF4, UKF5, UKF6, UKF7, UKF8
	Charity organisation	*"Our charity is focused in helping single mothers and many of the people involved in the organisation, are wealthy ladies that donate clothes and accessories"* [MXT8] *"We work as a charity, and we also aim to reduce food waste"* [UKF10]	Frequency: 7 - MXT8 - UKT1, UKT2, UKT4, UKT5, UKT6 - UKF10
	Public	*"The changes are for the benefit of the city; citizens are our main priority"* [MXF7] *"Improving the quality of life and reducing pollution in the city is always our goal"* [UKT8]	Frequency: 3 - MXF7 - UKT8 - UKF9
	Non-profit civil organisation	*"We don't want to benefit or create profits from our work, we only want to help people with food"* [MXF5]	Frequency: 3 - MXF5, MXF9 - UKT7

	Social Enterprise	*"We are not a private company; we are considered as a social enterprise and that is how we try to obtain funds"* [UKT3]	Frequency: 2 - UKT3 - UKF2
	Businesses Associations	*"Our mission as an organisation is to gather businesses together and help them to thrive by providing tools and information as well as connections"* [MXT4]	Frequency: 2 - MXT4 - UKT10

6.7.2.1. Organisations tackling food waste.

This topic that emerged from the interviews applies to five participant organisations, located in both countries, whose primary goal is to "tackle food waste"; nevertheless, the differences in their approaches to their mission and their results were significant. Their business models are reflective of the following types of organisations:

i. Social Enterprise
ii. Charity organisation
iii. Private organisation
iv. Non-profit civil organisation (1)
v. Non-Profit civil organisation (2)

All participants referred to different target markets and different ways in which they approach their beneficiaries.

The charity organisation mentioned that they preferred to help people in need, communities in deprived areas, and religious communities, which limited access to people with other circumstances. Although the purpose is to help people who require help, this would also mean a limitation if the primary purpose were to reduce food waste. In their opinion:

> *"There has to be a value in it; otherwise, you are not doing anything of worth". [UKF10]*

In contrast to this point of view, the social enterprise is entirely focused on tackling the problem of food waste and also creating awareness in the community. For them, it is more important to redistribute the food, avoid as much as possible any kind of loss and at the same time create spaces where people from all sorts of economic backgrounds can share their points of view. The participant reported:

> *'We don't distinguish between people and I think that is really valuable and I think for people that are in a difficult circumstances that it is more valuable, having a place where you can go together with all the poor people, you know like a special place, it's nice to just be part of you know the rest of the world, like everyone else and not feel like you are in any way less or different or, so that is what we are trying to do" [UKF2].*

This participant organisation is probably one of the most effective in facing the challenges, because it is open to all the public, and engages different sectors of the society.

The private organisation [UKF5] found in food waste an opportunity to commercialise food in perfect condition for human consumption and provide accessible prices for a sector of the society that is willing to buy products considered by manufacturers to be "ugly" or "not perfect for display". This organisation has been widely accepted by a public at medium economic level because of the low prices. Many of the interviewees agreed that food waste shows a lack of consumer appreciation towards food, that is, it is sometimes better to set a price at a minimum level sufficient for people who come to these organisations to perceive the food as something still valuable and not only surplus food, and also to help them to make better decisions about how much they really need.

> *"With a minimum price point, people make a more explicit choice about whether they need it or not". [UKF2]*

Similarly, different organisations demonstrated different processes for getting the surplus food from different retailers, supermarkets, manufacturers, and farmers. The private organisation claimed to have a direct agreement with manufacturers and farmers to buy all surplus food after their production. This food is in perfect condition for consumption, but retailers rejected it due to cosmetic specifications standards, like crooked vegetables or damaged packaging. Meanwhile, the social enterprise in the UK and the non-profit organisation in Mexico have an agreement to collect all surplus without cost in order to collect as much food as possible and redistribute. On the opposite side the charity charges a minimum fee to collect the food from retailers and supermarkets and in some cases even penalises them for delivering the surplus in bad condition.

6.7.3. Theme: Decision-making structure

Decision making is a theme that emerged from the data collection to explain how the decisions to implement more practices in the organisations are affected by the level of knowledge management and organisational culture.

Creating plans and policies comprises the utilisation of political thinking by the organisation (Andrews, 1971). This idea is based on how organisations enact their working atmosphere, how they execute their core skills and how managers understand and share the information (Weick, 1995). This issue arose as a result of some of the interviewees indicating that they do not have enough power within the organisation to make changes and suggest better actions, while other interviewees pointed out that they were directly responsible for encouraging change.

Hence, two aspects have been identified within the organisational structure and according to the hierarchical level of the participants inside their organisations that relate to participants' capacity to make decisions.

i. ***Centralisation (Top-down approach).*** Those organisations with a centralised structure usually had a very linear structure, such as restaurant chains or supermarkets. Their interviewees mentioned having little power to make or suggest changes in their organisations.
ii. ***Decentralisation (Bottom-Up approach).*** On the opposite side, the interviewees who mentioned having higher decision-making power to make changes were found in organisations with the highest number of implementations.

> *"Most of the decisions are really made here, we just pass reports" [MXF4]*

> *"Yes, anyone can make contributions. We handle it with Kaizens, and they are free for anyone, whatever position they may have in the company, in fact there is a Kaizen committee. There is a group of people who can gather and give suggestions, give projects and in the end the management is evaluated by sustainability in this case and from there you also get good ideas, good projects that have been implemented in the factory and at the same time the operator feels recognised for his idea being put into operation and having it recognised with a prize". [MXT1]*

6.7.4. Theme: Challenges and barriers

This theme addresses all situations mentioned by the participants where they faced or found a difficulty regarding the implementation of CE practices. The coding of the barriers and challenges was carried out inductively considering each comment that the interviewees mentioned concerning the problems presented in the organisations. Later they were grouped into different categories depending on the type of problem to which

they referred. To group the different categories, the categories provided by Ghisellini and Ulgiati (2020) of barriers found in organisations in Italy (Legislative, Economic, Market, Financial, Networking, Technological and Cultural) as well as the soft and hard barriers found in Portugal by De Jesus and Mendonça (2018) (Technical, Economic/Financial/Market, Institutional/Regulatory Social/Cultural) were considered and adapted to this research according to the data outcomes. However, some categories considered important and frequently mentioned by the interviewees were added, such as Educational, Operational and Climate conditions that were not appropriate to link with a previously established category but needed to be included to show the complete range of challenges in the studied countries (Mexico and the UK).

The following main challenges were grouped in the final coding framework:

i. Cultural. This category includes all comments of the interviewers referring to habits, perception, awareness, and values that create an obstacle for more implementations.
ii. Economic. Relates to financial situations such as investments, capital, profit or any monetary difficulty.
iii. Educational. Applies to knowledge, training, educative programmes, access to information.
iv. Environmental. Challenges relating to weather conditions.
v. Regulatory. Refers to an excess or lack of regulations that acts against the implementation of more CE practices.
vi. Operational. Alludes to problems with the design of the processes, demand for products, distribution and operational difficulties.
vii. Market. Refers to prices, demand and offer, currencies, international trade and open markets.
viii. Networking. Comments about communication between actors, traceability, networking.
ix. Technological. Attributed to the lack technological options, infrastructure.

Table 6.5: Emerging nodes – Theme: Challenges and barriers

Sub-theme	Nodes	Examples of participant statements	Stakeholder ID
Theme: Challenges and barriers			
Cultural	Current habits of the society	*"In South Yorkshire, food waste and all go to the black bin, you know, quite a few councils do separate food waste. The problem with it is that, well in my view you should not actually separate at the treatment plant if you have a good treatment for it already, but it should be done by people to minimise it for instance"* [UKF8]	Frequency: 1 - UKF8
	Lack of interest	*"At the end the business is not interested in textiles (recycling), they just want to get rid of it"* [MXT5] *"I am trying to change the supply chain, so it is lower carbon or emissions, we want to change that. They don't care (bosses)"* [UKT3] *"Workers are worried about what they will eat tomorrow, they still have very basic problems, when they solve that then they can think about something else".* [MXT10] *"Most of the people don't care at all if they are polluting, if they are wasting the fields, the majority, even avoid regulations so they don't spend more"* [MXF4]	Frequency: 5 - MXT5, MXT10 - MXF4 - UKF8 - UKT3
	Perception of the people	*"Emmmm well obviously there are legal barriers emmm I think a lot of that is about perception, so emmm so like I said the best before day is not a legal requirement, but most people don't understand what a best before date is for. So, you see a packet of crisps and you think ohhh it is the date to throw it away, and it is nothing to do with that"* [UKF2] *"Psychologically in terms of that if you don't tell somebody how much it is worth, they don't think it is worth very much. So that is a really complex psychological thing"* [UKF2].	Frequency: 9 - MXT7, MXT10 - UKF2, UKF4, UKF7, UKF9 - UKT2, UKT5, UKT8,
	Resistance to change	*"People are comfortable with what they have, they are not ambitious, so I think it is cultural"* [MXF1]	Frequency: 8

		"One of the barriers that is stopping us is the culture of the people, change the way they see the things, everything else is simple" [MXF2] *"It could be resistance to change, because in fact when we start with ISO 14001, working in a different way from what you are used to is usually more complicated. It was a lot of training, a lot of follow up with people. Simply changing the way they dispose of their waste was a problem"*. [MXT1]	- MXF1, MXF2, MXF3, MXF5 - MXT1, MXT2, MXT4 - UKF3
	Trust and values	*"What happens is that it is still a bit difficult (to donate) because practically the store is left in the hands of a staff of employees, they have to verify what is going to be wasted. We still do not have the supervisory capacity to have several supervisors so that they can go daily to stores to verify that they are not wasting more to take for themselves"*. [MXF5] *"It is forbidden to give it to employees. I believe that is a lack of trust because what the owners feel in that case is that as soon as they are told that they can take away, if they give them a lot of trust, they will start to take things that are not even waste"*. [UKF7]	Frequency: - MXF4, MXF5 - UKF7
Economic	Complicated access to funds	*"I tried but they don't give me the money. Banks won't give me the money"* [UKT3] *"The other problem that we face emmm we'll be facing going forward is that we don't have anything in terms of sort of other funding streams you know, whether it's Government funding, for delivery, social impact or other grants, and funding that is available, grants emmm are very pitch and hole, if you don't tick a box you don't get a grant. There are a lots of practical problems around being a non for profit or a social enterprise, so the first time we were trying to get the lease space it was terrible because no one wants to lease to a social enterprise because somehow if you are no longer going for the profit people don't trust you are credit worthy anymore* [UKF2]	Frequency: - UKF2 - UKT3
	Cost-Benefit to implement	*"It is a matter of cost-time-benefit to implement more"* [MXT3] *"Yeah, it is always cost-benefit, it's always cost that drives us like that"* [UKF9]	Frequency: - MXF8 - MXT3, MXT9

		"There is a lot of logistic optimisation in food waste, because logistics is expensive and food is cheap, so if you need to save food by investing in logistics you are not going to do it because it is going to cost you money" [UKF2]	- UKT1, UKT2 - UKF9
	Economic crisis	*"We faced a problem, when the market contracts, the crises are very strong, donations go down"* [MXF4]	Frequency: - MXF4
	Increase price of the products	"*Many times, these garments are more expensive for this type of process"* [MXT2] *"Solar panels are sub-contracted, it's very expensive and we don't have money to support that, not yet.* [MXF10] *"If you want to be sustainable the price goes up then which is quite unfair"* [UKT9]	Frequency: - MXT2 - MXF10 - UKT9 - UKF3
	Lack of Investment	*"Money is a big thing you know; you know what I mean? You need the market to be able to get things out, nobody is investing at the moment"* [UKT8]	Frequency: - UKT8
	Monetary resources limited	*"Well, to start that (the implementation of new practices) will have a cost, we are just thinking how to survive with this, how can I start something different? Right? money is barrier if we don't generate money. It will not allow you to focus, think and start new things if you don't have the time and resources"* [MXF4] *"I think it is related with the economic part (the implementation of new practices), without that problem more things might be implemented"* [MXF5] *"As I said before, there is not budget enough for this kind of thing, sometimes we are surprised that some of the projects ended up being sponsored by private initiatives"* [MXF7] *"What we need? We need resources to develop the twenty thousand projects we have, the twenty thousand ideas we have, to see a real development"* [MXF9]	Frequency: - MXF4, MXF5, MXF9 - MXT1, MXT2, MXT3, MXT4, MXT5, MXT6, MXT9 - UKF2, UKF3, UKF4, UKF7 - UKT7

		"For the moment I do not think lack of interest is the main problem, neither for the owners or the managers. It can be lack of resources, investment" [MXT1] *"I think it's more an economic barrier, in the sense that all these practices today in Mexico are very expensive even on a personal level. If you want an electric car it will be very expensive, so it is not worth it for what you are going to save in petrol, literally you are doing it because you want to save the planet. Up to now it is very expensive to implement this kind of thing in Mexico". At the end it has to be with the final cost, why they do not get the solar panels is about recovering the investment. Otherwise it is not worth it the implementation"* [MXT2] *"Well, only if the investment will return. The initial investment for solar panels is a bit expensive for the moment. We have other projects in this moment that will need this resource, so for the moment I don't know, it's still in consideration. Everybody asked us to reduce costs, even our clients, even if we explain and try to justify a project to improve something, everything requires some investment"* [MXT3] *"Economic as well"*. [MXT4] *"Economic, because everything needs additional expenses, if the company does not see a direct benefit"* [MXT5] *"Lack of investment, if we have more support in the textile industry to get more machinery, then we can have better propositions"* [MXT6] *"Economics is the first barrier, for every project we need to provide a study about how much it will cost, what is the return for the investment. For the moment our production is based on quality, even if that costs more, I am sure that at some point they will start to analyse that in terms of sustainability"* [MXT9].	

Educational	Challenge to train people	*"I can't do that (referring to having detailed control of what they receive), because I have an infinitive number of things to do, so we and I have limited capacity, because most of the people are volunteers, training is always challenging. [UKF2]*	Frequency: - UKF2, UKT4, UKT5
	Insufficient information	*"I think the principal is lack of knowledge, people are not aware of the impact if you have to do it or not"* [MXT2] *"I think we need more training, kind of be aware of all that, right?" [MXT6]* *"Well, it should be more like a habit, or as well more training to know how to do the things*" [MXT7] *"The barriers are lack of education by the end user, the value of the low carbon products"* [UKT3] *"We need to know how you separate it more technically so you can minimise your contamination for items that you should really be recycling"* [UKF9]	Frequency: - MXT2, MXT6, MXT7, MXT10, UKT3 - UKT8 - UKF9
Environmental	Weather conditions	*"Depends of the country and the circumstances around the country, because I worked in the same company in Mexico and the UK and we needed to keep the product refrigerated in Mexico otherwise the product was going to be wasted"* [UKF3]	Frequency: - UKF3 - MXF10 - MXT10
Legislative	Excessive regulations	*"They (Food banks) have really poor redistribution centres, because they have referrals and can only give food to certain people. They can only give it them 3 times a year because otherwise they say that will create dependency. Their stock management system is absolutely ridiculous, I think they can only keep stock for 3 months and then after 3 months of it being on a shelf, they need to get rid of it"* [UKF2] *"Health and safety are big barriers; we need to throw everything away, we can't have it for the next day and we can't give it to anybody because of rigorous health and safety"* [UKF7] *"For a donation you need to disclose it to the Tax Administration Service to even destroy the food or donation, then there's bureaucracy with the food bank if you want to give them something"* [MXF10]	Frequency: - UKF2, UKF4, UKF5, UKF7 - MXF10 - MXT4, MXT10 - UKF4

		"Mexican legislation for importation of textiles is considered a sensitive topic, everything needs to be strictly controlled" [MXT10] *"Following all the rules is exhausting, all the revisions, formalities, time invested. I think there is excessive regulation that only makes everything more difficult"* [MXT4]	
	Indifferent regulators	*"Not indifferent governments, indifferent local politicians here. At the minute you get a different portfolio in one of the councils and they can change the direction that we are going to go in, and things like that"* [UKT8] *"UK Government doesn't care, they stopped regulations in this sense"* [UKT3]	Frequency: - UKF9 - UKT3, UKT8
	Inflexible contracts between stakeholders	*"What they do is they all have an arrangement with Supermarkets nationally"* [UKF10] *"We had a 25-year contract with our incinerator supplier and then legislation changed"* [UKF9] *"I've seen it myself, that some people just move their waste. So, we have to accept that because nationally we are told to accept it, it's in our contract"* [UKF10]	Frequency: - UKF9 - UKT8 - UKF10
	Insufficient policies in place	*"No, the regulations weren't the problem, they need to bring more in"* [UKT3] *"Not having clear legislation. Sometimes what is not prohibited is allowed, but many times there are some gaps in legislation for things we want to do, and we are not sure if we'll be allowed"* [MXF1]	Frequency: - - MXF1 - UKT3
	No problem with regulations	*"No, we have periodical revisions for the ministry of health, and we have never faced any problems with regulations, all our permissions are updated"* [MXF3] *"Not really, we don't have anything that might affect us at the moment if we try to implement things. It's the opposite, certifications and formalities help us to export things easier"* [MXT1] *"No, nothing legal, I even understand that now local and federal Governments are trying to incentivise sustainability, so I don't see any legal problem"* [MXT3] *"No, I don't think there is a legislation problem that punishes you or incentivises you to be more sustainable, but I actually think that being more sustainable gives more certainty to our clients about our products"* [UKF3]	Frequency: - MXF1, MXF3, MXF5, MXF7, MXF9 - MXT1, MXT2, MXT3, MXT5, MXT6, MXT8 - UKF1, UKF2, UKF3, UKT5,

	Unaligned waste collection schemes	*At the moment it is the harmonisation of waste collection schemes, we've got different collection systems. So, we are a little bit far apart at the moment" [UKF9]*	Frequency: - UKF9 - UKT8
Logistics and planning	Inaccurate Forecast	*"It is hard for the chef to measure whether it is going to be busy or not so when it needs to be ordered"* [UKF1] *"There is still an issue with Forecasting errors and when that forecasting error starts at the Shelf in the Supermarket it tends to have a rippling effect back up to the regional food distribution centre, the national distribution centre, the distribution centres of direct suppliers. You have this ripple effect, but it's very much down to forecasting error and some of it is very much down to customer intelligence or getting promotions wrong, that sort of thing"* [UKF10]	Frequency: - MXF8 - UKF1, UKF2, UKF10
	Inadequate Infrastructure	*"We don't have much of an infrastructure, mainly I worked on my own, but we need an infrastructure to have projects like that"* [UKT3]	Frequency: - MXT8 - UKT3
	Insufficient options	*"Well I would like to see alternatives in Sheffield to recycle the food waste, but I don't even think there is one"* [UKF6] *"Yes, there are few options. Infrastructure of the state, of the municipality. The supply of the resources such as electricity, although there are now wind energy programmes, it is an important issue, and also old regulations"* [MXF1]	Frequency: - MXF1 - UKF6
	Lack of time to plan	*"I feel like we are doing sustainable practices, but since this is something recent it will take time to see results"* [UKF3] *"The main problem is the lack of workers to do these things because only my partner and I are there and to do this thing takes time, and if we hire somebody this will cost money"* [MXF3] *"There is a lot of things we can do but it's about how many hours there are in the day. It's very easy to sort of spread this out to thin and get distracted and you end up doing many things not very well and a couple of things rather good"* [UKF2]	Frequency: - MXF3, MXF6 - UKF2, UKF3, UKF9 - UKT8

	Operational Shrink	*"I think it is probably more logistical"* [UKT1] *"Food waste is a logistic problem in a lot of ways and is a type of problem that needs to be scaled and solved efficiently"* [UKF2] *"The problem is mainly in the production stage, although, we also have the sporadic accidents, those who handle the warehouse maybe do a bad manoeuvre or put the pallets wrong, but it is minimal, and it is not frequent then the main thing that I would say is that it is in the production process or within the production where the waste is produced"*[UKF3]	Frequency: - UKF2, UKF3 - UKT1
	Operational uncertainty	*"It's about control. What people are going to buy. So, we have to have a selection of sandwiches, but if today nobody comes for a tuna sandwich for 3 days, after 4 days we have to put it in the bin"* [UKF4] *"We don't know what is coming in for donation until a lorry turns up with 24 pallets on it and all we know is that the lorry is coming in"* [UKF10]	Frequency: - UKF2, UKF4, UKF10 - UKT2, UKT4
	Shortage in capacity to tackle the problem	*"We don't have the logistic capacity to do that"* [UKF2] *"We wouldn't have the capacity to do that"* [UKF9]	Frequency: - UKF2, UKF9 - UKT8
	Staff Rotation	*"Staff rotation is very high and that complicates things"* *"Volunteers can be a problem, and again you have to understand why they're volunteering and then build value around their volunteering"* [UKF10]	Frequency: - MXF1 - UKF10 - UKT2
Market	Currency fluctuation between markets	*"There's been issues with currency fluctuations for textiles as well in African countries, the same sort of issues. So, there is one side of it, the other side of it is the recycling companies, a lot of them work on a contracts basis"* [UKT10]	Frequency: - UKT3, UKT4, UKT10 - MXT10

	Intentional overstock	*"There is so much stuff that is getting in, just because it's overstock, it's not because some else couldn't predict the demand, it's because it's purposely over stock or it's stock never with the intention to be sold"* [UKF2] *"They are producing too much stock that goes in the bin" [UKF5*	Frequency: - UKF2, UKF5
	Misleading marketing practices	*"Because they (retailers) are used to buy one get one free, and things like that, instead of looking just to have just individual items that are reduced in price so if you get buy one and you get one free, half of it will end up in the bin"* [UKF9] *"The truth is that lately and since they (the owners) closed two branches, the owners no longer care, they just want to pay cheaper without caring too much about everything. Even though they show the face to the public that we are super friendly, eco-friendly, they don't really practise that too much"* [UKF9] • *"They open the packaging, contaminate it with detergent and then throw it in the trash, because if they throw it in the trash without contaminating it someone gets in their garbage dumpster and eats it, it has happened to them"* [MXF4] • *"Some years ago all the fish and freezers went down, they (Retailers) must had a power cut or something, so loads of stuff that they couldn't keep for very long anymore, so they put it all in the car park, chased people away, bleached the stuff in there so people couldn't take it, you know why? Because they were afraid that people were going to take that and they were not going to shop in Aldi or Lidl the next day because they got them for free. They were afraid to undercut their own business but still a lot of stores do that, they just secretly get rid"* [UKF2] *"We have a rule that the product is not provided to the client if it has more than half of its productive life left"* [UKF3]	Frequency: - MXF4 - UKF2, UKF3, UKF7, UKF9 - UKT8
	Reputation of Organisations (Brand-Image)	*"I think some retailers don't do donations, because of the reputational waste".* [UKF9] *"There is always a risk that if you are found getting rid of too much stock, because it has been given with people's trust that you will sell it or make the best use of it. There is always a risk that if you are not doing that then you can get into trouble, people won't trust you anymore"* [UKT1]	Frequency: - UKF9 - UKT1, UKT5, UKT8

	Specific market requirements	*"Well, of course I care that they sell me it in good quality and in good condition, right? otherwise I would return it, right?"* [UKF6]	Frequency: - UKF6
Networking	Dependency of Stakeholders	*"I mean if you look at all the different fibres, emmm we've got wool, and I classified leather as a fibre even though is not an individual fibre based product, so both of those are products into the food industry, so in that sense if we don't have a food industry, that is eating meat, then we lose crops if we call them crops, it's all based in land usage which again is a conflict with a switch over to a land base"* [UKT10]	Frequency: - UKF10 - UKT10
	How to engage stakeholders	*"I believe that this is the biggest challenge, to involve everyone and that everyone can get involved in the same intensity with which we are trying to carry out this project"* [UKF3] *"The problem is that you rely on people to regularly bring the clothes, you might go out to the businesses and say you know we are from a charity can we give you 200 hundred bags for your employees, you know things like that. It's desperate, to get whatever you can"* [UKT2]	Frequency: - UKF3 - UKT2
Technological	Need to improve current technologies	*"We have a couple of things that are already obsolete, we have an old oven, or here in our buffet we use a lot of ice and the structures are constantly oxidizing"* [MXF6] *"We want to buy some showcases, when the customer goes to raise the showcase, the bread is served and it closes again. So that the bread remains fresh longer. We don't have that for the moment"* [MXF6]	Frequency: - MXF6

6.7.4.1. Descriptive outcomes for challenges and barriers

Table 6.5 shows the themes expressed by the participants in the interviews by giving some examples of each node that provide exact quotations of their opinions. To complement these quotations, a descriptive analysis of the outcomes is presented below; further discussion and conclusions will be provided in chapter 6.

i. ***Cultural.*** The sub-theme cultural for the theme challenges and barriers comprises all responses related with description of ideas, customs and social behaviour of a society. The following themes explain the most recurrent descriptions given by the participants and some concrete examples for a better understanding.

Current habits of the society. For cultural barriers, participants referred to the current habits of the people. A participant who is a regulator (UKF8) mentioned the problem presented by the fact that consumers have not acquired the habit of separating their waste correctly, and the difficulty that this represents for recyclers in sorting the waste at the end of the collection.

Lack of Interest. Several participants mentioned that one of the main problems in the implementation of CE practices is the absence of commitment from the people in charge of the decisions in their organisation, like the CEO, owners or people in key positions. Also, one interviewee (UKT3) mentioned that the lack of interest is not only on the part of the people in their organisation, but also consumers are not willing to pay more for a product and are only looking for low prices.

Perceptions of the people. Perceptions must be understood in terms of what the society comprehends about ongoing habits in their daily activities. Participants referred to this in the case of food, and the fear of consumers to use something with an outdated 'best before' on the product label, even though the product is still in perfectly good conditions. Also, it was mentioned how people are more willing to waste something when they do not have to pay for it, or they only pay a small amount (i.e. donations from food banks or cheap clothes in charities). Finally, an interviewee (MXT7) mentioned that implementing such practices is not for them because they are only a small family business and that these practices should only be implemented by larger organisations.

Resistance to change. An important number of participants mentioned that in their opinion, more than a lack of interest there is resistance from the people in charge of their decisions in their organisations, and the society against doing things differently. The majority of participants that expressed this view come from the region of Yucatan, which they stated is a conservative region and not very open to changing the way they currently carry out their activities.

Trust and values. The last barrier linked with cultural outcomes relates to the trust and values in the relationships between employers and employees-volunteers in the organisations. Participants mentioned that one of the barriers to implementing more changes is related to distrust towards employees. In the case of the food industry many of the businesses reported mistrusting their employees, with employers preferring to waste the surplus food at the end instead of donating it to their employees, because they think that employees will intentionally create more food to create more surplus to take home.

ii. ***Economic.*** Relates to financial factors such as investments, capital, profit or any monetary difficulty. Below are the challenges most frequently mentioned by the participants.

Complicated access to fund. The participants who mentioned this belong to a social enterprise organisation. The main problem for these organisations is that they believe that they can barely cover their economic survival needs and banks are not willing to provide financing since it is very difficult for them to prove income. This makes generating innovations, planning or changes more difficult.

Cost-Benefit to implement. Participants from both the industries and countries investigated concluded that the biggest challenge for them is that the cost-benefit of implementing circular practices is not attractive to them and can even be at a higher cost. As an example, authorities that collect municipal waste mentioned that recovering certain materials is not as profitable as it is an activity that requires labour and consumes a lot of time.

Economic crisis. Only one participant mentioned economic crises as a problem, since in times when the economy contracts, they receive fewer donations, making their operation difficult.

Increases price of the products. A common narrative of the participants in mentioning implementation of more practices is that they believe that acquiring renewable energy, certifications, or even more sustainable practices would increase the price of their product.

Lack of Investment. Similar to the complicated access to funding, the participant mentioned the lack of investment in the public sector to encourage adoption of better practices.

Monetary resources limited. Approximately 30% of participants mentioned that the biggest challenge that arises in their organisations is that both physical and monetary resources are limited and need to be used for their daily operation.

iii. ***Educational.*** Applies to knowledge, training, educative programmes, access to information.

Challenge to train people. Interviewees related to organisations in which volunteer staff is required found it more difficult to convey the message to their staff, since there is very constant rotation, and it would require a lot of time and effort to implement more circular practices.

Insufficient information. In this category, participants mentioned their lack of access to information regarding how to apply best practices in their organisations, lack of training for their staff, as well as a lack of information on the part of their final client about these practices.

iv. ***Climate conditions:*** Mentioned weather conditions challenges.

Weather condition. Two participants from the two different industries in Mexico pointed to the climate factor as a challenge to avoiding waste in their organisations. In both the food and textile industry, unexpected factors such as hurricanes, excessive heat, and crop losses were mentioned as factors that prevent having less waste.

v. ***Regulatory:*** Refers to the excess or lack of regulations that acts against the implementation of more CE practices.

Excessive regulations. Approximately a quarter of the respondents considered that excessive regulations are a difficulty in avoiding waste in their supply chain. Among the excessive regulations mentioned: strict control over who can receive donated food,

especially in food banks, health and safety rules, the application of "by date" in food, as well as excessive bureaucratic requirements for making changes in their organisations.

Indifferent regulators. Some interviewees agreed that those responsible for implementing more practices in organisations are also those responsible for creating laws and regulations that force companies to implement them. However, they considered that it is an issue that is completely outside of their legislative agenda and that there is a lot of apathy. They consider that governments and local politicians are both indifferent.

Inflexible contracts between stakeholders. Inflexibility in contracts between supply chain actors refers to the fact that many actors are unable to implement changes because this would affect previous agreements with suppliers and customers. Sometimes this affects the level of donations they can deliver or receive.

Insufficient policies in place. On the other hand, some interviewees mentioned that there is not only a lack of regulation to encourage implementing changes, but that the existing regulations are not clear. In this regulation it is not specified what is prohibited, what is allowed, so sometimes legal gaps are found and as a precaution they prefer not to implement changes.

No problem with regulations. Just over half of the participants stated that they have not had problems with the established laws and that they are not an impediment to implementing changes, so they do not see current regulation as a problem.

Unaligned waste collection schemes. The lack of communication between regulators in different regions or cities regarding waste collection schemes makes it difficult to have joint participation in implementing solutions to the current problems about the proper processing of waste materials.

vi. **Operational.** Alludes to problems with the design of the processes, demand for products, distribution and operational difficulties.

Inaccurate Forecasts. The lack of proper planning, as well as erroneous purchasing forecasts, are mentioned as problems in avoiding waste generation. According to the interviewees, this is one of the main problems to overcome.

Inadequate Infrastructure. The lack of space and infrastructure in organisations is also mentioned as a barrier to change. The lack of local options that would support greater implementation of changes is in the same way considered as an obstacle to overcome.

Insufficient options. Another barrier mentioned was the lack of options that participants can access to create improvements in their organisations. That is, for example, lack of options for recycling materials or lack of suppliers with best practices.

Lack of time to plan. The lack of vision among staff, lack of time to plan activities outside their daily activities are some of the problems participants mentioned. They considered that planning more activities would be time consuming and difficult to implement.

Operational Shrink. Unpredictable accidents in everyday logistics activities such as transportation and storage are seen as inevitable in the creation of waste. They consider that the greatest loss of materials or products is due to oversight in the handling and distribution during the supply chain.

Operational uncertainty. Insufficient information about what is going to be received or sent (i.e. donations, sales) is problematic since it is impossible for them to reduce waste when they do not know what they will be using.

Shortage in capacity to tackle the problem. Lack of ability to solve any problem. (i.e. inability to collect more food from supermarkets and avoid waste due to lack of vehicles, personnel, etc.).

Staff Rotation. Similar to the aforementioned in the education sub-theme, with volunteer staff considered a challenge to train, and the constant rotation of personnel within organisations would create a lack of continuity in terms of the practices that need to be implemented.

vii. **Market**. Spoke about prices, demand and offers, currencies, international trade and open markets.

Currency fluctuation between markets. One of the problems that arises in the textile industry is the fluctuation of prices and the exchange rate between countries. This was pointed out as a problem for defining practices that help avoid waste. Since organisations are controlled by the market price, it is difficult for them to access

sustainable practices and, on the contrary, commercial exchange for lower prices is encouraged, even if it means less sustainable practices.

Intentional overstock. Some participants mentioned that marketing techniques that show more products than are required at the counter are adopted intentionally to encourage customers to buy. Purposely overstocking is a cause of a lot of waste. Retailers are producing more than they should and some push strategies from the centre to the stores are producing products that are not needed.

Misleading marketing practices. Regarding marketing practices that lead to more waste, participants mentioned the shortening of expiration dates on products, constant messages urging consumers to accumulate more products or acquire the latest fashion product are among the misleading techniques used. In some cases, they also mentioned Greenwashing as a common practice in organisations where the only aim is to generate a false impression about their sustainable practices rather than actually to generate change.

Reputation of Organisations (Brand-Image). Participants who have contact with retailers mentioned that they have sometimes lost donations from them, since they have preferred to destroy food instead of donating it, to avoid reputational waste.

Specific market requirements. Special requirements are another challenge to overcome in order to avoid waste. These refer to the aesthetic requirements that mean that products that do not meet the specified quality are wasted.

viii. ***Networking:*** Refers to communication between actors, traceability, networking.

Dependency of Stakeholders. Stakeholder dependence was mentioned as a problem in the implementation of changes. Two interviewees mentioned how the lack of cooperation in the supply chain makes implementing changes in their organisations more complicated. Similarly, they mentioned that any change made could have a negative impact on any of their suppliers or customers.

How to engage stakeholders. In the same way, only two participants mentioned that the real challenge to achieving a major change in their way of acting is making their stakeholders commit to acting together for a greater benefit. This refers in the case of

second-hand stores to such as how to make more people make donations, or, similarly, it could refer to how to make more stakeholders get involved in activities.

ix. **Technological.** Attributed to the lack technological options, infrastructure.

Need to get improve current technologies. Some interviewees considered that one of the problems in improving their practices is the lack of access to technologies that could help make their operations more efficient. They mentioned that they believe that the current equipment in their organisations is inefficient and consumes a lot of energy. They considered that it would be expensive to acquire more efficient technologies or, in some cases, said that there are still no efficient technologies for what they require.

6.7.5. Theme: Key drivers and opportunities

This topic covers all situations where participants mentioned what they consider as an opportunity to implement new practices in their companies or organisations.

The coding of the key drivers and opportunities was carried out using the same method as for the challenges and barriers. The coding was inductive, considering each comment that the interviewees mentioned referring to a positive view of what can be implemented in their organisations in terms of circular practices, also the comments about what they would consider as a benefit of this implementation. The main opportunities were grouped into different categories in the final coding framework as shown below:

i. *Economic.* This sub-theme refers to all the benefits that can be generated in a monetary way, creating new business opportunities or higher profits.
ii. *Educational.* This refers to and covers everything related to education and spreading more information through the supply chain and among stakeholders.
iii. *Environmental.* This includes the benefits and opportunities that participants mentioned in ecological and environmental matters.
iv. *Social.* This represents everything related to opportunities within the social environment, that is, interaction between actors in the supply chain, as well as benefits in favour of society as perceived by the participants.

v. *Technological.* Finally, the opportunities that may arise in the implementation of more circular practices in technological matters were mentioned as another important narrative.

Table 6.6 shows examples of each node.

Table 6.6: Emerging nodes – Theme: Key drivers and opportunities

Sub-theme	Nodes	Examples of participant statements	Stakeholder ID
Theme: Key drivers and opportunities			
Economic	Attract more customers-sales	*"I believe that the benefit would be to have less customers, perhaps, because prices would increase a little, but they would pay more, consume more" [MXF3]* *"Well, I think that if I could, for example, if we recycle more, I think that above all people are now more interested in that" [UKF6]*	Frequency: 10 - MXF3, MXF6. - MXT1, MXT2, MXT6 - UKF3, UKF6 - UKT4, UKT5, UKT9
	Improve efficiency	*"Take care of your inventories. If the customer leaves you your product does not move, if your product does not move you end up pulling it, if you end up pulling it, your cost increases, then what happens is there can be no increase in salaries, there can be no improvements in the company, and there can be no better investment in the equipment. [MXF10]*	Frequency: 4 - MXF10, - UKF9, UKF10 - UKT8,
	New business opportunities with waste	*"They take advantage of the waste and sell it, from that sale to us they pay us 30% for environmental education campaigns" [MXX7]* *"All goes to a rag merchant and we get paid for the rags" [UKT4]*	Frequency: - MXF4, MXF7 - UKT4, UKT5, UKT6 - UKF2, UKF4
	Reduce Cost - More profit	*"I believe that in the future the benefit you will get is to reduce costs and you can offer a better price. By offering a better price, you increase your sales percentage" [MXF10]* *"Well I think there are benefits, economic benefits like to reduce the cost, everybody is talking about cost, and everything is about reducing cost" [UKF4]* *"The first one would have more people, more consumers, more sales, and maybe they could even raise their prices and there they could generate more money" [UKF7]*	Frequency: - MXF2, MXF3, MXF5, MXF6, MXF7, MXF10 - MXT8, MXT9, MXT10 - UKF4, UKF6, UKF7, UKF9 - UKT8

	Tax incentives	*"They receive a tax benefit, or we do through a gift aid and just in the process of getting a gift aid manual from Britain. I think it is good will, let's not forget about the fact that they just want to get rid of it. [UKT6]*	Frequency: - MXF10 - MXT2 - UKT6
Educational	More educated society	*"Shortly after we started there was more media pressure about food waste, most national retailers started to adopt social corporate responsibility responses to that, for most companies this is a marketing problem" [UKF2]*	Frequency: - UKF2
	More information between stakeholders	*"I think that should be done first inside the company, that is something that is developed and communicated to the customer. It is easier, it is more transparent that it is not lying to you, it is rather communicating what I think" [MXT3]*	Frequency: - MXT3 - UKF3, UKF10
Environmental	Less waste	*"We stop throwing food away we get to feed everybody with the leftovers so the benefit of making sure that we don't waste is that we don't have people hungry" [UKF2]* *"It stops food, perfectly good food, going to waste" [UKF5]* *"We waste less because Too Good to Go is just for whatever is left" [UKF1]*	Frequency: - UKF1, UKF2, UKF5
	Promote environmental message	*"The brands are starting to promote it; they are the only two that come to mind that are using recyclable materials" [MXT2]*	Frequency: - MXT2
	Reduce Carbon Footprint	*"It is an enormous carbon footprint, so for every kilo of food that I redirect from landfill I save about 3 and a half kilos of carbon equivalent" [UKF2]* *"The only benefits are non-material ones like the social aspect of it, the environmental impact we have which is diverting waste from Landfill and also not producing more, consuming less raw materials, air, water pollution, greenhouse gases, carbon emissions and carbon footprint by turning the new textiles into new garments, doing this to see the benefits" [UKT7]*	Frequency: - UKF2 - UKT7
Social	Connect with people	*"It is not just about distribution cost, it is about connecting to understanding where that or this comes from, a farm, and actually it is on the road and that it is grown there and*	Frequency: - UKF2

		now I am eating it, and understanding that it has a lot of value for who you are as a person but also for how you value and treat your food and that sort of thing" [UKF2]	
	Create new habits	*"We are growing tomatoes and parsley and then we are going to use them in the menu" [UKF4]* *"Food waste is something that we should be dealing with at house level, you should be thinking about what you buy so you are not chucking away food waste, you know, minimise the amount of waste you are chucking away when is possible to do so" [UKF9]*	Frequency: - UKF4, UKF9 - UKT8
	Help people in need	*"It is a different satisfaction, because there I am literally feeding someone" [MXF4]* *"The benefit is for the entire universe because when you do things for the love of your people, that is priceless. Those are the benefits, the blessings" [MXF9]* *"I believe that the benefit and the pleasure is that it serves them" [MXT7]*	Frequency: - MXF4, MXF9 - MXT7 - UKF2 - UKF5
	Improve trust in organisations	*"I think a lot of customers would like to know where the stock goes and then what happens to it. So, I think the more information we can provide them with about how sustainable we are being, it will support what we are doing" [UKT1]*	Frequency: - UKT1, UKT4, UKT5
	More collaboration between stakeholders	*"There is so much opportunity for organisations like to just work together and whether they pay us some fee to manage their logistics because they are too small to do it, or whether they just call everyone and say, hey I've got some pasta left, do you want some pasta or whatever, but there is so much opportunity for collaboration I think" [UKF2]*	Frequency: - UKF2, UKF6, UKF10
	People engagement in activities	*"We have a lot of customers and volunteers who are dealing with illness or have a friend or family member and so you become a bit, not a shoulder to cry but quite often just somebody to talk to" [UKT5]*	Frequency: - UKF2, UKF10 - UKT5, UKT9
	Positive image of the organisation	*"Well, so that also the people, the community can perceive you as a better employment option, to see that the company cares for them, for their health, for the environment" [MXT1]*	Frequency: - MXF1, MXF2, MXF3, MXF6

		"The approval of the community. If the community accepts you" [MXF1] *"Socially I think a good image with respect to other restaurants" [MXF3]*	- MXT1, MXT3, MXT8 - UKF3, UKF4, UKF6, UKF7, UKF8 - UKT3
	Reinvent values and customer perception	*"Mmmm if maybe customers ask for what they didn't eat it could help" [UKF8]* *"Yeah, I noticed first commers usually don't bring much and take clothes but as times goes by, they realise what they are donating and they become a bit more careful with what they take and what they bring, they bring more and they take less" [UKT7]* *"I believe that implementing something like how to make them more aware of what they consume" [MXF6]*	Frequency: - MXF6 - UKF2, UKF8, UKF9 - UKT7, UKT8, UKT9 - UKF8
Technological	Improve current technologies	*"Digital patterns help you to save, to save a lot of fabric" [MXT6]*	Frequency: - MXT6
	Create new products in different supply chain	*"There are many ways to preserve food. Like vacuum packaging products" [MXF9]* *"With the waste we aim to generate energy, in fact, we have a Biogas burner" [MXF7]* *"For instance, feeding animals, you know in Japan there are really successful businesses or at least one that pick up food waste, and ferment it and feed pigs with the fermented waste" [UKF2]*	Frequency: - MXF6, MXF7, MXF9, - MXT2 - UKF2, UKF9 - UKT8, UKT10
	Use of sharing economies	*"Economically it helps me. I don't want to be throwing away the food, that doesn't suit me at all, right? I'm better selling it through the app" [UKF6]*	Frequency: - UKF6

6.7.5.1. Descriptive outcomes for Key drivers and opportunities

Table 6.6 shows examples of statements expressed by the participants in the interviews by presenting exact quotations of their opinions. To complement these quotations, a descriptive analysis of the outcomes is explained below; further discussion and conclusions will be explained in chapter 6.

i. ***Economic***: This sub-theme encompasses different statements expressed by the different respondents where the main factor is an economic benefit or advantage.

Attract more customers-sales. One of the main benefits that participants considered regarding implementation of best practices in their organisations is that they would attract a niche market that is interested in more sustainable products. They believe that showing that the company is more concerned about being sustainable will help them to attract more specialised customers, and that such customers will be willing to pay more for products and services.

Improve efficiency. Process efficiency is one of the benefits that participants considered. Having better processes, more analysis, and better planning is considered an opportunity to reduce operating costs.

New business opportunities with waste. Selling waste, finding new ways to use waste, or finding new alliances with supply chain actors are among the benefits that participants mentioned in this node. They believe that with the implementation of new practices, ideas can arise to create economic benefits.

Reduce Cost - More profit. Half of the interviewees considered the reduction of costs due to more efficient energy use as a main benefit, through increasing profits from their sales, or by minimising their operating costs through best practices.

Tax incentives. Three of the interviewees mentioned that their stakeholders may be attracted by tax benefits and reductions in their taxes offered through donations. This benefit would lead to more people making donations.

ii. ***Educational.*** Sub-theme that refers to the opportunities and benefits of receiving more information and education from the implementation of CE practices.

More educated society. An interviewee considered that among the benefits of the implementation of more circular practices is the fact of making society more aware of the changes that are required. Similarly, it was mentioned that in a large part the media are responsible for people now being more concerned about this type of practice.

More information between stakeholders. An opportunity that was also mentioned concerning implementation is that this would help to have better communication and education in the supply channel with different actors, so it would help improve collaboration and teamwork.

iii. ***Environmental.*** For this sub-theme all the nodes relating to the natural world and human activity's impact on it were considered.

Less waste. It was mentioned as a benefit that there would be less waste of resources, usage could be reduced or even directed differently for better use.

Promote environmental message. Another benefit mentioned as part of the environmental narrative was that companies will share more information with the public in an environmental approach, working as a channel to educate people about better practices.

Reduce Carbon Footprint. Two interviewees mentioned that by making the change to more circular practices, they would also be helping to reduce their carbon footprint in their operations.

iv. ***Social:*** Relates to nodes mentioning opportunities and benefits associated with the society.

Connect with people. Some of the interviewees from non-profit organisations mentioned that one of the benefits they find in the implementation of more circular practices is the connections they can generate between people. This is mostly related to charities, volunteers, donations and other altruistic organisations.

Help people in need. Similar to the previous point, social benefits are understood as the fact of helping more people through the best use of resources. According to the interviewees, making better use of resources opens the possibility of being able to donate or use excess resources to help other people.

Create new habits. With the creation of new habits, the interviewees referred to the fact that CE practices open the possibility for society to reinvent itself by acquiring some past practices that worked more efficiently or evolving them into new ones. They referred to practices such as reusing containers to generate less garbage, l producing vegetables and fruits locally or stopping use by date labelling for food.

Improve trust in organisations. The interviewees agreed that applying better planning and efficiency through CE practices would give society more confidence in their organisations. By this they meant that people would donate more and be willing to trust that their donations would be put to good use.

More collaboration between stakeholders. The interviewees see it as an opportunity to forge better collaboration between stakeholders. Among the opportunities for collaboration mentioned were to share more responsibilities in their operations, reach agreements to improve efficiency, and open more possibilities to help each other.

People engagement in activities. More participation of people in altruistic activities where some benefit is generated for the society was one of the opportunities mentioned by the participants.

Positive image of the organisation. About a third of the participants expressed that one benefit would be a positive improvement of the image of their organisations. They mentioned the importance of acceptance by the community where they are located, being recognised as a sustainable company and that the activity they perform is perceived as not harmful to the surroundings.

Reinvent values and customer perception. This last narrative as part of the social sub-theme relates to the opportunity to reinvent current values and habits in society.

v. ***Technological:*** All nodes related with machinery, equipment or online communications in the application of CE practices.

Improve current technologies. Participants see improving the current tools as an opportunity to achieve greater efficiency. They referred in the case of textiles to reducing the amount of fabric in their designs by using digital patterns and avoiding waste when cutting the fabric for the garments.

Create new products in different supply chain. The use of the current waste to create new products was considered a possible opportunity. They mentioned examples such

as using it to create biogas, electricity, animal feed, medicinal products or even reusing it again in the supply chain.

Use of sharing economies. Finally, another of the opportunities they mentioned is the use of apps to share products and services that are no longer being used, or to use them more efficiently by prolonging the useful life. Shared economies were mentioned by participants as appropriate for redistributing all kinds of articles. They mentioned applications like “Too good to go” or “Olio” where food is better used, and waste is avoided by redistributing it among people in the surrounding community.

6.7.6. Theme: List of current practices. Descriptive analysis.

During the interview, participants were asked about the practices they are currently doing in their organisation. These practices have been grouped according to the stage of the supply chain where they perform it, that is, from raw materials, production, distribution, consumption, through to disposal and in some cases post-disposal.

Table 6.7: Emerging nodes – Theme: Common CE practices implemented in the participant organisations.

Sub-theme	Nodes	Examples of participant statements	Stakeholder ID
Theme: Common CE practices			
Sourcing	Harvesting (Food & Textile)	*"Our production is efficient since the beginning; we try to be efficient in the harvesting"* [MXF2] *"Harvesting is a very labour-intensive activity, but it can also be an opportunity to be more sustainable"* [MXF10] *"Everything should be considered, from the first point, even harvesting should be part of the practices that needs to be improved"* [UKF3]	Frequency: 8 - MXF2, MXF9, MXF10 - UKF3, UKF4, UKF9. UKF10 - UKT9
	Avoid use of chemicals. (Food & Textile)	*"We don't use chemicals in our crops"* [MXF2] *"Nowadays many chemicals are ruining the food supply chain"* [MXF9]	Frequency: 2 - MXF2, MXF9
	Local Sourcing (Food & Textile)	*"If people consume local products, the damage to the environment can be reduced"* [UKF10] *"The ideal will be that customers prefer and buy products produced by local farmers"* [UKF3]	Frequency: 2 - MXF1, MXF2. MXF3, MXF5 - UKF3, UKF6, UKF10 - UKT9
	Less discarded products for quality reasons (Food)	"We use every part of the oranges; we try not to waste anything" [MXF2] *"We recover and redistribute the wonky vegetables that nobody wants to sell in the supermarket"* [UKF5]	Frequency: 2 - MXF2 - UKF5
Production	Structured planning (Food & Textile)	*"Structured planning of all the steps during the supply chain is a powerful thing to do" [MXT3]* *"One effective tool for improvements is always the planning" [MXT5]*	Frequency: 5 - MXF1, MXF2 - MXT3, MXT5 - UKT3,
	Efficient use of resources (Food & Textile)	*"Taking advantage of all the product is what we teach to the people"* [MXF9] *"We try to use as much as we can to avoid waste and save money"* [UKF6]	Frequency: 3 - MXF9 - UKF6, UKF9

		"The efficient use of all the available resources should be in the list" [UKF9]	
	Follow sustainability guides. (Food & Textile)	*"The use of guides about the best course of action is very useful for the company, so employees can follow specific rules for more sustainable practices"* [MXF6]	Frequency: 1 - MXF6
	Use of cleaner energies. (Food & Textile)	*"We are implementing the best in technology so the products we produce are using greener and efficient resources" [MXT1]* *"Yes, cleaner energies help with the processes" [UKF9]*	Frequency: 2 - MXT1 - UKF9
	Recover wasted material from the production. (Food & Textile)	*"Exactly, we use only what we need, and we try to recover material so we can use it for other things"* [MXT9]	Frequency: 1 - MXT9
	Made to order production. (Textile)	*"We can work with a specific order; clients can choose how they want it and then in this way we can plan better how to use the material"* [MXT6]	Frequency: 1 - MXT6
	Design long lasting products (Textile)	*"We want our products to last more, we don't want to sell cheap clothes. Fast fashion is not our goal"* [MXT2]	Frequency: 3 - MXT2, MXT3 - UKT7
Distribution	Strategic distribution (Food & Textile)	*"We have different warehouses in specific locations to maximise our distribution and spend less"* [MXF4]	Frequency: 3 - MXF2, MXF4 - UKF1
	Use of software to plan routes. (Food & Textile)	*"I understand that our headquarters in charge of the distribution use some software and GPS systems that help to find the ideal route"* [UKF1]	Frequency: 1 - UKF1
	Backhauls (Food & Textile)	*"Yes, we use backhauls. We can take advantage of better prices"* [MXF2]	Frequency: 1 - MXF2

Consumption	Sustainable packaging (Food & Textile)	*"Our packaging is designed to be sustainable and easy to recycle" [UKF2]* *"We use the less packaging that we can, we try not to contribute with more waste"* [UKF6]	Frequency: 2 - UKF2, UKF6
	Serve smaller portions (Food)	*"We noticed that if we have smaller plates, people will take less food in the buffet and eat only what they need"* [UKF1]	Frequency: 6 - MXF3, MXF6, MXF8, - UKF1, UKF6, UKF7
	Reuse products (Textile)	*"Many people just like to throw many things, when in reality they can be reused"* [UKT1] "We help to distribute clothes that can be reused" [UKT4]	Frequency: 8 - MXT8 - UKT1, UKT2, UKT4, UKT5, UKT6, UKT7, UKT10
	Exchange of items (Textile)	*"We want to contribute to reuse clothes that are in perfect conditions"* [UKT7]	Frequency: 1 - UKT7
Disposal	Pay as you feel. (Food)	*"One of the schemes that we implemented is the pay as you feel. This was usually to use the food that otherwise would've been wasted"* [UKF6]	Frequency: 1 - UKF6
	Use of apps to redistribute the food (Sharing economies) (Food)	*"We use an app call 'Too good to go', to sell all the food at the end of the day" [UKF1]* *"One more thing is to use the app to sell all the food that will expire soon. That help us to keep our ingredients fresh and to redistribute our food, also help us to get new clients"* [UKF6]	Frequency: 2 - UKF1, UKF6
	Internal and External donations (Food & Textile)	*"Indeed, we do donations to communities where we know are needed of food. With this approach we reduce the waste, and we help others"* [MXF5] "We have agreements with some restaurants to donate the vegetables and they can prepare food for people in need" [UKF10]	Frequency: 2 - MXF5 - UKF10

	Sell waste. (Food & Textile)	*"We can take advantage of the waste collected and get commercial value"* [UKT8] *"The rag merchants can pay for all the textile waste that is not in good conditions to be reused"* [UKT9]	Frequency: 3 - UKF9 - UKT8, UKT9
	Water treatment (Food & Textile)	*"Sometimes we need to use a lot of water to treat the textiles but we also try to provide a treatment for the water so it can be used many times"* [MXT1]	Frequency: 1 - MXT1
	Waste Management (Food & Textile)	*"Separate the waste and process them to recover some of the materials is a good way to improve our circular process"* [UKT8]	Frequency: 2 - UKF9 - UKT8
	Transform waste into new products. (Food & Textile)	*"We obviously don't use all the textile, but we try to keep the excess from the guayaberas so we can give it to people to create new things. Some people use this textile to create yarn, clothes for pets, pillows, etc"* [MXT7]	Frequency: 1 - MXT7

The most mentioned practices in each stage were the following:

i. ***Sourcing:*** During the first stage of provision of raw materials for production, respondents mentioned practices currently implemented. Some of these practices are related to:

Harvesting techniques. Interviewees from both industries mentioned using techniques to harvest better and more efficiently. Here they referred to avoiding waste caused by poor harvesting methods.

Avoid use of chemicals. Interviewees mentioned among their good practices avoiding the use of chemicals, pesticides and other substances that might damage the environment.

Discard less products for quality reasons or reuse them for other purposes. In the production stage, interviewees who worked in distribution of fruits and vegetables in supermarkets particularly mentioned that the biggest cause of waste at this stage is that supermarkets reject certain products with poor aesthetic appearance for marketing reasons (i.e. wonky vegetables), although in reality they are perfectly fit for consumption. At the moment they are working with supermarkets to sell this type of product or sell it to a different market where physical appearance is not so important.

Local sourcing. Acquiring products locally or distributing them locally was mentioned by interviewees as part of current CE practices.

ii. ***Production:*** In the case of the production process, they focused more on their companies' efficiency, and the adequacy of their planning. They mentioned currently implementing the following practices:

Planning efficient production. The interviewees mentioned productive processes that make the most efficient use of resources. With this practice, the interviewees referred to carrying out the production in a shorter time, at a lower cost, and with less energy use.

Efficient use of resources. They referred to using only the necessary amount of resources, with less waste of resources at the time of production.

Follow sustainability guide according to requirement of their clients. On some occasions, customers are the ones who dictate the way in which operations will be

carried out, in terms of sustainability. Some of the interviewees said they follow the rules that have been requested for the preparation.

Use of cleaner energies for their productive process. The use of renewable energy, greener energy, or improvement in the use of the energy used for production were among the current practices mentioned.

Recover wasted materials from the production to reincorporate them in the productive process. The resources used in the production process are sometimes wasted, so the interviewees mentioned being in control of recovering those materials and reintegrating them into the production process to avoid such waste.

Made to order production. Made to order refers to only producing products according to the specification of the clients when they order. This procedure allows reduction of the amount of waste from continuous production.

Design long lasting products. In the case of textiles, the interviewees mentioned that their approach was directed towards the quality of the garment, manufacturing only those of higher quality and with a longer lifetime.

iii. Distribution. The movement of goods from the production process to the sale point is considered the distribution stage of the supply chain. For this stage the following practices were mentioned by interviewees as up-to-date practices in their companies:

Strategic distribution. Through the distribution planning, the collection and delivery points, maximising distances and times, the interviewees said they were obtaining greater efficiency and less waste of the products.

Use of software to plan routes. The use of GPS software to calculate distances between deliveries and ideal routes.

Use of backhauls. Backhaul refers to making the most of the space at the time of shipment or collection of a merchandise, to ensure that transportation does not return or go empty to the place of destination.

iv. ***Consumption.*** Consumption is the point of the supply chain where the customers acquire a product or a service to use it. Interviewees mentioned some

practices at this point of the supply chain, and how they use CE strategies. Examples of these practices are as follows:

Sustainable packaging. One of the practices most frequently mentioned by the interviewees was to make the packaging more friendly to the environment or completely reduce it. This was mentioned by interviewees in both industries.

Serve smaller portions (food). One way to avoid further wastage of food, as mentioned by actors related to restaurant chains, was to serve smaller portions than would usually be given in buffets or in restaurants. They mentioned that by using this measure there was noticeably less waste.

Reuse products. This practice was mentioned by actors in the supply chain in the textile industry, who referred to the use of second-hand clothing, an activity especially common in vintage stores, second-hand or charity shops.

Exchange of items. Similarly, in the textile industry, an interviewed actor mentioned that among his best practices is the exchange of garments to extend their use.

v. ***Disposal.*** For the disposal of their waste, interviewees mentioned that they use some practices to increase efficiency and waste as little as possible.

Pay as you feel. The interviewees mentioned using pay as you feel, a strategy whereby customers make a payment for what they receive according to what they are willing to pay. Through this strategy, food has been distributed that would otherwise have been wasted.

Use of apps to redistribute the food (Sharing economies). Some interviewees said they use apps to publish the excess food they have left at the end of a workday.

Internal and external donations. For both the textile and food industry, donations to employees (internal donations) and charitable works or other associations (external donations) have been used to avoid waste.

Sell waste. Several interviewees mentioned their current selling of excess or waste generated in their production for profit as an economic opportunity.

Water treatment. Usually used in the textile industry due to the chemical processes that are carried out on the garments; however, food producing industries also said they

had a water treatment plant that allows them to return the water to the ground after being used, but without causing damage to the environment.

Waste Management. Finally, the vast majority of respondents mentioned in their current practices the separation of garbage, materials and other items both for sale and reuse in the production process.

6.8. Key findings – Thematic analysis

Forty interviews were conducted with different actors in the supply chain of the textile and food industries in two different countries, Mexico and the United Kingdom. The answers provided by the different actors interviewed help to understand the most common narratives regarding the topics analysed.

The key findings for the different regions and industries analysed are the following:

6.8.1. Food-Yucatan

In the present chapter, direct interviews were conducted with the different actors in the supply chains. These interviews allowed us to know the personal perspectives of the people in charge of implementing changes in the supply chains of their organisations. The key findings from the narratives of the interviewees from the Yucatan food industry are presented as follows:

- *Lack of awareness of the CE concept.* In general, the interviewees from the food industry showed unawareness or very little knowledge about the concept; however, they mostly related it with sustainability and other terms such as integral businesses, green logistics or reverse logistics. As examples:

  "Integral businesses, value chains with the client, supplier, so I manage it as a value chain, who participate in the value chain in which we are and in what way we help or benefit each other" [MXF1]

  "Not with that name but surely speaking in another way: sustainability, sustainability, green logistics, reverse logistics and all those weird words. I guess it must be something like that" [MXF2]

Other participants mentioned never having heard about the concept. Due to the lack of knowledge of the subject, a lack of interest in applying more practices could be observed among the participants.

- *Care about promoting healthier habits.* Regarding the practices that they are currently doing, the interviewed participants in the case of the food industry in Yucatan mentioned being more concerned about the campaigns to improve the health of their customers through a healthier diet, as in the case of not providing salt on the tables. With these comments about the health of their clients, the organisations' concern about the current health problems among the population is again brought to light. This concern to improve the health of their clients is mainly due to problems of obesity, diabetes, hypertension, among other related diseases that have been increasing in recent years. Similarly, they showed concern about issues mostly mentioned by the media, such as avoiding the use of straws.
- *No trust in their employees.* In terms of problems and challenges to implementing more circular practices, participants in the food industry mentioned, in particular, resistance to change, trust and values in their employees.

  One of the participants stated about this challenge:

  "What happens is that it is still a bit difficult (to donate) because practically the store is left in the hands of a staff of employees, they have to verify what is going to be wasted. We still do not have the supervisory capacity to have several supervisors so that they can go daily to stores to verify that they are not wasting more to take for themselves". [MXF5]

- *Monetary resources limited to implement changes.* One factor that the participants considered key to making changes is that they do not have sufficient monetary resources since they considered that the application of practices would be more expensive, and they did not consider the cost-benefit to be sufficient. They do not therefore consider that applying more circular practices would be of benefit to their organisations.
- *Resistance to change.* Almost half of the interviewees mentioned that they consider it very difficult to make changes in their organisations since they not only face the low availability of senior managers or owners to make changes,

but, in general, it is difficult to implement changes among their employees in all areas. The interviewees considered this challenge as the main one to overcome to incorporate more practices, since the population has a very traditional culture where change is very little accepted.

6.8.2. Food-South Yorkshire

Participants in the South Yorkshire area from the food industry are actors who are making changes to avoid food waste, so they have a high level of knowledge that was reflected in their responses. Those who demonstrated greater knowledge were those related to organisations fighting food waste, such as food banks and civil organisations.

- *High knowledge of the concept.* Regarding the knowledge of the interviewees about the concept of CE, half of the interviewees (5) showed high knowledge of the subject and related it to advanced concepts such as the 9R Framework. Some interviewees related it to recycling:

  "I think in Circular Economy you can make things that can be recycled but what you need to do is to get people to understand what can be recycled" [UKF9]

  But also, interviewees referred to other concepts such as cycles and loops and a holistic system. A clear idea about the concept was shown and related more academically to the term.

  To a lesser extent they referred to the term as sustainability (2), but still having high knowledge about its meaning. Participants proved to be better prepared, understand the concept and are applying it in their organisations to improve their practices. Only one participant claimed to have no knowledge of the concept (1), but in the interview demonstrated knowledge of some basic notions.

- *Extended list of challenges.* In reference to the challenges to be faced, the interviewees provided a lot of challenges and problems that they face in their organisations. The fact that the people interviewed in this industry in the South Yorkshire region have a high knowledge of the subject is also reflected in their practices. These participants were the ones most aware of the challenges they have to face in order to implement more circular practices. They also collaborated more than the participants from the other industry or country. The

challenges they provided were of all kinds, in dimensions ranging from cultural, economic, educational, climatic, legislative, logistic, market to networking dimensions. Similarly, it is important to note that they mentioned many more challenges and problems in their organisations compared to benefits of adopting best practices. The high knowledge they have of their operations makes it possible for them to be more exact in what is required in their industry. The biggest cultural challenge they had encountered related to consumers' perceptions about the current cultural habits relating to food. One of the participants mentioned regarding the cultural challenge:

"Psychologically in terms of that if you don't tell somebody how much it is worth, they don't think it is worth very much. So that is a really complex psychological thing" [UKF2]

The interviewee considered that the psychological factor is the main one leading to food waste. This refers to the valuation that consumers give to food. In the case of food banks or organisations that are fighting food waste, they refer to the fact that the food they give to their beneficiaries on many occasions is not valued because of the fact that it is given to them at a lower price or for free. The expiration dates for the food also affect the perceptions of consumers in a psychological way, since seeing that the date has expired produces an effect of making the consumer doubt or reject the food, when on many occasions it is still perfectly edible.

In regard to the habits of the society, the interviewee referred to the lack of correct habits in the population for proper disposal of the food in the bins, food which could be used for compost or for animal feed if the necessary measures were taken to ensure better use at the end of its productive life, or at least to minimise the amount of waste. The interviewee refers to this problem in the following statement:

"In South Yorkshire, food waste and all go into the black bin, you know, quite a few councils do separate food waste. The problem with it is that, well in my view you should not actually separate at the treatment plant if you have a good treatment for it already, but it should be done by people to minimise it for instance" [UKF8]

Table 6.8. shows the different waste collection schemes in the South Yorkshire region. The lack of coordination between the collection schemes used in each city of the region makes it difficult to create more efficient schemes for recovering materials, as well as making it difficult to create common plants for processing waste using the same process.

Table 6.8: Sample of different waste collection schemes in the South Yorkshire region

(Source: Data obtained and adapted from the waste collection supplier website for each Council, 2019)

Type of Bin / Council	Black Bin 	Green Bin 	Blue Bin 	Grey Bin 	Brown Bin 	Others	Important
Sheffield	X (All rubbish that can't be recycled in the other bins)	X **Yes** Glass bottles Jars Cans **Bin available only for flats not for houses.*	X **Yes** Paper Cardboard		X **Yes** Glass Cans & Tins Plastic bottles * **Bin available only for houses not for flats.*		• Sheffield has different bins for houses and flats. • **Houses** have 3 bins: black, blue & Brown. *Plastic bottles can be included in the brown bi • **Flats** have 3 bins: black, blue and the green has same function as the brown for houses with the exception that plastic bottles cannot be include • Additional services with extra cost: o Bulky Waste Service o Furniture & Electrical items (Collect the HWRC centres) o Garden Waste
Doncaster Rotherham	X (All rubbish that can't be recycled in the other bins) X (All rubbish that can't be recycled in the other bins)	X **Yes** Garden Waste **No** Food waste Cardboard X **Yes** Paper Cardboard	X **Yes** Paper Tins/Cans Foil Empty Aerosols Plastic bottles X Glass Tins / Cans Foil		X **Yes** Garden waste **No** Food waste Cardboard Metals Stones	X Green Box (Glass bottles and jars)	• Small electrical items • Textiles (Can be put in a plastic bag next to the blue bin or gre box) • Plastic & cartons (Such as Tetra Park) will be collecting from the kerbside in early 2019.
Barnsley		X **Yes** Garden Waste	X **Yes** Cardboard Paper Magazines Newspapers **No** Brown envelopes Wrapping paper	X **Yes** Food Waste Plastic trays& films Clinical waste (All rubbish that can't be recycled in the other bins)	X **Yes** Tins Foil trays Glass bottles & Jars Plastic Bottles **No** Kitchen foil Aerosols Pyrex Light Bulbs Broken Glass Plastic food packaging		

As it can be observed in Table 6.8 the bin colours for the collection of certain materials vary depending on the borough; meanwhile, in certain boroughs no textiles or electronic materials are collected. The disparity between these schemes makes it difficult to create a joint work plan. Other challenges that were mentioned, but to a lesser extent, include the lack of confidence in employees in the case of restaurants, the lack of interest among owners in implementing changes, and resistance to change.

Regarding economic issues, for this region it is equally difficult to access resources to implement more practices, since they mentioned that their monetary resources are limited.

Organisations that require volunteers to carry out their operations mentioned that one of their difficulties is that it is complicated to implement practices when they require a vast amount of time to constantly train staff who are only temporary.

One of the participants mentioned that in the UK the climate is favourable to maintaining food since it requires less refrigeration and can be preserved for a longer time; however, the fact that they need to obtain raw materials from countries with hotter climates is a challenge since food can be lost in the transportation process.

They were also asked about whether they considered that the regulations in the United Kingdom were favourable or not for avoiding food waste; in general, the opinion is that the regulations are adequate; however, they could be improved. One of the interviewees pointed out that excessive health and safety regulations are a barrier that prevents them from freely managing their waste and using it for other purposes. He stated:

> *"Health and safety are big barriers; we need to throw everything away, we can't have it for the next day and we can't give it to anybody because of rigorous health and safety" [UKF7]*

On the contrary they mentioned that more regulations are needed around the creation of laws that protect and improve the way in which waste or surplus is handled, but they consider apathy of politicians in charge of the regulations to be a current problem. To finalise the legislative topic, they also mentioned that the lack of flexible contracts with their suppliers and customers, which would enable changes to be implemented according to changes in the world and contemporary requirements, is a brake for implementation. Many of these contracts last for up to 10 years, as is the case with waste collection or food surplus.

A significant number of participants considered that the problem of waste in the supply chain is mainly due to logical problems and unethical practices in the market.

The lack of uncertainty in the operations of the companies regarding the demand that they will have for their products and inaccurate calculations in their forecasting lead to a great extent to a greater amount of waste. In many cases it is even intentionally poorly planned, and larger quantities than really needed by companies are required to give the impression of always having stock on the shelves.

This is a fairly common practice in supermarkets and the retail industry in general, which are responsible for generating waste due to their total focus on commercial strategies. An interviewee mentioned:

"There is so much stuff that is getting in, just because it's overstock, it's not because some else couldn't predict the demand, it's because it's purposely over stock or is stock never with the intention to be sold" [UKF2]

Another participant supported this view:

"They are producing too much stock that goes in the bin" [UKF5]

Other practices to protect the image of the organisations involve destroying the surplus, instead of donating it, because in this way companies do not run the risk of being legally involved in some way if the food is not in good condition. Or in the case of discount supermarkets, the fact of donating your products can cause the target market that goes to the food banks, which on many occasions is the same target market, to stop consuming because they are consuming the donated products, thus affecting their total sales. As a last point, the participants from this industry said that more involvement of the different stakeholders is needed, but the problem they face is how to get them to commit more, as the following participant stated:

"I believe that this is the biggest challenge to involve everyone and that everyone can get involved in the same intensity with which we are trying to carry out this project" [UKF3]

- *Different business models tackling the same problem (Food waste).* An interesting discovery about the food industry in South Yorkshire was how different styles of organisations are fighting the same problem: Food waste. Three participants from organisations with different social and commercial purposes, but with the same objective, shared interesting points of view that could help them to cooperate. The point on which they differed was the way in which they choose the beneficiaries of their surplus food in reducing food waste.

  The participant with the least restrictions on their beneficiaries also demonstrated implementation of the best practices as well as less waste production and greater knowledge of the subject.

The participant mentioned:

"We are not at all fans of targeting people, a lot of organisations that work with surplus food target people in poverty and it seems to make sense because you deal with 2 problems at the same time. But for us there is a strategic mismatch in doing that because it implies that you have second class food for second class people" [UKF2]

On the other hand, a participant with a social perspective more focused on the socio-economic level of their beneficiaries indicated that they had restrictions on how to redistribute food and sometimes this generated waste because they could not redistribute all surplus food due to regulations put in place.

"We support where people are in distress, support religious communities. They can be charities helping people back into work. It can be refugee type charities who are supporting people trying to resettle in the UK. Obviously, we would prefer that community associations were in relatively deprived area, but you know if somebody from Crookesmoor up the road wanted to sign in, then we would say no". [UKF10]

6.8.3. Textile-Yucatan

- *Stakeholder pressures.* According to the interview with the actors of this industry, the interviewees with the higher knowledge about the concept of CE were those whose clients demand a greater number of practices of this nature, and those who demonstrated lowest knowledge about the concept are those who carry out textiles locally or for handicrafts. Interviewees from this industry demonstrated less knowledge than those in the food industry in the same region.
- *Lack of interest.* Among the challenges mentioned by the interviewees in reference to the textile industry in Yucatan is the lack of interest from the workers of the companies, since they have major concerns such as economic ones which mean they are unable to focus on other types of practices or improvements. Two interviewees commented on this:

  "Workers are worried about what they will eat tomorrow, they still have very basic problems, when they solve that then they can think about something else". [MXT10]

  "At the end the business is not interested in textiles (recycling), they just want to get rid of it" [MXT5]

- *Resistance to change.* Again, the narrative emerged that the biggest problem in the region is the resistance to change among managers, employees and customers.

  "It could be resistance to change, because in fact when we start with ISO 14001, working in a different way from what you are used to is usually more complicated. It was a lot of training, a lot of follow up with people. Simply changing the way they dispose of their waste was a problem". [MXT1]

- *Limited resources.* Almost all interviewees (70%) agreed that the biggest problem is that the resources they have are limited.

  "For the moment I do not think lack of interest is the main problem, neither for the owners or the managers. It can be lack of resources, investment" [MXT1]

- *Economic barrier.* This barrier was significantly highlighted by many organisations as the principal challenge for the textile companies.

  "Economic is the first barrier, for every project we need to provide a study about how much it will cost, what is the return for the investment. For the moment our production is based on quality, even if that costs more, I am sure that at some point they will start to analyse that in terms of sustainability" [MXT9].

- *Lack of knowledge***.** The lack of knowledge and the lack of sufficient information about the recyclability of textile materials or the practices that they can implement in their organisations are points on which they would like to improve. Among the participants 40% showed similar views about this, for example:

  "I think the principal is lack of knowledge, people are not aware of the impact if you have to do it or not" [MXT2]

  "I think we need more training, kind of be aware of all that, right?" [MXT6]

  "Well, it should be more like a habit, or as well more training to know how to do the things" [MXT7]

- *International regulations.* Although more than half of the interviewees mentioned having no problems with regulations, interviewees with international operations mentioned that one of their barriers is about legislation

in customs textile terms since they considered it to be a product sensitive to taxes and import-export regulations.

"Mexican legislation for importation of textiles is considered a sensitive topic, everything needs to be strictly controlled" [MXT10]

Regarding the opportunities that the interviewees mentioned, it is felt that the implementation of best practices would make them more attractive for customers looking to have suppliers with more sustainable practices.

"In the end everything is business. But as a company, it will give you certain extra points, in fact our customers right now maybe that is why they prefer us. Although for now the sustainable part is not so important, but there will come a time that if and if we are one step ahead with these practices, it will be much better in the long term" [MXT1]

- *Image of the organisation.* Not only being attractive for the customers but also the fact that they are implementing more practices provides a better image for their organisation:

  "The brands are starting to promote it; they are the only two that come to mind that are using as recyclable materials" [MXT2]

  And a positive image of them in the community:

  "Well, that also the people, the community can perceive you as a better employment option to see that the company cares for them, for their health, for the environment" [MXT1]

  Another opportunity in this industry is for technologies to be developed that make the use of materials (fabrics) more efficiently and, therefore, there is less waste of these during the manufacture of garments.

  "Digital patterns help you to save, to save a lot of fabric" [MXT6]

- *Interest in fast fashion.* An important discovery in this industry is that the opportunity is currently being considered among companies in this region to boost the manufacture of fast fashion garments since they consider that the manufacturing industry in Yucatan is unattractive compared to industries established in other countries. This would be an error, since the lack of knowledge among the participants in general about the practices of circular

economy indicate that this would lead to greater pollution due to the negative environmental effects of fast fashion.

6.8.4. Textile-South Yorkshire

- *Second-hand shops.* Because second-hand and vintage stores are highly accepted by society in the region, and the numbers of these are considerable, for the purpose of this investigation it has been decided to explore this area of the textile industry, especially since it has been very little explored in other investigations. The knowledge about the practices of circular economy among the interviewees was generally high, and they indicated that recycling is the main activity which they link with it.
- *Connection between different industries.* A crucial interviewee from the textile chain mentioned the existing connections between the different industries which mean that an adjustment in some would significantly affect the operations and resources of others. The participant made an important point about this in two different statements:

  "CE is about this conflict of usage of land because it seems like people are very blinkered and we need a basic plan for the food stream, but what happens on the textile side?, and we are not are sustainable enough yet to say ok we won't grow any more cotton we'll keep recycling what we've got in use now. In the hope that we don't need the land anymore so we can grow crops and nobody seems to have this conversation and both industries are going very very narrowly down their own roads" [UKT10]

  In the second statement the participant mentioned:

  "I mean if you look at all the different fibres, we've got wool, and I classified leather as a fibre even though it is not an individual fibre based product, so both of those are products into the food industry, so in that sense if we don't have a food industry, that is eating meat, then we lose crops if we call them crops, it's all based in land usage which again is a conflict with a switch over to a land base" [UKT10]

  This opens up a new little explored narrative regarding how changes or new implementations of circular economy practices in an industry could negatively affect the results of different industries.

- *Lack of access to monetary resources and investment.* On the other hand, among the challenges most pointed out by the interviewees, these are predominantly economic, with limited monetary resources, lack of access to resources to be able to implement more practices and lack of investment being the principal one. Some of the interviewees mentioned:

  "Money is a big thing you know; you know what I mean? You need the market to be able to get things out, nobody is investing at the moment" [UKT8]

  "I tried but they don't give me the money. Banks won't give me the money" [UKT3]

  This is also linked with the lack of interest among those in senior positions in their organisation:

  "I am trying to change the supply chain, so it is lower carbon or emissions, we want to change that. They don't care (bosses)" [UKT3]

- *Consumers prefer cheaper options.* Another highlighted challenge is that, at the moment, consumers prefer to buy short-life, low cost garments, so they consider that implementing more sustainable practices will raise the cost of the garments making them less attractive against fast-fashion options.

  "If you want to be sustainable the price goes up then which is quite unfair" [UKT9]

- *Indifference of the Government to implementing more regulations.* The lack of interest in creating regulations for this industry was noted by the interviewees. They mentioned that in other industries importance is given to recycling materials, or considering uses after disposal; however, the textile industry has been less considered than other industries. The participants pointed out:

  "Not indifferent governments, indifferent local politicians here. At the minute you get a different portfolio in one of the councils and they can change the direction that we are going to go in, and things like that" [UKT8]

  "UK Government doesn't care, they stopped regulations in this sense" [UKT3]

  This can also be corroborated by referring to Figure 6.1 which illustrated the different garbage collection schemes in boroughs of the South Yorkshire region. This figure shows that only Doncaster has a scheme for collecting textiles for processing and recovering material at the end of its useful life. The

other places in the region simply dispose of it through general waste without recovery of the textile material.

- *Fluctuation of prices in the markets***.** With reference to the market-related problems that the textile industry faces, the interviewees pointed out that it is an industry with price fluctuations that often make goods unattractive to resell. This is because prices depend on demand in other less developed countries where the textile is marketed or processed.

  "There's been issues with currency fluctuations for textiles as well in African countries, the same sort of issues. So, there is one side of it, the other side of it is the recycling companies, a lot of them work on contracts basis" [UKT10]

- *Lack of follow-up after disposal.* Similarly, in this industry there is little follow-up or transparency in the supply chain once textiles are disposed of in less developed countries. In this region, greater consumer knowledge was found about the consumption of textiles, so there were greater options for second-hand, vintage, garment exchange schemes and re-uses in other industries.
- *Strongly depend on donations.* Regarding the problems faced by second-hand stores or charities, they rely heavily on donations to be able to continue their operations. Similarly, they are organisations that are usually linked to support of a specific cause, for example, health-related causes, to support research about certain diseases or conditions, to help people with limited resources and even to provide medical support for pets. This means that people need to trust that they are doing what they promise in their missions and, in the same way, donors need to be confident that their donations will be used for a social benefit.
- *Possibility to obtain profit from rag merchants.* In reference to the opportunities, the interviewees pointed out that they can market textiles by weight and obtain profits that, although low, continue to be an economic option.

  "All goes to a rag merchant and we get paid for the rags" [UKT4]

- *Tax benefit.* One attraction of donation in this region is that there are associated tax benefits that can benefit both donors and organisations that receive donations.

"They receive a tax benefit, or we do through a gift aid and just in the process of getting a gift aid manual from Britain. I think it is good will, let's not forget about the fact that they just want to get rid of it. [UKT6]

Reducing the carbon footprint of consumers is one of the conditions that lead them to donate:

"The only benefits are non-material ones like the social aspect of it, the environmental impact we have which is diverting waste from landfill and also not producing more, consuming less raw materials air, water pollution. greenhouse gases, carbon emissions and carbon footprint by turning the new textiles into new garments, doing this to see the benefits" [UKT7]

6.8.5. General Key Findings Thematic Analysis

The thematic analysis produced the following general key findings:

i. In regards of understanding the concept of CE, it is apparent from the interviews that most of the firms related the term CE with the 9R Framework (Recover, Recycle, Repurpose, Remanufacture, Refurbish, Repair, Reuse, Reduce, Rethink, and Refuse). The majority of participants who associated circular economy with the 9R model, referred to 'recycle'. Six of the seven stakeholders that mentioned 'recycle' as a CE concept were from the food and textile industries; however, the term was mostly used by participants located in the United Kingdom. The second most frequently mentioned concept related to circularity, closing the circle, loops and cycles. Similarly, this concept was mentioned by four participants in both the textile and food industry. Finally, more than a quarter of the participants from the two studied industries in both countries linked the concept with sustainable practices in their organisations. Some of the participants associated it immediately, indicating that they view CE as a synonym for sustainable practices. It should be noted that the relationship between the two concepts was mostly emphasised by organisations that are located in the area of Yucatan.
ii. In terms of the different business models, the majority of interviewees belong to the private sector, followed by the charity and public sectors. An interesting key finding relates to the different ways that organisations tackle the same problem, i.e. food waste. The targets, level of engagement, aims and strategies

were defined differently by the interviewees, which could help to understand how organisations are working towards solving a problem and suggest strategies they can share with each other.

iii. The decision-making structure of the organisation, along with the management knowledge and organisational culture, influences the level of change in the organisations. Organisations with decentralised structure (bottom-up) are more likely to implement changes. It was also noted that the decision structure in the two countries was different. Whilst in the UK decisions to implement changes can sometimes start via a bottom-up approach, in Mexico the approach is completely top-down.

iv. Challenges and barriers suggested by the participants were located in nine different categories: Cultural, economic. educational, climate conditions, regulatory, operational, market, networking and technological.

v. On the other hand, participants made less mention of key drivers and opportunities, with only five different categories identified: economic, educational, environmental, social and technological.

vi. Finally, a list of the most mentioned practices currently implemented in the organisations was presented according to the supply chain stage.

6.9. Chapter summary

This chapter introduce the descriptive results of the thematic analysis obtained from the semi-structured interviews with 40 different actors in the supply chain in two different industries located in the two selected countries. Through an inductive methodology and with the use of NVivo V12 software, the semi-structured interviews were coded. Six main themes emerged from the coding. The first one is about the level of the knowledge the interviews have about CE, the majority of the interviewees revealed medium to high level of knowledge and related the term with similar notions such as 9R Framework, Cycles and loops, Holistic systems, responsible manufacturing sustainability, and other similar concepts. The second main result was about the type of organisation interviewed given as result a majority of private organisations followed by charities and public organisations. The third theme was about the structure for the decisions given as a result that organisations with decentralised decisions (Bottom-Up approach) were more prone to implement CE practices. The fourth theme was a

classification of the main challenges and barriers mentioned for the interviewees, these results were grouped in cultural, economic, educational, environmental, regulatory, operational, market, networking and technological. In the same way, also the fifth theme was about the key drivers and opportunities mentioned for the participants, they cited opportunities in the economic, educational, environmental, social, and technological way. Finally, a compilation of the main CE practices mentioned by the interviewees are also presented according to the stage of the supply chain that occurs.

The results from chapters 5 and 6 will be merged in Chapter 7 to obtain an overview of both chapters and principal key findings that will be critically discussed in Chapter 8 with the support in the Theoretical Framework previously suggested in Chapter 3.

CHAPTER 7

DATA MERGING

In Chapter 5, a preliminary study was completed to understand circular economy practices in the industries and countries studied for this research. The exploratory study was accomplished using the content in organisations' websites to find reports of any CE practices. The results of the content analysis assisted as the basis for understanding the current practices and the degree of implementation in organisations. The outcomes of this chapter were presented descriptively to indicate the critical actions in existing data and to observe present situations. Chapter 5 served as a support for further study in Chapter 6. In Chapter 6, current practices were explored in depth through 40 semi-structured interviews with different actors in the supply chain. Through a thematic analysis of the interviews, diverse narratives were obtained on topics such as degree of knowledge of the circular economy, different reactions dealing with situations, the structure of decisions to implement changes, barriers, opportunities and the most commonly implemented practices. The results of chapter 6 were presented in the same way, utilising a descriptive analysis to demonstrate, in a general way, the results obtained and coded through NVivo V12 Software.

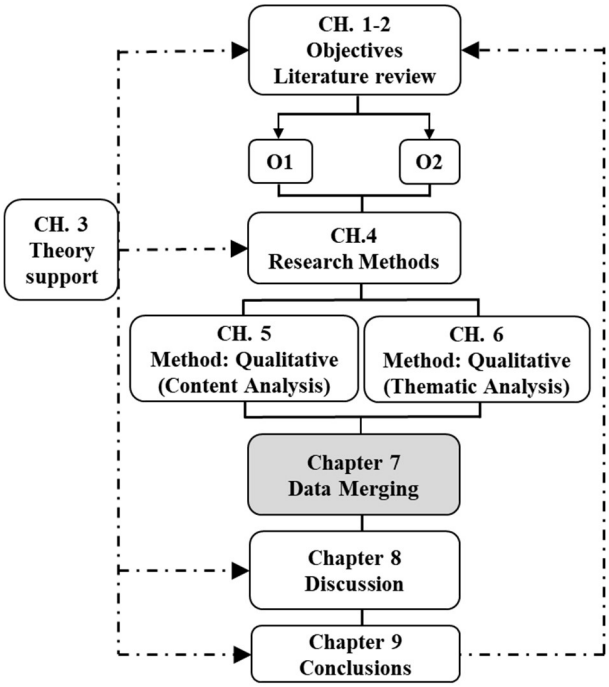


Figure 7.1. Research Map - Data Merging

The purpose of this chapter, as shown in Figure 7.1, is to make a comparison between the findings of chapter 5 (Content Analysis) and chapter 6 (Thematic Analysis). The intention of this chapter to explain the results of both chapters logically, assign significance to the tendencies shown, as well as to interpret the reasons for these tendencies from the descriptive results. The chapter is divided into seven parts to explain the characteristics of the samples as individual cases and to offer a comparison between these samples. This means that the separate studies of the industries in each country will be compared, and a comparison between industries and countries will also be made. These analyses and comparisons will allow a better understanding at local, international and inter-industry levels.

The comparisons presented in the chapter will follow the logic showed in Figure 7.2:

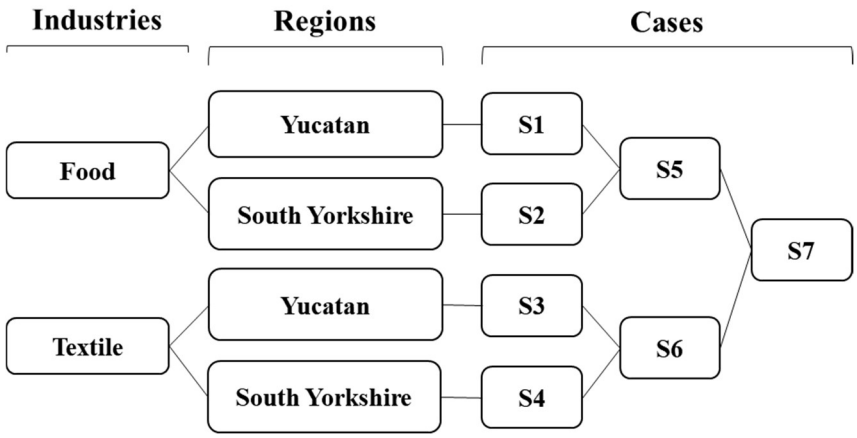


Figure 7.2. Cases analysed

S1. Food Industry in Yucatan (MX)
S2. Food Industry in South Yorkshire (UK)
S3. Textile Industry in Yucatan (MX)
S4. Textile Industry in South Yorkshire (UK)
S5. Food Industry comparison Yucatan (MX) and South Yorkshire (UK)
S6. Textile Industry comparison Yucatan (Mexico) and South Yorkshire (UK)
S7. Food Industry global and Textile Industry Global.

Seven different research cases will be presented to assess the results. As mentioned above, the comparison of the industries studied will help to understand the differences between industries with perishable (Food) and non-perishable products (Textiles). The comparison between regions of different countries will help to understand how the

implementation of circular practices is being developed in different places based on different factors like culture, climate, and human indices. The objective of these comparisons is also to lay the foundations for future research in regions where there have not yet been enough studies about circular economy practices. Through this comparison, a holistic view of the results can be presented, which will have more extensive applications. Every case will be analysed through the theoretical lenses previously suggested as a core framework of this thesis in Chapter 3.

Finally, the main findings of the analysis of all these perspectives, and the conclusions of the chapter will be presented.

7.1. S1. Food - Yucatan (MX)

The food industry in Mexico is one of the most dynamic in the country. This industry accounted for 3.5 per cent of the gross domestic product (GDP) (INEGI, 2017), a total of 18.2 billion pesos. Chapter 5 laid the foundations for a general understanding of the trends in the industries studied. However, the content analysis of the website data confirmed that it was insufficient and too incomplete to be used to make general conclusions. Although the number of organisations obtained through the DENUE database was quite high and allowed a significant list of food industry members to be drawn up, only a small number on this list have web pages to make a further investigation. Besides, the few stakeholders that have web pages proved to have very little information available to share. The information contained in the web pages generally concerns the mission, vision, objectives of the company.

In some cases, products or services offered did not contain information about their internal practices and only in very few cases did they give access to their annual business reports. Hence, the interviews in Chapter 6 were conducted to complement the information obtained online; not only to obtain private information on practices in organisations but also to enhance the results by involving more actors in the supply chain.

Because the list obtained in Chapter 5 corresponds to formally registered companies, it is essential to take into consideration that large parts of the companies in Mexico operate informally. Therefore, in chapter 5, informal economy stakeholders were also considered. Regarding the practices identified in Chapter 5 compared to Chapter 6, it

is noteworthy that online there was more evidence of practices around environmental care and less importance attached to the companies' economic approach. However, in reality, in the operations of the organisation, economic issues are the main concern and caring for the environment is something that is not considered. Stakeholder theory helped to identify the main groups of actors in this region for the food industry and how these groups are driving or hindering the application of more practices. According to the results obtained in the content and thematic analysis, some key findings were obtained about the stakeholders (Table 7.1):

Table 7.1. Analysis of Stakeholders - Food Yucatan

	Power	Legitimacy	Urgency
Stakeholders' interaction drives CE practices	- -	- There is a tendency to show online concern for the communities in the surroundings of the analysed organisations. This is transformed into more activities and wellbeing for the people in these communities. - Focused on people's health and food habits	- -
Stakeholders' interaction hinders CE practices	- Lack of incentives from the authorities or regulations in terms of waste disposal.	- Stakeholders in the Food supply chain in Yucatan, indicated the lack of guidance about better ways to reduce their waste or types of implementations for their companies.	- In terms of urgency, businesses mentioned struggling with economic factors deriving from the demands of their customers that leave little scope for implementations when they are looking to decrease costs and prices of their products and services.

The analysis of the stakeholders in the food industry in Yucatan produced some interesting results. According to what was observed, the organisations from the food industry in Yucatan were concerned to demonstrate their concern for the environment and the communities around where they are located. However, this is not reflected in the in-depth interviews conducted. It seems that the motivation of these organisations is based on the acceptance of the local community and promoting their image, so one way of encouraging more practices in these organisations would be for them to promote a positive image in front of their clients to gain more acceptance. Another critical point to note was that in both analyses, organisations were more concerned about issues such as promoting good habits than in applying best practices to improve their internal operations. Health issues in the region were referred to continuously by the participants. That health in the region is a shared concern among the participants encourages other types of issues to be taken on that are less critical.

On the other hand, there is a lack of regulatory incentives to motivate them to implement new practices, so it would be recommended that local authorities take action to suggest procedures by companies. Similarly, the lack of knowledge of what they can do could be reduced by the authorities through information campaigns via videos, social networks, emails and other resources. Finally, the strategies of the government should be focused on promoting more significant economic movement in favour of the organisations in order to motivate them to implement changes.

In terms of the resources available in the region for the food industry, general findings about the resources in the location and in the organisations overall are explained in Table 7.2, in order to clarify whether the current situation can generate competitive advantage through more implementations or whether, conversely, it will discourage them.

Table 7.2. Analysis of RBV - Food Yucatan

Resources & Capabilities	Profile	Competitive advantage (A) / Disadvantage (D)
Tangible		
Financial	• Limited economical resources of the organisations to invest. •	D
Physical		A

	• The location of the Yucatan Peninsula is a very privileged and strategic location connecting US, Latin America and Europe. • The weather can be an advantage because it helps in the production of tropical products. • In the same way the temperatures can be too high and it is not easy to keep the food for longer periods without using extra energy.	A D
Technological	• Potential to implement greener energies (Wind, sun, water)	A
Organisational	• There is a lack of planning and management control systems. • Most of the organisations work as informal/not registered organisations	D D
Intangible:		
Human	• Lack of staff training • Cultural resistance to change	D D
Innovation	• Absence of innovation	D
Reputational	• Perception of region as a supplier of raw material producer, farmers and manufacturers	A

Regarding the problems reflected by the conflict of interest between agents and principals, a critical narrative that was reflected in several opinions of the interviewees concerned the lack of trust in employees to generate more circular practices (Table 7.3). This type of dilemma represents a situation that was repeated many times as a barrier for more implementations.

Table 7.3. Analysis of Agency dilemma- Food Yucatan

	Agency factors
Lack of trust in employees	i.e. The principals (Owners-general managers), lack trust in their employees because there is a conflict in terms of food waste. They prefer to waste it instead of giving it to the employees because they think that employees will generate more waste on purpose to take food home.

Finally, in reference to the external pressures that motivate or obstruct the application of more practices and with the support of Institutional theory, some keys factors are presented in Table 7.4.

Table 7.4. Analysis of Institutional pressures- Food Yucatan

	(Coercive) Regulative	Normative	Mimetic (Cultural-Cognitive)
Pressure mechanism	Absence of coercive (Regulations) measures to encourage implementations.	No apparent habits of more sustainable practices. Resistance to change	Social pressure seems to dictate the behaviour of the companies, which can be used in favour of more implementations.

Some pressures on the organisations are based on the local community beliefs and interest. The lack of coercive measures works to the disadvantage of more implementations because the stakeholders do not feel pressure to adopt any structural change.

7.2. S2. Food - South Yorkshire (UK)

The food companies in the South Yorkshire region are mostly located in the city of Sheffield and primarily made up of microenterprises. The economic activities of the food industry are similar to those of Yucatan, with the activities of higher commercial weight being animal food processing, meat production and bread production. The characteristics of the regions are similar in proportion and production characteristics; however, the socio-economic and climatic levels differ entirely. Although the information shared on the web pages of the industries in South Yorkshire is limited, the interviewees showed a vast knowledge of the practices of the circular economy, and there was correspondence of the practices mentioned online with those mentioned in the interview. The food industry in this region is actively represented by companies engaged in processing of bread, meat production and processing of animal feed. They have a strong influence as do food banks, philanthropic organisations and organisations fighting food waste. The culture of consumers is increasingly focused on supporting these organisations and raising awareness about food waste. Companies are implementing practices to be more efficient, ethical and more interested in exploring transparency in the supply chain.

The key findings for this region in the food industry are presented below. Regarding the comparison of the chapters and results obtained from the content analysis of the web pages and interviews with actors in the supply chain of the food industry in South Yorkshire, the following key findings emerged:

Table 7.5. Analysis of Stakeholders – Food South Yorkshire

	Power	Legitimacy	Urgency
Stakeholders' interaction drives CE practices	-	• Link built with academics to develop research that helps to tackle food waste.	-
Stakeholders' interaction hinders CE practices	• Apathy from politicians to implement more practices. • Lack of flexible contracts from clients to suppliers.	• Consumers' perception about best before creating food waste for the retailers. • Householders' lack of understanding about what type of waste should be placed in the bins	• -

In regard to how the interaction between stakeholders encourages or hinders the adoption of more practices, it was found that there is low motivation on the part of stakeholders in the food industry in South Yorkshire. This low motivation is, according to the interviewees, derived from the absence of political commitment to an agenda for implementing more regulations in relation to food waste. In terms of consumers, the perception about the best before dates plays an important part in obstructing the work against food waste. Some organisations agreed that the lack of coordination between the councils in South Yorkshire on waste collection is a challenge in terms of their joining forces in a recycling scheme.

Table 7.6. Analysis of RBV - Food South Yorkshire

Resources & Capabilities	Profile	Competitive advantage (A) / Disadvantage (D)
Tangible		
Financial	• Limited economical resources of the organisations to invest.	D
Physical	• Strategically located in the middle of the country with close access to other important cities and regions.	A

Technological	• Low-Medium level of technological advances compared with other regions in the country.	D
Organisational	• In general, companies based in this region demonstrated high level of organisation through certifications (i.e. ISO 9001, etc), manuals, and working codes in place. • Companies are legally established.	A A
Intangible:	-	
Human	• Good working and ethical conditions for the workers with high importance given to equality, legality and inclusivity.	A
Innovation	• Low-Medium level of innovation that can be improved.	D
Reputational	• Companies demonstrate ethical practices in their online content. • They also are interested in showing legality in their processes as one of the main pillars of their image.	A A

The organisations have given particular importance to ensuring that everything is done within the regulations and legal framework as well as being environmentally friendly. The climate does not represent a problem for the preservation of food in the region, but since the trade balance of the country is negative and there is a need to import many raw materials and products from warmer countries there is a possibility of waste occurring during the transportation in their supply chains. Analysis of resources in the South Yorkshire region generally indicates competitive advantage, as its climatic conditions are more conducive to prolonged food preservation than hot climates. Although they considered that the monetary resources are limited to invest in cleaner energies and implement more strategies, for the moment they have upright structures deriving from the institutional pressures to adopt certifications and regulations that help to create more orderly planning within the organisations.

Table 7.7. Analysis of Agency dilemma- Food South Yorkshire

	Agency factors
Lack of trust in employees	i.e. As in the Yucatan region, the principals (Owners-general managers) lack trust in their employees because there is a conflict in terms of food waste. They prefer to waste it instead of giving it to the

	employees because they think that employees will generate more food on purpose to take food home.
Absence of interest from authorities	Interviewees mentioned being interested in implementing more ideas in their organisations, but they feel there is a conflict of interest with the pollical agenda. Politicians and Government place economic priorities above other interests.

The conflict that exists between agents and principals refers in this region mainly to the lack of trust in employees that was also pointed out in the Yucatan region for the same industry. This refers, in the same way, to not distributing the remaining food at the end of the day to the employees, but to waste it because the employees would otherwise take advantage of it to produce more food intentionally. The second conflict of interest relates to the lack of opportunities in local politicians' agendas to include more regulations to encourage the adoption of changes in organisations.

Table 7.8. Analysis of Institutional Pressures- Food South Yorkshire

	(Coercive) Regulative	**Normative**	**Mimetic (Cultural-Cognitive)**
Pressure mechanism	Not enough coercive pressure on the organisations.	Organisations obey morally governed normative pressures, so they will not to be shamed and get certifications and accreditations.	There is a very low stakeholder pressure towards sustainable resource consumption

Finally, in terms of Institutional pressures, the findings demonstrated that there are not enough coercive pressures to incentivise institutions to implement more measures than the basic certifications. Neither is pressure from stakeholders strong enough to stimulate the use of better procedures.

7.3. S3. Textile - Yucatan (MX)

Similarly, as in the Food industry in Yucatan, the database used to explore the amount and type of textile companies in Yucatan was DENUE (INEGI), with a number of 14,871 companies legally registered. The top 50 companies were analysed in chapter 5 in a content analysis and chapter 6 via in-depth semi-structured interviews. In general, the number of companies that reported online practices was minimal. The few

companies that did so were high profile and reported circular economy practices perfectly designed for their organisation, but the majority are in reality not using CE practices. In the comparison between chapters 5 and 6, regarding the textile industry in Yucatan the important points listed below in Table 7.9 need to be taken into consideration.

Table 7.9. Analysis of Stakeholders – Textile Yucatan

	Power	Legitimacy	Urgency
Stakeholders' interaction drives CE practices	• Suppliers are implementing better practices because some International important clients request Environmental certificates as a condition to work with them.	• A bond between the communities around the manufacturing plants and the producers is created to generate well-being and jobs. This incentivises formation of links between them to take advantage of textile waste.	• Climate change groups and pressure in social media influencing implementation of new practices.
Stakeholders' interaction hinders CE practices	-	• International organs (Customs regulators) hinder the donation or use of textile waste after the use in the manufacturing plants due to temporary import agreements.	-

In regard to how the interaction with stakeholders drives the implementation of CE practices, it was found that the companies that demonstrated high online knowledge are manufacturing companies that produce clothing for brands that are very widely known as leaders in circular economy practices (i.e. Nike, Patagonia, North Face, etc). This was similarly corroborated in Chapter 6, since there was a marked difference between the practices and knowledge presented by large manufacturing companies with international projection, and with major brands as clients, compared to small companies engaged in hand made clothing manufacturing. The interviewees of the large companies claimed to follow CE practices because it makes them attractive to their clients, who demand and supervise these practices; that is, the motivation is to generate an advantage over their competitors in other countries. There are opportunities in the region to recycle raw materials and transform them into new

materials that can be reintegrated into the supply chain, such as converting pieces of cloth that are leftover waste from production of threads or fabrics. Results on whether the available resources in the region provide competitive advantages or disadvantages for the inclusion of circular activities are shown in Table 7.10 below:

Table 7.10. Analysis of RBV - Textile Yucatan

Resources & Capabilities	Profile	Competitive advantage (A) / Disadvantage (D)
Tangible		
Financial	• Limited economical resources of the organisations to invest.	D
Physical	• The location of the Yucatan Peninsula is a very privilegeD and strategic location connecting US, Latin America and Europe.	A
Technological	• Potential to implement greener energies (Wind, sun, water) • Low-level of innovation and technology compared with other regions in the country. • High production of handmade clothing	A D D
Organisational	• There is a lack of planning and management control systems. • Most of the organisations work as informal/not registered organisations	D D
Intangible:		
Human	• High Turnover • Low salaries • Basic working conditions and environment • Cultural resistance to change	D D D D
Innovation	• Absence of innovation	D
Reputational	• Perception of the region on accessible prices and reliable manufacturers	A

In relation to tangible and intangible resources available in the region, the analysis showed more disadvantages than advantages due to lack of monetary resources and

management control systems in general. This can explain the low number of applications of CE practices in the region, and the lack of motivation to apply them.

Table 7.11. Analysis of Agency dilemma- Textile Yucatan

	Agency factors
Clients (Sustainability) -Market pressure (Fast Fashion)	There is an important paradigm in the Textile Industry in Yucatan that refers to the economic interest in the region to develop fast fashion against increasing expectation from the clients towards more sustainable practices in the Textile Industry.
International regulators - Manufacturers	Since Mexico is under International trade agreements, there is an important conflict of interest between the clients (usually in the United States) and manufacturers since the textiles are introduced under a temporary import regime and any waste produced during production needs to be returned.

The conflict of interest derives from the attention to the fast-fashion industry and lack of knowledge about the circular economy, which would imply that in the future they might face pollution problems due to bad planning about how to implement more sustainable growth. On the other hand, there is also an institutional pressure deriving from International measures that obstruct the use of textiles after the production of temporary imports.

Table 7.12. Analysis of Institutional pressures- Textile Yucatan

	(Coercive) Regulative	**Normative**	**Mimetic (Cultural-Cognitive)**
Pressure mechanism	The contracts with International clients required regulations and certifications.	International regulations to control the use of textiles under temporary import regime.	Second-hand clothes are not well accepted by the society yet because the garments are considered to be for low income groups.

Regarding the textile waste in the region, several interviewees said they had contact with companies or organisations that transform the waste into new products or materials to reintegrate into the supply chain. Buying used garments from second-hand stores is not as accepted by society for psychological reasons as it is linked to low-income people who cannot afford to buy new products.

7.4. S4. Textile - South Yorkshire (UK)

The textile industry in the South Yorkshire region has a large concentration of companies located in the city of Sheffield, a large majority of which are micro enterprises. The main activity of these companies is the mass production of outerwear from textile materials. Buying garments from second-hand or vintage stores is fairly widely accepted by society and is seen as a good practice. The results of the analysis on the web pages of textile companies in the South Yorkshire area were insufficient since few companies present online information about their practices, and the information found on the web pages just refers in a very limited way to the mission and products of the company. For this reason, the findings in chapter 6 significantly complement the results of chapter 5. It is also important to note that in this study very few textile companies were willing to collaborate with information, so considering that in the region there is a great acceptance of second-hand stores, it was decided to explore this option further. The results of the merged information are explained in the following tables:

Table 7.13. Analysis of Stakeholders – Textile South Yorkshire

	Power	Legitimacy	Urgency
Stakeholders' interaction drives CE practices	- Government provides Gift Aid and Tax benefit for donations.	- Buying from second-hand or vintage stores has fairly wide acceptance by society and is seen as a good practice.	- Increasing concern of environmental groups about fast fashion is causing awareness among consumers.
Stakeholders' interaction hinders CE practices	- Apathy from politicians towards implementing more regulations. - Lack of flexible contracts from clients to suppliers.	- For the second-hand stores to receive donations, they need to be trustable.	-

According to the interactions with stakeholders, A factor that is driving more practices is the application of tax benefits to individuals and organisations in reference to

donations. There is a high acceptance of second-hand shops in the region, including charity shops, and vintage stores. Environmental groups are generating more activities to reduce the use of textiles as part of the movement against fast fashion.

In contrast, the facts that hinder the application of more CE practices are related to absence of new regulations in the political agenda, the inflexibility in contracts, such as those of councils with collection waste contractors, finally the struggles of charities to maintain trust so that donors will keep providing garments.

Table 7.14. Analysis of RBV - Textile South Yorkshire

Resources & Capabilities	Profile	Competitive advantage (A) / Disadvantage (D)
Tangible		
Financial	• Limited economic resources of the organisations to invest.	D
Physical	• Strategically located in the middle of the country with close access to other important cities and regions.	A
Technological	• Low-Medium level of technological advances compared with other regions in the country.	A
Organisational	• In general, companies based in this region demonstrated high levels of organisation through certifications (i.e. ISO 9001, etc), manuals, and working codes in place. • Companies are legally established.	A A
Intangible:		
Human	• Good working and ethical conditions for the workers with high importance given to equality, legality and inclusivity.	A
Innovation	• Low-Medium level of innovation that can be improved.	A
Reputational	• Companies demonstrate ethical practices in their online content. • They also are interested to show legality in their processes as one of the main pillars of their image,	A A

The interviewees, in general, demonstrated considerable knowledge of the concept and resources that provide them with competitive advantage for the implementation of more practices. It was easier to identify options to process the textiles at the end of the

useful life. It was significant that one of the most widespread online features is transparency in the supply chain, fair trade, ethics, and evaluation of suppliers.

Table 7.15. Analysis of Agency dilemma- Textile South Yorkshire

	Agency factors
Textiles are not valuable material for councils	Interviewers mentioned being interested in implementing more ideas in their organisations, but they feel there is a conflict of interest with the pollical agenda. Politicians and Government place economic priorities above other interests.
Conflict of interest between different Industries	Connection and dependence between industries were suggested by one interviewee. The participant mentioned how the decision to implement more sustainable practices in one industry can affect in a negative way a different industry or the other way around. (i.e. using cotton bags to replace plastic bags can affect the crops used for the Food Industry or in a positive way, for example, plastic waste can be used to produce textile products such as carpets)

Likewise, issues that had not been noted in the other case studies were addressed, such as the connections and dependence between industries, and the fluctuation of textile prices. Addressing these issues promotes more significant discussions on implementing more practices in the industry. The interviewees considered that there is an opportunity to reinvent the values and perceptions of consumers concerning the purchase and use of textiles. This means that reducing the number of textiles required could discourage excessive use of fast fashion and create a culture towards slow fashion. Finally, the interviewees mentioned the possibility of generating profits using textile waste to not only sell as waste but to create new products such as insulation material for houses.

Table 7.16. Analysis of Institutional pressures- Textile South Yorkshire

	(Coercive) Regulative	**Normative**	**Mimetic (Cultural-Cognitive)**
Pressure mechanism	Not enough coercive actions for the organisations.	Organisations obey morally governed normative pressures, so they will not be shamed and get certifications and accreditations.	There is a medium stakeholder pressure towards sustainable resource consumption

Like those in the Food Industry in the region, the interviewees agreed that the regulations for the Textile Industry are insufficient to encourage them to improve their practices; nevertheless, in the region there is a high acceptance of certification and accreditation linked with the need to meet the legal basic requirements. For this region, it is notable that more groups are concerned about environmental issues and suggest changes, especially in relation to the fast fashion trend.

7.5. S5. Food – Overall

As previously reported on the food industry in Yucatan, there was a difference in the practices reported online that focused on the environment and the actual practices, which interviewees mentioned as having a more economic focus. This could suggest that there could be an attempt in companies in Mexico to convey a false image or present misleading information that focuses on how environmentally friendly they are in their practices or products. On the other hand, in the food industry in South Yorkshire, there was a reasonable correspondence between online practices and practices mentioned in the interviews with the actors in the supply chain. The climate is a factor that helps or impairs the efficiency of operations to transport and conserve food for a longer time. The priorities for implementing practices in their organisations are reflected differently, with factors such as climate, eating habits, employee confidence and regulations involved. The fact that employee confidence in Mexico is weak makes it challenging to implement practices to stop food waste or redistribute it. On the other hand, the excess of regulations in the UK complicates the implementation of CE practices in the organisations in the same way.

Stakeholders. The interaction between stakeholders in the two regions analysed showed how some stakeholders could influence the application or lack of application of the circular economy in organisations. As explained in chapter 3, the stakeholder theory helps us to identify the critical groups that can influence the decisions of other organisations. These may be driven by power, legitimate, or urgency mechanisms. Regarding the power attribute, no mechanisms were found that act positively to motivate stakeholders to implement more practices. However, on the negative side, the interviewees from both regions mentioned that the lack of incentives and regulations by the governments causes them discouragement since they do not see any benefits. In this sense, more attention and incentives towards the organisations are required from

politicians, to activate more significant actions in the companies. Regarding the legitimate factors that influence the creation of best practices, it was found that having more contact with universities or research centres to generate studies can promote greater exchange and creation of ideas to apply in organisations. Links with universities were only found in the South Yorkshire region, and this can be suggested for the Yucatan region. A negative factor found in both regions was the lack of indications from the authorities towards the consumers about the practices that they can carry out, environmental education, how to dispose of their garbage so that it can be recycled, and, above all, more information about the best before labelling of food to encourage greater use and less waste.

Resources. There is disparity in the resources available in the two regions. Superior availability of resources can be observed in the region of South Yorkshire, primarily technological and organisational resources, which confers a more significant competitive advantage that could explain why more companies have certifications and fulfil the requirements of legal regulations. However, because of the type of climate and location of the Yucatan region, it has greater possibilities for using renewable energy for its operations. Organisational resources provide the most significant advantage to the South Yorkshire region, as there are quality controls, resource efficiency, certifications and documentation in place. In contrast, the disadvantage in Yucatan is that most companies are informal, do not follow any regulation and are not required to have certifications or contracts. Meanwhile, cultural factors have a strong influence on collaboration of the staff to include different activities. The vast majority of interviewees described the culture in Yucatan as being very conservative and resistant to change.

Conflict of Interest. In both regions, interviewees from different organisations stated that one of the challenges for better utilisation of food resources at the end of the working day, especially for catering and restaurants, is trust in the employees. They referred especially to the issue that if they were to donate the food at the end of the workday to their employees, they would run the risk of employees preparing extra food each day to take away intentionally.

External Pressures. Finally, the following data were found in the analysis of external pressures on the organisations. In terms of coercive pressures, the

interviewees mentioned that there is a lack of regulatory measures imposed by the authorities to motivate implementation or changes in their current practices. On the other hand, the resistance to change among employees and customers in the Yucatan region is an essential factor inhibiting changes in structure. In terms of customer pressures in both regions, we are beginning to see a growing concern for sustainable product consumption. However, it is apparent to a greater extent in the South Yorkshire region than in the Yucatan region. Lastly, there was considerable pressure from organisations in South Yorkshire to follow basic guidelines of transparency, legality, inclusiveness and regulations, due to both customer and government requirements.

7.6. S6. Textile - Overall

Results from the textile industry in both regions created an exciting case since this comparison between two different regions allowed a more complete analysis of the supply chain, from manufacturing to consumption and post-consumption. The industry in Yucatan analysed the manufacturing part and the pressures that it receives from the final clients. The analysis of the textile industry in both regions presented very little information about the practices of the circular economy currently available in the selected organisations. The lack of information online may suggest that there is no interest in exhibiting sustainability in their practices and there are not many implementations based on the circular economy model.

Stakeholders. Regarding the interaction between stakeholders, an outstanding sample was found in the Yucatan companies of the pressure that stakeholders can exert in their interaction to generate more practices. The companies that demonstrated compliance with regulations, sustainable and environmentally friendly practices were the ones that were required to do so by their clients as a condition of working with them, so the influence they can have can be essential to encourage the application. Furthermore, it was also shown that the link that the companies maintain with the communities in which they are located in the Yucatan region encourages the organisations to develop activities that reinforce their relationship. This phenomenon could also be explained by the fact that their workforce is drawn from the surrounding area or by their unwillingness to create any local problems related to their operation. The regulations established by the customs authorities were considered by one of the participants as a

barrier to better use of textile waste since, under the agreement made on temporary importation, they need to return all the waste that was produced in the production of the garments. As the last point regarding stakeholders, the increasing influence of groups active in the environmental fight against the effects of fast fashion was observed.

Resources. As in the food industry, there is a clear disparity in available resources between the two regions. South Yorkshire principally has more advantageous technological and organisational resources, which permit greater competitive advantage compared to the other region. Yucatan region, on the other hand, has opportunities to implement renewable energy due to its privileged location and climate. South Yorkshire region is strong in organisational resources such as quality controls, resource efficiency, certifications and documentation which allow its companies to be more prepared for the introduction of new ideas. The difficulty for Yucatan is the informal environment in which companies operate; regulations are not strictly followed and there is an absence of certifications or contracts. As a last point, cultural influence has a strong impact on the implementation of changes due to the resistance towards adopting new ideas.

Conflict of Interest. Among the conflicts of interest in the textile industry in both countries are the fluctuating and unattractive price of textiles at the end of the production cycle, the economic need to generate more income against environmental effects (i.e. fast fashion), and finally, the regulations from customs agencies that reduce the willingness of companies to use waste for reuse within the country. Finally, an interesting conflict of interest was mentioned by one interviewee regarding how positive changes made in one industry could negatively affect another supply chain and vice versa.

External Pressures. Ultimately, in regard to external pressures on the organisations, as in the Food industry, in terms of coercive pressures, the participants stated that there is an absence of supervisory measures imposed by the experts to promote modifications in their current practices. The opposition to modifying already known practices is a challenge highlighted in the working culture of Yucatan. There is rising interest in environmentally friendly manufactured goods, and the textile industry is constantly being pressured to adopt a holistic approach to addressing this concern. To

conclude, there is a substantial pressure in South Yorkshire for organisations to obey basic standards of transparency, legality, inclusiveness and regulations.

7.7. S7. Food and Textile – Overall

In the overall analysis of the industries and regions analysed, the specific characteristics of each industry in different circumstances could be observed separately. The key overall findings led to emergence of the following outcomes:

i. In all cases, participants highlighted the significant help needed from the policy agenda, including more significant incentives for organisations in terms of economic, fiscal, social or labour motivations.
ii. Regarding the knowledge of the circular economy model, it was confirmed that the greater the knowledge, the greater the concern to generate related practices, although the great majority simply linked CE to sustainable practices and did not recognise circular economy as a concept.
iii. The decision-making structure of the organisation, along with the management knowledge and organisational culture, influences the level of changes in the organisations.
iv. The level of formality and legality in organisations seems to have a positive influence on the actions carried out and, as a consequence, facilitates incorporation of new ideas into the organisation.
v. It was remarkable how companies with more resources are currently implementing better activities in their organisations. It was not physical resources that were providing competitive advantage but the presence of more rules, certifications and regulations in companies.
vi. The food industry is more concerned about local waste schemes, while textile waste is not considered a feasible scheme for local governments. Private companies usually manage textile waste outside of the community's public services.

7.8. Chapter Summary

This chapter has merged the proposed theories presented in Chapter 3, findings of chapters 5 (Content Analysis of Websites), Chapter 6 (Thematic analysis of semi-structured interviews) derived from information collected from two specific areas in the United Kingdom (South Yorkshire) and Mexico (Yucatan). This merge of data is presented in 7 different cases, highlighting the main findings from every particular case study. The key findings for the 7 cases are the following:

- *S1. Food/Yucatan.* The CE practices showed online in Chapter 5 for the companies selected in the region are considerably more when in reality, the interviewees in Chapter 6 mentioned to have economic issues as their main concern and caring for the environment is something that is not in their priorities.
- *S2. Food/South Yorkshire*. Even though the information online in Chapter 5 was limited for the companies, the interviewees showed a high level about the CE concept in this region. There is also a high culture of consumers who are increasingly focused on supporting these organisations and raising awareness about food waste.
- *S3. Textile/Yucatan*. For this region and industry, the results in Chapter 5 reported limited information about their practices online but the few companies that reported practices, were advance CE practices.
- *S4. Textile/South Yorkshire*. Stakeholder urgency related with climate change seems to be influencing consumers in this region which affect the supply chain in other regions such as the previously presented in Yucatan.
- *S5. Food/Overall*. The difference among the practices showed online seems to be less accurate with the reality in the Yucatan region, companies are using this information to convey a false image of environmentally friendly practices.
- *S6. Textile/Overall*. The comparison between regions for this industry is more difficult because while the Yucatan region is a manufacturer region, South Yorkshire is focus on the consumption side. An interesting analysis of Stakeholders influencing the practices in other regions is explained.
- *S7. Food and Textile/Overall*. Finally, a comparison presenting the different themes for each industry is presented.

These seven cases were presented in figure 7.2 of this chapter. In each case the analysis represents a specific step towards understanding the dynamics between the two regions and industries analysed. The results of each case have been presented through detailed analysis of stakeholders, resources, conflicts of interest and external pressures using the theoretical framework suggested in chapter 3 (Figure 3.3). This analysis sought to understand how these elements help or hinder the application of circular economy practices in organisations.

CHAPTER 8

DISCUSSION

According to the results and gaps found in the literature review explained in Chapter 2, this thesis analysed the perspectives of different stakeholders in the supply chain of Food and Textiles in the regions of Yucatan and South Yorkshire, in order to understand the challenges and opportunities in the implementation of circular economy practices. **Error! Reference source not found.** shows the flow of the chapters. Chapter 8 is connected with Chapter 7 in order to analyse and critically discuss the merged results. Chapter 3 is used as support of the present Chapter, providing the theoretical framework that will help to discuss the outcomes.

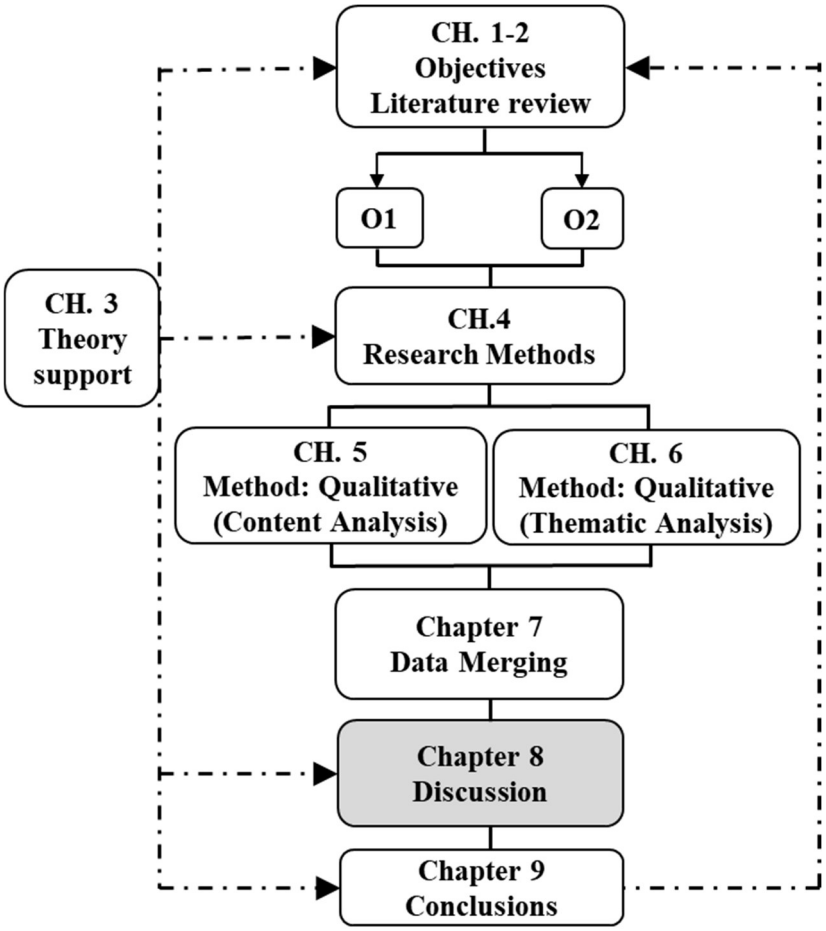


Figure 8.1. Research Map - Discussion

To accomplish the objectives established in Chapter 1, Chapter 3 presented a theoretical framework to support the selection of the theoretical lens used to produce the analytical outcomes from the collected data. Four theories were determined: (1)

Stakeholder theory, to identify and analyse different groups of stakeholders, (2) RBV, to know how the available resources can help generate a sustainable competitive advantage, (3) Agency theory, to understand the problems faced by the organisations in reference to the conflict of interests between agents and principals, (4) Institutional theory, to understand how organisations address the external pressures that affect the adoption of new models.

In correspondence with these theories and objectives, data collection methods were designed based on qualitative procedures. The first qualitative method selected for a preliminary analysis was content analysis, to examine the websites of top companies located in the regions selected (Chapter 5). Nevertheless, the data obtained from this first analysis was found to provide insufficient online evidence about the companies. Several analysed websites contained only basic essential data, or in most of the cases, the companies did not even have a website. For this reason, a second qualitative research method, thematic analysis, was used to complement this data by collecting information from different groups through semi-structured interviews (Chapter 6).

Finally, all the information collected from both methods was merged in Chapter 7 to compare the preliminary analysis with the thematic analysis, giving, as a result, a descriptive list of critical findings evaluated in seven different cases as shown in Figure 7.2 Chapter 7 then presented the data in a descriptive form based on merging the content analysis with the thematic analysis. This chapter aims to analyse and discuss the key findings with support of the theory previously suggested in Chapter 3. The discussion of the findings is divided into four sub-sections corresponding to the objectives set out in Chapter 1. Each section will explain how findings from the different chapters were linked to achieve the relevant objectives.

8.1. CE practices enabled within selected multi-tier.

Within this research, two objectives were defined according to the results obtained in the systematic review of the literature. Objective 1 refers about the analysis of multi-tier and multi-stakeholder supply chains. For this reason, a comparison between the dynamics of two regions was suggested to obtain contrasting comparison between countries with different economic circumstances. This information was obtained from grey literature and from both secondary and primary sources. Table 8.1. presents the

summary of aims and main findings in relation to the different chapters for this specific objective. The first column of the table lists the tasks performed in each chapter, the second column lists the aims with reference to Comparation of findings in different countries, and finally, column 3 sets out the main findings in relation to the considered objective.

Table 8.1: Summary of findings – Comparation of findings in different countries

Compare Dynamic in Different Countries		
Chapter	**Aim**	**Main findings**
C2 Literature Review	Understand the need for research	▪ Identification of need for more research in less developed countries. ▪ Majority of studies focused on more developed countries. ▪ Need for studies of more countries for comparison and to provide supporting evidence.
C5 Content Analysis	Preliminary analysis of specific industries and regions using the content of websites of companies in the studied region.	▪ Allowed rapid comparison between regions ▪ Evidence of practices for each region ▪ Lack of sufficient online information. ▪ Differences in how the companies displayed the information online and in the main practices in each region and industry.
C6 Thematic Analysis	In-depth analysis of the regions and industries by interviewing key stakeholders.	▪ Understanding gained of the dynamics in different regions and industries based on the narratives of the participants.
C7 Data Merging	Merge the data obtained in Chapter 5 and 6 to understand the differences in the data collected and analysed from different cases.	▪ Comprehension of discrepancy between practices shown online and those currently in practice in the organisations.

It has thus been possible to obtain a clear picture of the current dynamics of the industries in each region as well as the related challenges and opportunities. In comparing the different countries, differences could be seen regarding various factors that affect the supply chain, such as climate, formal and informal trade, management of organisations, ideology, and of course, economic level.

As the first point of comparison, the two regions have very different climates, with the Yucatan region having a warm climate for most of the year, which makes it more

difficult to preserve food over a longer period, while the cooler climate of South Yorkshire allows food to be preserved for a longer time and at lower energy cost.

An essential difference also emerged regarding the nature of trading in the two regions. In Mexico informal trade accounts for 60% of the country's total trade, and this leads to low levels of organisation and management control, while in South Yorkshire, it is viewed as a priority for companies to demonstrate to the public that they follow regulations, certifications and transparency applying to the supply chain. An important institutional coercive pressure needs to be established by local governments to encourage legality in the operations of the firms in special to deal with informal trade and rules. This proved to be a key factor for encouraging companies to implement more significant circular economy practices since, in both regions, the companies with more and better practices were those that engaged in more rigorous planning. Whereas availability of physical resources was not a decisive factor, implementation of more controls by companies clearly was. This could suggest the role that regulators can play in encouraging the implementation of best practices by supporting and advising the different organisations in the region. Another area of contrast between the regions was observed in the ideology of the society in each region and the ideology in the two regions' organisations. In general, participants in the Yucatan region constantly mentioned the reluctance of senior management to adopt new practices and of workers to follow instructions once changes were implemented. Meanwhile, in the South Yorkshire region, change is accepted as long as it is clearly for the benefit of the company.

Finally, there was no significant economic difference between the regions in relation to the implementation of higher practices as participants from both regions indicated that they had limited resources to invest in change. It is also to note that even though tangible resources have an impact in how companies adopt specific practices, intangible resources and specific group of key stakeholders as suggested by Ackermann and Eden (2011) are more likely to generate a higher impact rather than economic resources.

8.2. CE practices enabled within selected multi-stakeholders supply chain.

Also, as part of the first objective about the analysis of multi-tier and multi-stakeholder supply chains and how they motivate or obstruct changes inside the organisations. Table 8.2 8.2. presents the main findings regarding the perspectives of different stakeholders in the supply chains of the Food and Textile industries in the Yucatan and South Yorkshire regions. The first column of the table lists the tasks performed in each chapter, the second column lists the aims with reference to this objective, and finally, column 3 sets out the main findings in relation to the considered objective.

Table 8.2: Summary of findings for multi-stakeholder supply chains

Analyse the perspective of different stakeholders		
Chapter	**Aim**	**Main findings**
C2 Literature Review	Understand the needs for research	▪ Insufficient information for specific Industries ▪ Not enough perspectives of stakeholders
C5 Content Analysis	Preliminary analysis of specific industries and regions using the content of websites of companies in the studied region.	▪ Lack of information of the companies online ▪ Absence of transparency about their stakeholders
C6 Thematic Analysis	In-depth analysis of the regions and industries by interviewing key stakeholders.	▪ Narratives of different stakeholders in the regions analysed. ▪ Collaboration and influence between stakeholders.
C7 Data Merging	Merge of the data obtained in Chapter 5 and 6 to understand the difference between the data collected and analysed from different cases.	▪ Inconsistency between practices reported online and those carried out in practice.

In chapter 2 of this thesis, a lack of stakeholder analysis was discovered in the current literature with reference to Circular Economy. Although a preliminary study of the available companies in the analysed regions was made in Chapter 5, the quantity of information was insufficient, and it did not consider all the actors involved in the supply chain of the food and textile industry. For this reason, Chapter 6 considered the descriptions of various stakeholders related to the industries studied but considering various stages of the supply chain in order to have a clearer view of the entire supply

chain, as outlined in the supply chain map in Chapter 2. The mapping of supply chains in Chapter 2 helped to identify all the related actors and their potential collaborations. Such engagement can affect the performance of organisations to a greater or lesser extent, either positively or negatively. In Chapter 6, a broader view was obtained of how they are connected to each other and the extent of their collaboration and influence. While a certain degree of conflict was found between the interests of the different collaborators, the examples from the participants also demonstrated that cooperation for a specific good is most effective when people work collaboratively. In the textile industry, in particular, the impact of connections in the supply chain in encouraging the creation of best practices became clearer.

8.3. Understanding Challenges and opportunities

The second objective is about finding what factors can drive or hinder the implementation of CE practices in the selected multi-tier and multi-stakeholder supply chains? Some of the challenges and opportunities raised in the available academic literature were identified as a preliminary step. Govindan and Hasanagic (2018) identified thirteen motivational drivers and provided a cluster of drivers in reference to Policy and economy, health, environmental protection, society, and product development.

In terms of Barriers Govindan and Hasanagic (2018) also produced a list of 39 barriers and classified them in eight clusters being Governmental issues, economic issues, technological issues, barriers regarding the level of knowledge and skill issues, management issues, CE framework issues and market issues. In the same regard, Kirchherr et al., (2018) also produced one of the first large research on CE barriers in the EU. However, previous studies have dealt with these challenges and opportunities in a general way across industry and not responded to situations in specific industries or countries with different human developments. This is confirmed in the gaps of the literature and recent reviews presented by Pieroni et al (2019) showing a lack of research showing multi-disciplinary perspectives.

Even though these publications have assisted to establish the basis for futures studies based on drivers and barriers, the information is less suitable for nations with unique struggles. Latin America is a region where their political instability has created an

economic breach between social classes. This gap has been widening creating class disparity, difficult access to health services and lack of basic services for the majority of the population. The objectives proposed in this thesis are to expand the knowledge of this region, and to provide case studies in seven different circumstances in order to serve as a foundation for studies in other states, regions and countries with similar conditions.

Challenges are considered to include everything that may obstruct or prevent the implementation of new practices in organisations. These can be economic, social, political, environmental and other factors. Each region has different challenges. Opportunities are defined for the purposes of this research as the circumstances that may make possible or promote the implementation of circular economy practices in organisations.

Figure 8.3. explains in a general way the findings from different chapters based on the aim of each chapter. The first column lists the tasks performed in each chapter, the second column lists the aims with reference to the objective, and finally, column 3 sets out the main findings in relation to the considered objective. The results are highly concentrated and summarized to identify the main overview of this study. More information will be provided later in this chapter to further explain these findings and what they mean in comparison to previous studies conducted for European countries.

Table 8.3: Summary of findings for Challenges and opportunities

Understand Challenges and opportunities		
Chapter	**Aim**	**Main findings**
C2 Literature Review	Identify challenges and opportunities based on previous academic publications	▪ Insufficient information for specific Industries ▪ Assumptions based on developed countries. ▪ Majority of studies founded on Micro-cases. ▪ Not enough representation of different groups of stakeholders - only the most powerful ones
C5 Content Analysis	Preliminary analysis of specific industries and regions using the content of websites of companies in the studied region.	▪ Companies displayed online limited information about their practices. ▪ Higher level of environmental practices shown online other than economic or social.
C6 Thematic Analysis	In-depth analysis of the regions and industries by	▪ Different challenges and opportunities based on factors such as regulations, weather, habits, education.

	interviewing key stakeholders.	▪ Insufficient information about stakeholders, and lack of transparency in the supply chain.
C7 Data Merging	Merge the data obtained in Chapter 5 and 6 to understand the differences in the data collected and analysed from different cases.	▪ Inconsistency between practices reported online and those carried out in practice.

As mentioned above, the findings from Chapter 2 were based on the available literature. From the analysis of the articles, it was found that there is insufficient information for specific industries, and usually the information provided is general; therefore, more studies of specific industries are required. The purpose of this research is not only to add to the number of articles but also to analyse in a different context the challenges and opportunities relating to the CE. The availability of more information on different industries could help to understand what is actually going on in these industries. Table 8.4. presents the main findings for Challenges and opportunities in the main two regions (Yucatan and South Yorkshire) for the two studied industries (food and textile).

Table 8.4: Challenges and opportunities per case

Case	Challenges	Opportunities
S1 – FY	*Stakeholders* ▪ Poor communication with stakeholders ▪ Low level of awareness among the stakeholders involved in their SC ▪ Low stakeholder engagement between organisations. *RBV* ▪ Limited economic resources to invest ▪ Limited knowledge about CE ▪ Lack of trained staff ▪ Extreme hot weather ▪ Minimal level of innovation ▪ Absence of planning and management control systems *Agency* ▪ Informal relationships between Supplier-buyer	*Stakeholders* ▪ There is a bond between the manufacturing plants and the communities based on generating well-being and jobs. *RBV* ▪ Well-connected location (logistically) ▪ Region with potential to implement cleaner energies (Wind, sun, water). ▪ Known as a producer/manufacturing region. (Attractive for investment and production) *Agency* - *Institutional*

	▪ Low trust in suppliers ▪ Lack of trust in staff *Institutional* ▪ Informal economy ▪ Resistance to change from top ▪ managers and staff ▪ Absence of regulations in terms of waste disposal ▪ Not enough coercive measures ▪ Incoherence between practices shown online and real practices	-
S2 – FSY	*Stakeholder* ▪ Consumer perception about best before is triggering food waste ▪ Lack of clear indications from councils to householders about what type of waste should be placed in the bins. *RBV* ▪ Limited economic resources to invest ▪ Low-Medium level of technological advances compared with other regions in the country. *Agency* ▪ In some cases, inflexible contracts with suppliers to respond to changes. ▪ Lack of trust in staff *Institutional* ▪ Low interest from politicians to include regulations in the political agenda. ▪ Not enough coercive measures	*Stakeholder* ▪ Increasing stakeholder pressure towards sustainable resource consumption *RBV* ▪ Strategically located in the middle of the country with close access to other important cities and regions. ▪ More awareness about environmental practices ▪ Good working and ethical conditions for the workers, with high importance given to equality, legality and inclusivity. ▪ High level of organisation, management and control systems *Agency* - *Institutional* ▪ Links with academics to develop research that helps to tackle food waste. ▪ Certifications from regulatory institutions. ▪ Formal economy between suppliers and buyers
S3 - TY	*Stakeholder* ▪ Poor communication with stakeholders ▪ Low level of awareness among stakeholders involved in their SC ▪ Low stakeholder engagement between organisations.	*Stakeholder* ▪ There is a growing pressure from International stakeholders to implement certifications and greener policies as a condition to work with them. ▪ There is a bond between the manufacturing plants and the

	▪ Second-hand clothes are not yet well accepted by the society because the garments are considered to be for low income groups. *RBV* ▪ Limited economic resources to invest ▪ Limited knowledge ▪ Lack of trained staff ▪ High staff turnover ▪ Low salaries ▪ Basic working conditions and environment ▪ Minimal level of innovation ▪ High production of handmade clothing (not very efficient) ▪ Absence of planning and management control systems *Agency* ▪ Informal relationship between Supplier-buyer ▪ Low trust in suppliers ▪ Lack of trust in staff ▪ Fast fashion is a future goal of manufacturers to obtain more profit. *Institutional* ▪ Informal economy ▪ Absence of regulations in terms of waste disposal ▪ Resistance to change from top managers and staff ▪ Not enough coercive measures ▪ Textiles are products that are under strict import regulations and use restrictions. ▪ Incoherence between practices shown online and real practices	communities based on generating well-being and jobs. *RBV* ▪ Well-connected location (logistically) ▪ Region with potential to implement greener energies (Wind, sun, water). *Agency* ▪ Good perception of the region as reliable suppliers/manufacturers and accessible production prices *Institutional* -
S4 – TSY	*Stakeholder* ▪ For the second-hand stores to receive donations from the society, they need to be trustable. *RBV* ▪ Economic resources limited to invest ▪ Low-Medium level of technological advances compared with other regions in the country.	*Stakeholder* ▪ Second-hand or vintage stores have fairly wide acceptance by society, and it is seen as a good practice. ▪ Increasing concerns of environmental groups about fast fashion are raising awareness between consumers. *RBV*

	Agency ▪ In some cases, inflexible contracts with suppliers to respond to environmental challenges. ▪ Conflict of Interest between different Industries ▪ Textiles are not valuable material for councils. *Institutional* ▪ Low interest from politicians to include regulations in the political agenda. ▪ Not enough coercive measures	▪ Strategically located in the middle of the country with close access to other important cities and regions. ▪ Good working and ethical conditions for the workers, with high importance given to equality. ▪ Legality and inclusivity. *Agency* - *Institutional* ▪ High level of organisation (Certifications and management) ▪ Government provides Gift Aid and Tax benefit for donations. ▪ Formal Economy

As mentioned above, the findings from Chapter 2 were based on the available literature. From the analysis of the articles, it was found that there is insufficient information for specific industries, and usually the information provided is general; therefore, more studies of specific industries are required. The purpose of this research is not only to add to the number of articles but also to analyse in a different context the challenges and opportunities relating to the CE. The availability of more information on different industries could help to understand what is actually going on in these industries. Table 8.4. presents the main findings for Challenges and opportunities in the main two regions (Yucatan and South Yorkshire) for the two studied industries (food and textile).

Table 8.4e 8.4. specifies the main difficulties and opportunities found in the main cases studied. Case S5 (Food overall), S6 (Textile Overall) and S7 (Food-Textile Overall) were not included as they are derived from the first four cases. The following two subsections present discussion of the findings of the previous chapters in relation to challenges and opportunities.

Figure 8.2. presents a general overview of the main findings per each theory. These findings were combined for the theoretical framework in Chapter 3 to illustrate how every finding is linked with the theory. Each theory presents the challenges and opportunities to be evaluated in this research such as how resources, stakeholders,

agency-principal relationship, and institutional pressures influence the adoption of best practices related to the circular economy.

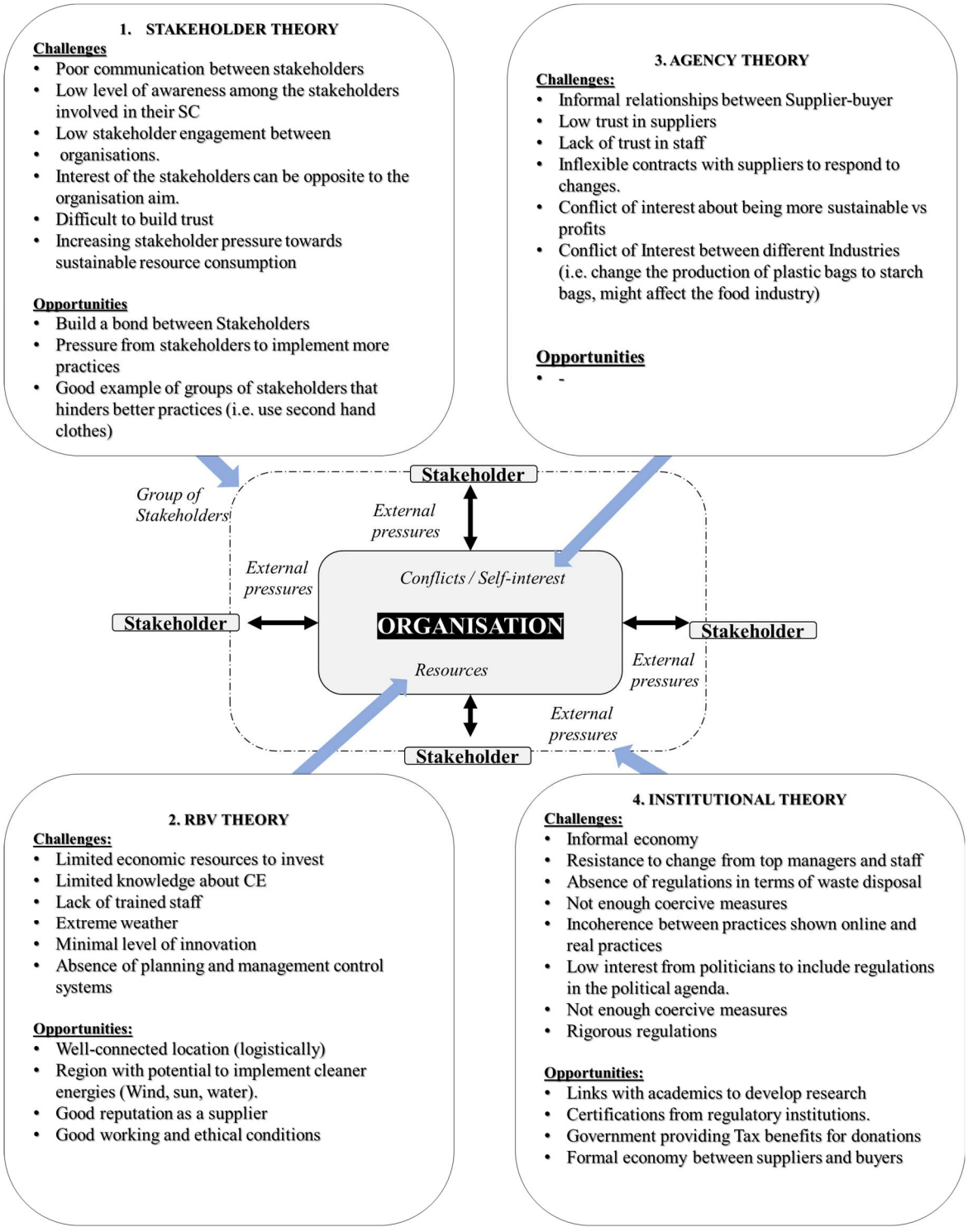


Figure 8.2: Link between Theoretical Framework and general findings for Challenges and Opportunities

8.3.1. Challenges

The analysis of the data collected enabled the main challenges in each industry and country to be summarised. The emergent challenges related with economic, legal, social, environmental and technological factors included in the different theoretical framework will be explained as next.

- *Stakeholder challenges.* As Friedman and Miles (2006) stated, organisations need to adopt a wider stakeholders' view; and the aim of the corporations should be to manage stakeholders' needs, interests and points of view. The collaboration among stakeholders demonstrated the ways in which stakeholders impact the usage or absence of usage of the CE in companies. The results showed that while companies with poor communication, lack of awareness and engagement with their stakeholders show less interest in the implementation, stakeholders with pressure from their clients have more CE practices for the requirement of their clients. This was especially notable in the case of Suppliers with International clients. International clients in special those from more developed countries as the ones in the European block or the ones based in the United States and Canada were more likely to require from their suppliers' stricter regulations related with the supply chain and sustainable practices. Mitchell and Wood (2020) explained this attribute of stakeholders as "power", where a relationship between actors in which one can get another actor to do something that would not have otherwise been done.
- *RBV challenges.* The challenge that interviewees from both industries mentioned most was the economic limitation since they consider that the implementation of circular economy practices requires investment to acquire new technology, more sustainable materials, trained personnel, or new systems. Although most of the interviewees claimed to see economic benefits in implementing more circular economy practices, they consider the associated economic cost to be high compared to the related benefits, at least in the short term. Among the regions studied, differences were found in the availability of tangible and intangible resources; however, the participants implementing more practices were not those with more considerable physical resources, but those with appropriate administrative systems and better systematic processes in their organisations. Lahti et al. (2018) mentioned about how organisations

are able to adjust their establishes resources to adapt to alterations in conditions, tendencies, and circumstances. The intangible resources seem to have more impact in the decision-making than the actual tangible resources and can be a key factor to encourage more implementations.

- *Agency challenges.* An important point mentioned for the Agency challenges was the lack of trust in the staff, especially in the food industry. This challenge can be minimised through taking greater control of their processes, to achieve more efficient use of resources, and putting in place specific procedures for employees to follow, and thereby giving greater certainty to principals. Van Slyke, (2007) mention about the two dilemmas in the relationship between principal-agent, this challenge can be link with the second assumption which refers to the agent as an influential figure because they can access sensitive information and are in a position to make decisions, enabling them to act for their self-benefit. For this specific situation managers can deal with this situation by shaping the processes and establishing mechanism that incentivise employees to follow specific steps that can help to avoid food waste.
- *Institutional challenges.* In regards of the external institutional pressures, they also recognised that it is necessary to start adopting more of these practices in order to get or keep clients. Some other organisations are already doing so, while there is additional growing pressure from more environmentally educated consumers. Widmer and Prior (2019) call this Isomorphism which is the idea that institutions over time they will be converted into the same by embracing parallel policies and strategies in order to improve their own. Local authorities could promote the implementation of practices through administrative controls in companies, i.e. by helping them to control their production processes, this is also linked with increasing coercive institutional pressures. As far as the textile industry is concerned, the challenges to be faced relate to the market forces that put pressure on manufacturing countries to produce more products and more cheaply, which generally leads to environmental damage. Resistance to change demanded by society and a defensive reaction regarding obstacles and dangers, again lead us to think that the implementation of more administrative controls can help companies feel more comfortable with accepting new opportunities. Finally, the political

agenda for both industries needs to include more coercive and regulatory actions as well as promotion of fiscal incentives.

8.3.2. Opportunities

In their narratives the interviewees made less mention of opportunities than challenges; most considered that while there are still many challenges, they did not know what opportunities the CE could bring for their organisations.

- *Stakeholder opportunities.* Developing connections with different stakeholders and connecting distribution efforts in a coordinated way could help industries to become more efficient in terms of logistics. There is a growing interest in both regions from environmental groups that promote the insertion of more sustainable and circular practices in companies, so more and more consumers are also valuing application of such practices in production of the products they consume. Finally, the engagement of more stakeholders in the exchange of information in the SC was shown to be beneficial for the region of South Yorkshire, where there are strong links between universities, private initiatives and public institutions that favour the creation of knowledge for developing new practices. Ackermann & Eden (2011) recommended the use of stakeholder theory to understand the groups and then the top management can be able to incorporate more strategies from the literature and applying them to real situations.
- *RBV opportunities.* Although they mentioned having limited monetary resources to invest or develop more practices in their organisations, they also emphasised that they agreed that in the long term it would help their organisations to increase their profits. Both regions are in an ideal geographical location for implementing strategies aimed at the optimisation of distribution routes since these regions both have excellent connections within the region and with other regions. On the other hand, industries in the Yucatan region have enormous potential to take advantage of cleaner energies due to its privileged warm climate that provides sunshine throughout most of the year. Participants from this region constantly mentioned their interest in solar panels. There is still a little fear of implementing such innovations that are still entering

the market in the region, but this represents a potential opportunity as the presence of more and more competitors in that market is causing prices to fall.

- *Agency opportunities.* Another opportunity equally mentioned by the interviewees that can help to expand the scale of implementations by organisations is the inclusion of more significant legal filters, both coercive as well as those offering compelling benefits. An understanding of the main conflicts of the different groups in every firm can also help to shape the strategies to improve the performance.
- *Institutional opportunities.* The South Yorkshire region, on the other hand, has the strength of greater administrative controls that allow it to constantly adapt to changes in the markets. It attaches greater importance to legality, transparency, and ethics, which could be a powerful factor in encouraging implementation of more practices among suppliers in regions such as Yucatan. Although coercive measures seem to be the most effective institutional pressure for the implementation of CE practices in the regions, a revision of the normative certifications and encouragement for International accreditations such as ISO 9001 and ISO 14001 has also shown potential to incentivise companies and has helped them to progress in their supply chain processes.

8.4. Incentives to Implement practices.

The purpose of this section is to understand finally how the previous findings can help the organisations to implement more practices and what incentives can be effective in different contexts, such as economic, social and regulatory.

- *Economic.* On the economic side, the incentives found in the interviewees' narratives refer to greater certainty about how implementation can contribute to greater gains for the organisation. This could be addressed by giving numerical results about how the reduction of resources will directly affect the companies' profits; for example, reducing the electricity needed in production, the amount of material used, obtaining recycled materials that are cheaper than virgin raw materials, among others.
- *Social.* Regarding social issues, the participants stated that the current resistance to introduction of new implementations, both at the top levels of the

organisation and among the employees, is one of the greatest challenges to be overcome. Therefore, it is important to generate strategies to include staff in decision making, as well as to provide clear evidence on how these implementations can help improve their work environment, their profits or their future, since attempting to implement these practices without the engagement of staff can reduce their potential impact.

- *Regulatory.* In relation to regulatory interventions, greater controls are required in the supply chain, to avoid waste of potentially useful materials. This requires more legislation and more consideration of such issues in the political agenda. Also, flexibility is needed in areas such as Best Before labelling.

8.5. Chapter summary

The aim of this chapter is to evaluate the fulfilment of the objectives set out in chapter 1. Chapter 8 also helped to explain in detail how the other chapters contributed to provide information and were linked with each of the objectives.

The comparison between regions suggested Yucatan/South Yorkshire, was analysed in terms of Institutional pressures, stakeholders influence, resources, and agent/principal dynamics. The dynamics between formal/informal trade in different countries seems to influence the application of more CE practices. Important findings were presented in reference to the institutional culture and society. In one region the culture is conducive to implementing more practices, and in the other region it is a hindrance. The results demonstrate that a coercive pressure from local governments would be beneficial to encourage legality in the operations of the firms in special to deal with informal trade and rules. This showed to be an important component for urging companies to employ more CE practice. The availability of physical resources was not a critical factor, but pressure from customers and institutional pressures demonstrated to be more important.

In terms of multi-stakeholder analysis, it was demonstrated that in some cases, the influence of key stakeholders in the decision making was more important and the more decentralised decisions the more the staff was encouraged to increase the good practices. The analysis of different stakeholders responds to a lack of studies on the

subject in the currently available literature. The results obtained during the data collected in the previous chapters can provide the foundation for future research.

CHAPTER 9

SUMMARY, CONCLUSIONS AND FUTURE RECOMMENDATIONS

The intention of the chapter is to summarise the main findings that emerged from this research and compare them with the objectives set in Chapter 1 to explain how these results contributed towards their accomplishment. The contributions to the theory and the practice are summarised, and, finally, the limitations of this research and future directions for study are detailed. **Error! Reference source not found.** presents the Research Map showing the location of the present Chapter in this thesis and the connection with other chapters.

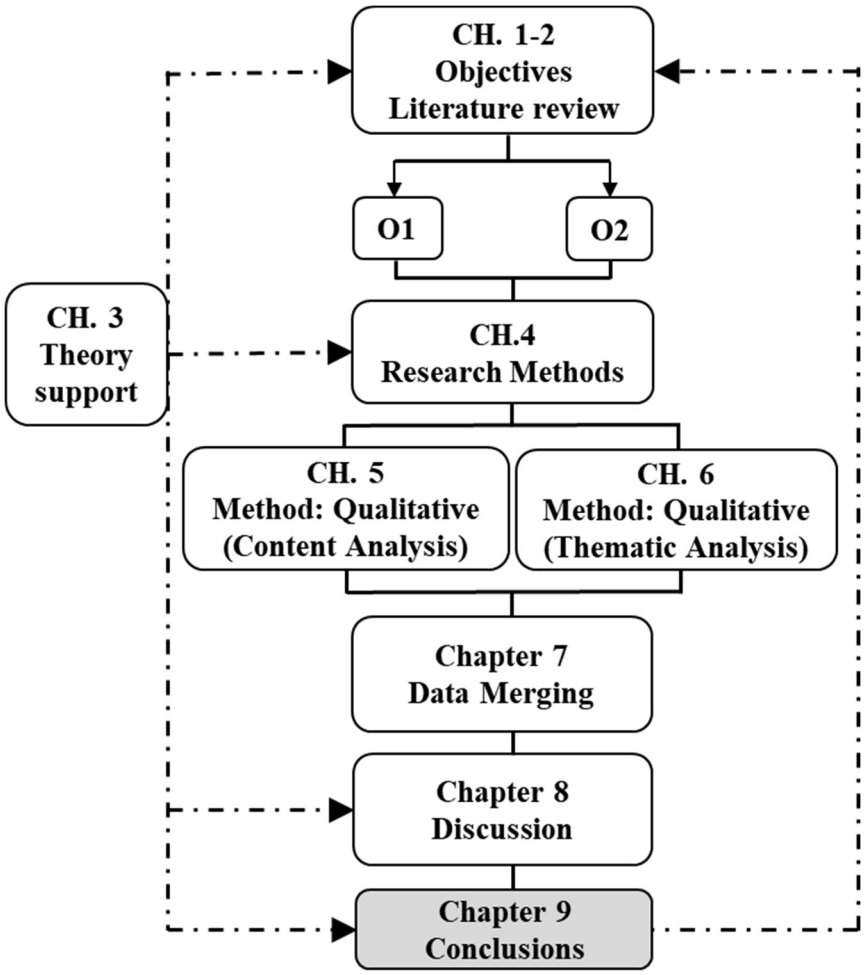


Figure 9.1. Research Map – Conclusions

To determine the outcomes of this chapter it is relevant to recall the four primary objectives which were set for this research. As stated in Chapter, 1 the established objectives were:

> RQ1: Which CE practices are currently being enabled within selected multi-tier and multi-stakeholder supply chains, and to what extent?
> RQ2: What factors can drive or hinder the implementation of CE practices in the selected multi-tier and multi-stakeholder supply chains?

The contribution of the thesis to each of these will be assessed in the subsequent sections.

9.1. Research findings

This thesis used qualitative methods to meet the established goals. Based on a content analysis of organisations' websites, a preliminary exploratory study was carried out to understand the general situation within the studied industries in the selected regions.

This preliminary exploratory study provided an overview of objectives 1 and 2 regarding challenges and opportunities within the current situation, as well as the differences in practices between the two regions. However, the information was found to be insufficient for drawing any conclusions as few organisations have online content and the existing content is very basic.

On that basis, it was considered necessary to conduct in-depth interviews with actors in the supply chain to understand the real situation within the organisations. Therefore, different organisations were contacted from different stages of the supply chain and 40 interviews were conducted with suppliers, customers or actors related to those organisations. A thematic analysis was then carried out inductively to understand the most common narratives of the interviewed actors. Using NVivo V12 software, the interview data were codified, and different categories were obtained to represent each objective more completely, trying not to limit the codes, in order to let them arise more naturally.

From the coding of the interviews, results were obtained for meeting the different objectives. Below, the theoretical contributions and implications of these results are explained.

9.2. Theoretical contributions and implications

The first theoretical contribution offered by the current research relates directly to the systematic literature review conducted in Chapter 2. Most of the recent studies have suggested a need for much more exploration of some of the objectives considered in this thesis. For example, Kirchherr and Santa (2019), who conducted the most recent critique of the research carried out so far in the field of circular economy, highlighted several points that have been addressed in this research.

First, they suggested that there is a lack of empirical work, since only 55% of the studies they analysed were empirical, while 45% were conceptual studies that were not attempting to create theoretical knowledge. This statement confirms the contribution of this research, in which empirical cases were analysed using stakeholders involved in the supply chains of the food and textile industries. This data collection process enabled points of view to be obtained from different actors, in different regions, from those considered in previous studies.

Second, they highlighted the fact that 61% of the articles on CE were very small case studies that were of very limited external use. This thesis, on the other hand, aimed to draw generalisations on the industries studied since this will be of practical use to a greater number of practitioners, as well as laying the theoretical basis to explore specific case studies in each industry in the future.

Third, this study also indicates that the vast majority of existent studies (95%) focused on manufacturing industry. Hence, this thesis contributes by giving different perspectives of diverse actors throughout the supply chain rather than focusing specifically on manufacturing, involving actors from the beginning of the chain as producers and farmers, to actors engaged in post-disposal activities, regulators and government, thereby adopting a holistic approach.

Fourth, the above-mentioned study refers to the lack of studies with a focus on less developed countries, with 95% concentrating on countries with higher levels of development. Such studies would be of little help in understanding the situation in less developed countries and helping them to implement better practices. This thesis explored the challenges facing each of the two studied countries, via different narratives on such as the legislature, climate, cultural and socio-economic factors and

specific problems facing each region. This made the contribution of expanding the research scope to consider opportunities and challenges that may not apply in more developed countries and offering an approach that could be used in similar countries, particularly in Latin America.

Finally, the above-mentioned authors referred to the lack of recommendations for practitioners and policy makers in the existent studies. With this in mind, this chapter provides recommendations for appropriate actions according to the case study results, and for different stakeholders.

Based on the points mentioned above and taking into account that the Kirchherr and Santa (2019) study is one of the most recent in the field, it can be concluded that this research has contributed positively in addressing the gaps identified in the current theoretical framework.

9.3. Practical contributions and implications

The results of analysis of the collected data offer a more holistic understanding of the supply chain, from sourcing of raw materials to post-disposal. This thesis provides a guide for managers of organisations in the Yucatan and South Yorkshire regions on making decisions regarding how to re-evaluate their organisations in order to suggest implementations of the circular economy. Managers can use the current findings to inform decisions on how to motivate, based on the characteristics detected in their organisations.

The first contribution of this thesis concerns creating awareness of the perspectives of different stakeholders, how to forge collaboration among them, understand the influence they could have on the supply chain, and how all can work together for a common goal. In Chapter 2 was suggested to drawn up a map to identify all stakeholders who are in contact with organisations in a circular supply chain, to gain better understanding of the current picture and to take care not to lose sight of the interests of the various groups. Following the same process in the organisations will facilitate the task of developing business and operational relationships that will help the organisation to incorporate new and improved standard practices.

The second contribution is the study's identification of the most significant challenges and opportunities found in each region. In chapters 5 and 6, the most significant

narratives from the organisations obtained online and through interviews were explained and classified accordingly to get different themes. The findings between the narratives obtained online and the ones obtained in the interviews were compared in Chapter 7 and finally classified accordingly in Chapter 8 to understand how these challenges and opportunities can be applied in practice by using previous theoretical knowledge of the interaction between organisations.

Based on this enhanced knowledge, companies can develop strategies that are more precisely directed towards successful implementation of new practices.

The third and final practical contribution is about knowing the practices implemented in each region and how to learn from the best of them.

9.4. Research Limitations and Future Research Directions

This thesis has several limitations concerning the methods, theories and samples used. The following limitations should be considered for future researches:

First, this thesis used qualitative methods to obtain in-depth views of the different actors in the supply chain. Although some figures were presented in discussing the practices and narratives, the use of quantitative data to generate numerical results. Such information could provide detail to complement the qualitative results.

Second, an inductive approach was adopted to understand the most frequent narratives, as no previous studies existed on the selected regions. Future studies could use the knowledge provided in this research as a guide for generating future data using a deductive approach.

Third, four corresponding theories were suggested to understand and analyse the organisations holistically in terms of the factors that influence opportunities and challenges in organisations. However, other theories could analyse points of view not considered in this thesis and thus contribute factors that have not been taken into account in this research.

Fourth, the sample for this research was obtained using the snowball technique to obtain interviews with different stakeholders. At least five different stakeholder groups were sought in each supply chain studied in order to obtain different perspectives. Although the number of interviews was sufficient to obtain a significant amount of

necessary information, there are still many points of view from different stakeholders that it was not possible to obtain, for example, those of raw material producers. Therefore, for future research, it is recommended to consider different stakeholders than those examined in this thesis.

Fifth and finally, this thesis aims to understand the supply chain in a general way in the food and textile industries, so future research could conduct micro studies with specific focus on an organisation and its stakeholders in one of those industries or focus on other industries.

This thesis was inspired by the need to understand the research problem in relation to specific regions and industries and to generate knowledge in a research field where no study has yet been done. Therefore, based on the previous points, this research suggests the following action points for future research:

i. Conduct quantitative studies to complement the narratives and themes that emerged from this research. This may be achieved through using surveys, statistics or numerical models to complement the information presented.
ii. Apply different theories for the analysis of the data obtained to help understand the models used and points of view not studied in this research. Some theories can add interesting point of views, for instance Resource dependence theory that analyse how external resources of organisations influence their actions, Stewardship theory to complement Agency Theory or even Contingency theory to deal with constrained organisations and to understand how they can maximise their performance by reducing the effects of variable environmental and internal limitations.
iii. As a priority, different stakeholder groups should be involved to broaden the range of perspectives considered such as producers, wholesalers, politicians, diverse regulators and more.
iv. Perform studies in different regions or industries to understand the opportunities and challenges in different parts of the world and thereby contribute to developing practices in those places. This research can assist in special as a point of comparison with other regions located in Latin America or countries with similar human index such as regions in Asia or Africa.

References

Abbey J, Meloy M, Guide D, Atalay S. (2015). 'Remanufactured products in closed-loop supply chains for consumer goods'. Production and Operations Management. 24 (3), 488–503.

Abbey, J. D. et al. (2017) 'The Role of Perceived Quality Risk in Pricing Remanufactured Products', Production and Operations Management, 26(1), pp. 100–115. doi: 10.1111/POMS.12628.

Abernathy, F.H. (2000), 'Retailing and supply chains in the information age'. Technology in Society, Vol. 22, pp. 5-31.

Accorsi, R; Manzini, R; Pini, C; Penazzi, P. (2016). 'On the design of closed-loop networks for product life cycle management: Economic, environmental and geography considerations'. Journal of Transport Geography. 48 (1), 121–134.

Ackermann, F. & Eden, C., (2011). Strategic Management of Stakeholders: Theory and Practice. Long Range Planning, 44(3), pp.179–196. Available at: http://www.sciencedirect.com/science/article/pii/S0024630110000452 [Accessed April 12, 2017].

Advanced Textiles Source (2017). 'What "going circular" means for the apparel and textile industry'. Available at: http://advancedtextilessource.com/2017/02/10/what-going-circular-means-for-the-apparel-and-textile-industry/ [Accessed April 17, 2017].

Agee, J. (2009) 'Developing qualitative research questions: A reflective process', International Journal of Qualitative Studies in Education, 22(4), pp. 431–447. doi: 10.1080/09518390902736512.

Ahmadzadeh, E. & Vahdani, B., (2017). A location-inventory-pricing model in a closed loop supply chain network with correlated demands and shortages under a periodic review system. Computers & Chemical Engineering, 101, pp.148–166. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0098135417300911 [Accessed August 23, 2017].

Ali, S.H., (2017). The ecology of diamond sourcing: from mined to synthetic gems as a sustainable transition. Journal of Bioeconomics, 19(1), pp.115–126. Available at: http://link.springer.com/10.1007/s10818-016-9241-8 [Accessed August 10, 2017].

Allwood, J.M., et al. (2006). 6.Well Dressed? The Present and Future Sustainability of Clothing and Textiles in the United Kingdom. University of Cambridge, Institute for Manufacturing, Cambridge, UK.

Amin, S. H. and Zhang, G. (2012) 'A proposed mathematical model for closed-loop network configuration based on product life cycle', The International Journal of Advanced Manufacturing Technology. Springer-Verlag, 58(5–8), pp. 791–801. doi: 10.1007/s00170-011-3407-2.

Amin, S.H., Zhang, G. & Akhtar, P., (2017). Effects of uncertainty on a tire closed-loop supply chain network. Expert Systems with Applications, 73, pp.82–91. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0957417416306996 [Accessed August 25, 2017].

Andrews, (1971). 'The concept of corporate strategy' Homewood, Ill., Dow Jones-Irwin.

Andrews, E. et al., (2009). Life Cycle Attribute Assessment. Journal of Industrial Ecology, 13(4), pp.565–578. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2009.00142.x [Accessed August 10, 2017].

Ashayeri, J., Ma, N. and Sotirov, R. (2015) 'The redesign of a warranty distribution network with recovery processes', Transportation Research Part E: Logistics and Transportation Review, 77, pp. 184–197. doi: 10.1016/j.tre.2015.02.017.

Ashton, T. S., (1997). 'The Industrial Revolution 1760-1830'. OUP Catalogue, Oxford University Press, number 9780192892898.

Ashton, W., (2008). Understanding the organisation of industrial ecosystems: A social network approach. Journal of Industrial Ecology, 12(1), pp.34–51.

Aydin, R., Kwong, C.K. and Ji, P. (2016) 'Coordination of the closed-loop supply chain for product line design with consideration of remanufactured products', Journal of Cleaner Production, 114, pp. 286–298.

Backhouse C., Clegg A, Staikos T (2004). Reducing the environmental impacts of metal castings through life-cycle management. Progress in Industrial Ecology, An International Journal (PIE), Vol. 1, No. 1/2/3, 2004

Bansal, Pratima ; McKnight, Brent (2009). Looking forward, pushing back and peering sideways : analyzing the sustainability of industrial symbiosis. The journal of supply chain management : a global review of purchasing and supply. Hoboken, NJ : Wiley-Blackwell, ISSN 1523-2409, ZDB-ID 14635690. - Vol. 45.2009, 4, p. 26-37

Basu, A., Lal, R., Srinivasan, V., & Staelin, R. (1985) Sales- force compensation plans: An agency theoretic perspective. Marketing Science, 4, 267-291

Bauwens, T., Hekkert, M. and Kirchherr, J. (2020) 'Circular futures: What Will They Look Like?', Ecological Economics. Elsevier, 175(April), p. 106703. doi: 10.1016/j.ecolecon.2020.106703.

Berlanstein, Lenard R., ed. (1992). 'The Industrial Revolution and work in nineteenth-century Europe'. London and New York: Routledge.

Bhattacharjee, S. & Cruz, J., (2015). Economic sustainability of closed loop supply chains: A holistic model for decision and policy analysis. Decision Support Systems, 77, pp.67–86. Available at: http://dx.doi.org/10.1016/j.dss.2015.05.011.

Bimpizas-Pinis, M., Bozhinovska, E., Genovese, A., Lowe, B., Pansera, M., Alberich, J. P., & Ramezankhani, M. J. (2021). Is efficiency enough for circular economy?. Resour Conserv Recycl, 167, 105399.

Blomsma, F. and Brennan, G. (2017) 'The Emergence of Circular Economy: A New Framing Around Prolonging Resource Productivity', Journal of Industrial Ecology, 21(3), pp. 603–614. doi: 10.1111/jiec.12603.

Borrello, M. et al., (2017). Consumers' perspective on circular economy strategy for reducing food waste. Sustainability (Switzerland), 9(1).

Braungart M and McDonough W (2002). 'Cradle to Cradle. Remaking the Way, We Make Things (Patterns of the Planet)'.

Briggs, D. (2003). 'Environmental pollution and the global burden of disease. British Medical Bulletin'. 68 (1), 1-24.

Bruce M., Daly L. and Towers N. (2004) 'Lean or agile: A solution for supply chain management in the textiles and clothing industry?', International Journal of Operations & Production Management, 24(2), pp. 151–170.

Bryman, A. & Bell, E. (2015). Business Research Methods. Oxford: Oxford University Press.

Cadarso, M.-Á. et al., (2012). International trade and shared environmental responsibility by sector. An application to the Spanish economy. Ecological Economics, 83, pp.221–235. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800912002224 [Accessed August 10, 2017].

Cannella S, Bruccolerib M, Framinana JM. (2016). 'Closed-loop supply chains: What reverse logistics

factors influence performance?'. International Journal of Production Economics. 175 (1), 35–49.

Cardoso, S. R., Barbosa-Póvoa, A. P. and Relvas, S. (2016) 'Integrating financial risk measures into the design and planning of closed-loop supply chains', Computers & Chemical Engineering, 85, pp. 105–123. doi: 10.1016/j.compchemeng.2015.10.012.

Cerdas, F., Kurle, D., Andrew, S., Thiede, S., Herrmann, C., Zhiquan, Y., Jonathan, L.S.C., Bin, S. and Kara, S. (2015) 'Defining circulation factories – A pathway towards factories of the future, Procedia CIRP, 29, pp. 627–632.

Chavez, A. et al., 2012. Implementing Trans-Boundary Infrastructure-Based Greenhouse Gas Accounting for Delhi, India. Journal of Industrial Ecology, 16(6), pp.814–828. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2012.00546.x [Accessed August 10, 2017].

Chen, H., Liu, N. and He, Y. (2016) 'Remanufacturing of electronic products in bonded port area across home and foreign markets', The International Journal of Logistics Management, 27(2), pp. 309–334.

Cheng, H. G. and Phillips, M. R. (2014) 'Secondary analysis of existing data: opportunities and implementation', Shanghai Archives of Psychiatry, 26(6), pp. 371–375. doi: 10.11919/j.issn.1002-0829.214171.

Chouinard, Y. & Brown, M.S., 1997. Going Organic: Converting Patagonia's Cotton Product Line. Journal of Industrial Ecology, 1(1), pp.117–129. Available at: http://doi.wiley.com/10.1162/jiec.1997.1.1.117 [Accessed August 10, 2017].

Chung, W.-H., Okudan Kremer, G. E. and Wysk, R. A. (2013) 'A Modular Design Approach to Improve Product Life Cycle Performance Based on the Optimization of a Closed-Loop Supply Chain', Journal of Mechanical Design. American Society of Mechanical Engineers, 136(2), p. 21001. doi: 10.1115/1.4025022.

Circular Economy Club (n.d), Most Countries In Latin America Will Be Water Scarce by 2025 - Circular Economy Club. Available at: http://www.circulareconomyclub.com/most-countries-in-latin-america-will-be-water-scarce-by-2025/ [Accessed April 13, 2017].

Clancy, G., Fröling, M. and Peters, G. (2015) 'Ecolabels as drivers of clothing design', Journal of Cleaner Production, 99, pp. 345–353. doi: 10.1016/j.jclepro.2015.02.086.

Clark, S.S. & Chester, M. V., 2017. A Hybrid Approach for Assessing the Multi-Scale Impacts of Urban Resource Use: Transportation in Phoenix, Arizona. Journal of Industrial Ecology, 21(1), pp.136–150. Available at: http://doi.wiley.com/10.1111/jiec.12422 [Accessed August 10, 2017].

Clegg, A. (2015). 'Imagine a world without waste: it's possible with a circular economy'. Available at: https://www.theguardian.com/sustainable-business/2015/sep/24/circular-economists-wasteful-manufacturing. Last accessed 07th Jan 2017

Clough P., Nutbrown C. (2012). A student's guide to Methodology. London: SAGE, 2012 3rd ed. ISBN: 9781446208625; ISBN: 144620862

Co, H. C. and Barro, F. (2009) 'Stakeholder theory and dynamics in supply chain collaboration', International Journal of Operations and Production Management, 29(6), pp. 591–611. doi: 10.1108/01443570910957573.

Cobb, B. (2016). 'Inventory control for returnable transport items in a closed-loop supply chain'. Transportation Research Part E: Logistics and Transportation Review. 86 (1), 53-68.

Corder, G.D., Golev, A. & Giurco, D., (2015). "Wealth from metal waste": Translating global knowledge on industrial ecology to metals recycling in Australia. Minerals Engineering, 76, pp.2–9. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0892687514003707 [Accessed August 10, 2017].

Costanza, R. & Daly, H.E., (1992). 'Natural Capital and Sustainable Development'. Conservation Biology, 6(1), pp.37–46. Available at: http://doi.wiley.com/10.1046/j.1523-1739.1992.610037.x [Accessed April 13, 2017]

Courtonne, J.-Y. et al., (2016). Environmental Pressures Embodied in the French Cereals Supply Chain. Journal of Industrial Ecology, 20(3), pp.423–434. Available at: http://doi.wiley.com/10.1111/jiec.12431 [Accessed August 10, 2017].

Cowton, C. J. (1998) 'The use of secondary data in business ethics research', Journal of Business Ethics, 17(4), pp. 423–434. doi: 10.1023/A:1005730825103.

Crotty, J. & Smith, M., (2006). Strategic Responses to Environmental Regulation in the U. K. Automotive Sector Directive and the Porter Hypothesis. Journal of Industrial Ecology, 10(4), pp.95–111.

Crotty, M., (1998). 'Foundations of social research: Meaning and Perspective in the Research Process´. p.256.

Daft R. (2015). Organization Theory and Design. Australia: South-Western, 2015 Twelfth edition.

Dahlström, K. & Ekins, P., (2007). Combining economic and environmental dimensions: Value chain analysis of UK aluminium flows. Resources, Conservation and Recycling, 51(3), pp.541–560. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344906002540 [Accessed August 10, 2017].

Dalhammar, C. (2016) 'Industry attitudes towards ecodesign standards for improved resource efficiency', Journal of Cleaner Production, 123, pp. 155–166.

Das K, Posinasettib N. (2015). 'Addressing environmental concerns in closed loop supply chain design and planning'. International Journal of Production Economics. 163 (1), 34–47.

David Briggs. (2003). 'Environmental pollution and the global burden of disease. British Medical Bulletin'. 68 (1), 1-24.

Davis, C., Nikolíc, I. & Dijkema, G.P.J., 2009. Integration of life cycle assessment into agent-based modeling toward informed decisions on evolving infrastructure systems. Journal of Industrial Ecology, 13(2), pp.306–325.

De Giovanni, P. (2014). 'Environmental collaboration in a closed-loop supply chain with a reverse revenue sharing contract'. Annals of Operations Research, 220(1), pp.135–157.

De Giovanni, P. (2017) 'Closed-loop supply chain coordination through incentives with asymmetric information', Annals of Operations Research. Springer US, 253(1), pp. 133–167. doi: 10.1007/s10479-016-2334-x.

De Jesus, A. and Mendonça, S. (2018) 'Lost in Transition? Drivers and Barriers in the Eco-innovation Road to the Circular Economy', Ecological Economics. Elsevier, 145(December 2016), pp. 75–89. doi: 10.1016/j.ecolecon.2017.08.001.

Demirel, N.. et al., (2014). 'A genetic algorithm approach for optimising a closed-loop supply chain network with crisp and fuzzy objectives'. International Journal of Production Research, 52(12), pp.3637–3664. Available at: http://www.scopus.com/inward/record.url?eid=2-s2.0-84898044226&partnerID=40&md5=f015478664dce1685541ac3a6945dd33.

Demski, J., & Feltham, G. (1978) Economic incentives in budgetary control systems. Accounting Review, 53, 336-359.

Densley Tingley, D., Cooper, S. & Cullen, J., 2017. Understanding and overcoming the barriers to structural steel reuse, a UK perspective. Journal of Cleaner Production, 148, pp.642–652. Available at: http://linkinghub.elsevier.com/retrieve/pii/S095965261730210X [Accessed August

10, 2017].

Despeisse, M. et al., 2017. Unlocking value for a circular economy through 3D printing: A research agenda. Technological Forecasting and Social Change, 115, pp.75–84. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0040162516303341 [Accessed August 10, 2017].

Dev, N.K., Shankar, R. & Choudhary, A., 2017. Strategic design for inventory and production planning in closed-loop hybrid systems. International Journal of Production Economics, 183, pp.345–353. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527316301220 [Accessed August 23, 2017].

Dey, P. K., Malesios, C., De, D., Budhwar, P., Chowdhury, S., & Cheffi, W. (2020). Circular economy to enhance sustainability of small and medium-sized enterprises. Business Strategy and the Environment, 29(6), 2145-2169.

Di Maio, F. et al., 2017. Measuring resource efficiency and circular economy: A market value approach. Resources, Conservation and Recycling, 122, pp.163–171. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344917300447 [Accessed August 10, 2017].

Doherty, A. M., Chen, X., & Alexander, N. (2014). The franchise relationship in China: agency and institutional theory perspectives. European Journal of Marketing.

Donaldson, T. and Preston, L. E. E. E. (2020) 'The Stakeholder Theory of the Corporation : Concepts , Evidence , and Implications Author (s): Thomas Donaldson and Lee E . Preston Source : The Academy of Management Review , Vol . 20 , No . 1 (Jan ., 1995), pp . 65-91 Published by : Academy of Manag', 20(1), pp. 65–91.

Dubey, R., Gunasekaran, A., Childe, S. J., Blome, C., & Papadopoulos, T. (2019). Big data and predictive analytics and manufacturing performance: integrating institutional theory, resource-based view, and big data culture. British Journal of Management, 30(2), 341-361.

Duh, M. (2010). Applying Agency Theory and the Resource-Based View in explaining performance differences between family and Non-family businesses. Society of Economists Maribor, 45-52

Early, C. et al., 2009. Informing packaging design decisions at Toyota Motor sales using life cycle assessment and costing. Journal of Industrial Ecology, 13(4), pp.592–606.

Egerton-Read, S. and Iles, J. (2017). 'New textile fibre is created using cotton scraps and wood'. Seb Egerton-Read. Available at: http://circulatenews.org/2017/02/new-textile-fibre-created-using-cotton-scraps-wood/. Last accessed 9th Jan 2017).

Eisenhardt, K. M. (1988). Agency-and institutional-theory explanations: The case of retail sales compensation. Academy of Management journal, 31(3), 488-511.

Eisenhardt, K. M. (2018) 'Linked references are available on JSTOR for this article : Agency Theory : An Assessment and Review', 14(1), pp. 57–74.

Ellen MacArthur Foundation (2015) 'About the Ellen MacArthur foundation'. Available at: https://www.ellenmacarthurfoundation.org/about. Last accessed 9th Feb 2017).

Ellen MacArthur Foundation (2019a). 'Mission'. [Online]. Available from: https://www.ellenmacarthurfoundation.org/our-story/mission. Accesed: 26 July 2019.

Eraˇ G Pinçe, Ç., Ferguson, M. and Toktay, B. (no date) 'Extracting Maximum Value from Consumer Returns: Allocating Between Remarketing and Refurbishing for Warranty Claims'. Available at: http://www.prism.gatech.edu/~bt71/articles/ExtractingMaximumValue.pdf (Accessed: 19 August 2017).

Erez, E. S., Zhitomirsky-Geffet, M. and Bar-Ilan, J. (2015) 'Subjective vs. objective evaluation of ontological statements with crowdsourcing', Proceedings of the Association for Information

Science and Technology. John Wiley and Sons Inc., 52(1), pp. 1–4. doi: 10.1002/pra2.2015.145052010068.

Escobar LF., Vredenburg H., (2011). Multinational Oil Companies and the Adoption of Sustainable Development: A Resource-Based and Institutional Theory Interpretation of Adoption Heterogeneity. Journal of Business Ethics 98(1):39-65

European Commission (2011). 'Roadmap to a resource efficient Europe'. COM(2011) 571 final. Brussels: European Commission.

European environment agency. (2016). 'Circular economy to have considerable benefits, but challenges remains'. Available: https://www.eea.europa.eu/highlights/circular-economy-to-have-considerable. Last accessed 01st March 2017

Fahimnia, B., Sarkis, J., Dehghanian, F., Banihashemi, N. and Rahman, S. (2013) 'The impact of carbon pricing on a closed-loop supply chain: An Australian case study', Journal of Cleaner Production, 59, pp. 210–225.

Fama, E. (1980) Agency problems and the theory of the firm. Journal of Political Economy, 88, 288-307.

Fayezi, S., O'Loughlin, A. and Zutshi, A. (2012), "Agency theory and supply chain management: a structured literature review", Supply Chain Management: An International Journal, Vol. 14 No. 5, pp. 556-570.

Federal Ministry of Environment, Nature Conservation, B. and N. S. (2006) 'Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (Kreislaufwirtschafts- und Abfallgesetz - KrW- / AbfG)', 1994(December), p. 46.

Fernandez Mendoza, JM, Sharmina, M, Gallego Schmid, A, Heyes, G & Azapagic, A 2017, 'Integrating Backcasting and Eco-design for the Circular Economy: The BECE Framework' Journal of Industrial Ecology. DOI: 10.1111/jiec.12590

Fischer, A. & Pascucci, S., 2017. Institutional incentives in circular economy transition: The case of material use in the Dutch textile industry. Journal of Cleaner Production, 155, pp.17–32. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652616320935 [Accessed August 10, 2017].

Fleischmann, M., van Nunen, J. & Gräve, B., 2003. Integrating Closed-loop Supply Chains and Spare Parts Management at IBM. Interfaces, 33(6), pp.44–56. Available at: http://repub.eur.nl/pub/258/erimrs20021125175235.pdf.

Food and Agriculture Organization of the United Nations (n.d.). 'FAO's role in food losses and waste'. Available at: http://www.fao.org/food-loss-and-food-waste/en/ (Last accessed: 17-April-2017)

Food and Agriculture Organization of the United Nations, (2012). The State of Food Insecurity in the World 2012. http://www.fao.org/home/en/ Last accessed 15th June 2016

Foster, J. B. (1999). Marx's theory of metabolic rift: Classical foundations for environmental sociology. American journal of sociology, 105(2), 366-405.

Franco, M. A. (2017) 'Circular economy at the micro level: A dynamic view of incumbents' struggles and challenges in the textile industry', Journal of Cleaner Production, pp. 833–845. doi: 10.1016/j.jclepro.2017.09.056.

Freeman, R. E. (2010). Strategic Management: A Stakeholder Approach. Cambridge: Cambridge University Press.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. & de Colle, S. (2010). Stakeholder Theory:

The State of the Art. Cambridge: Cambridge University Press.

Friedman, A.L. & Miles, S., 2006. Stakeholders: theory and practice, Oxford University Press. Available at: https://books.google.co.uk/books?id=ITD8VWJGOYYC&dq=stakeholders+theory&lr= [Accessed April 12, 2017].

Fry, J. et al., 2016. An Australian Multi-Regional Waste Supply-Use Framework. Journal of Industrial Ecology, 20(6), pp.1295–1305. Available at: http://doi.wiley.com/10.1111/jiec.12376 [Accessed August 10, 2017].

Galve, J. et al. (2016) 'Sustainable Supply Chain Management: The Influence of Disposal Scenarios on the Environmental Impact of a 2400 L Waste Container', Sustainability. Multidisciplinary Digital Publishing Institute, 8(6), p. 564. doi: 10.3390/su8060564.

Gao, F. et al., 2009. Life cycle assessment of primary magnesium production using the Pidgeon process in China. The International Journal of Life Cycle Assessment, 14(5), pp.480–489. Available at: https://doi.org/10.1007/s11367-009-0101-9.

Gao, J. et al., 2016. Pricing and effort decisions in a closed-loop supply chain under different channel power structures. Journal of Cleaner Production, 112, pp.2043–2057. Available at: http://dx.doi.org/10.1016/j.jclepro.2015.01.066.

Geissdoerfer, M. et al. (2017) 'The Circular Economy – A new sustainability paradigm?', Journal of Cleaner Production. Elsevier Ltd, 143, pp. 757–768. doi: 10.1016/j.jclepro.2016.12.048.

Gemechu, E.D. et al., 2016. Import-based Indicator for the Geopolitical Supply Risk of Raw Materials in Life Cycle Sustainability Assessments. Journal of Industrial Ecology, 20(1), pp.154–165. Available at: http://doi.wiley.com/10.1111/jiec.12279 [Accessed August 10, 2017].

Geng, Y. & Doberstein, B. (2008). Developing the circular economy in China: Challenges and opportunities for achieving "leapfrog development. International Journal of Sustainable Development & World Ecology 15 (2008), pp. 231–239.

Genovese, A., & Pansera, M. (2021). The circular economy at a crossroads: technocratic eco-modernism or convivial technology for social revolution?. Capitalism Nature Socialism, forthcoming.

Genovese, A., Acquaye, A.A., Figueroa, A. and Koh, S.C.L. (2017) 'Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications', Omega, 66, pp. 344–357.

Genovese, A., Lenny Koh, S. C. and Acquaye, A. (2013) 'Energy efficiency retrofitting services supply chains: Evidence about stakeholders and configurations from the Yorskhire and Humber region case', International Journal of Production Economics. Elsevier, 144(1), pp. 20–43. doi: 10.1016/j.ijpe.2012.12.019.

Georgiadis, P. and Vlachos, D. (2004) 'The effect of environmental parameters on product recovery', European Journal of Operational Research, 157(2), pp. 449–464. doi: 10.1016/S0377-2217(03)00203-0.

Gerber, L., Fazlollahi, S. & Maréchal, F., 2013. A systematic methodology for the environomic design and synthesis of energy systems combining process integration, Life Cycle Assessment and industrial ecology. Computers & Chemical Engineering, 59, pp.2–16. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0098135413001890 [Accessed August 10, 2017].

Geyer, R. et al., 2007. Time-dependent material flow analysis of iron and steel in the UK. Resources, Conservation and Recycling, 51(1), pp.101–117. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344906001832 [Accessed August 10, 2017].

Ghadge, A. et al. (2016) 'Facility location for a closed-loop distribution network: a hybrid approach', International Journal of Retail & Distribution Management. Emerald Group Publishing Limited , 44(9), pp. 884–902. doi: 10.1108/IJRDM-07-2015-0094.

Ghauri, P.N. and Grønhaug, K. (2005) Research methods in business studies: A practical guide. Available at: https://books.google.co.uk . Last accessed 26th Jan 2016

Ghauri, P.N. and Grønhaug, K. (2005) Research methods in business studies: A practical guide. Available at: https://books.google.co.uk . Last accessed 26th Jan 2016

Ghisellini et al (2016) 'A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems'. Journal of Cleaner Production, 114, pp. 11–32.

Ghisellini, P. and Ulgiati, S. (2020) 'Circular economy transition in Italy. Achievements, perspectives and constraints', Journal of Cleaner Production. Elsevier Ltd, 243, p. 118360. doi: 10.1016/j.jclepro.2019.118360.

Ghisolfi, V. et al. (2017) 'System dynamics applied to closed loop supply chains of desktops and laptops in Brazil: A perspective for social inclusion of waste pickers', Waste Management, 60, pp. 14–31. doi: 10.1016/j.wasman.2016.12.018.

Gilbert, P., Wilson, P., Walsh, C. and Hodgson, P. (2017) 'The role of material efficiency to reduce CO emissions during ship manufacture: A life cycle approach', Marine Policy, 75, pp. 227–237.

Gillis W., Combs J., (2009). Beyond Agency Theory: A Resource-Based Explanation for franchising and franchisor performance. Academy of Management Proceedings. 1–6.

Gimenez, C. and Tachizawa, E.M. (2012) 'Extending sustainability to suppliers: A systematic literature review', Supply Chain Management: An International Journal, 17(5), pp. 531–543.

Goktan, A. B. (2014) 'Impact of Green Management on CEO Compensation: Interplay of the Agency Theory and Institutional Theory perspectives. Journal of Business Economics and Management 15(1):96-110

Gold, S., Kunz, N. & Reiner, G., 2017. Sustainable Global Agrifood Supply Chains: Exploring the Barriers. Journal of Industrial Ecology, 21(2), pp.249–260. Available at: http://doi.wiley.com/10.1111/jiec.12440 [Accessed August 10, 2017].

Golev, A. & Corder, G., 2015. Typology of Options for Metal Recycling: Australia's Perspective. Resources, 5(1), p.1. Available at: http://www.mdpi.com/2079-9276/5/1/1.

Gonela, V., Zhang, J. & Osmani, A., 2015. Stochastic optimization of sustainable industrial symbiosis based hybrid generation bioethanol supply chains. Computers & Industrial Engineering, 87, pp.40–65. Available at: http://linkinghub.elsevier.com/retrieve/pii/S036083521500203X [Accessed August 10, 2017].

Govindan, K. and Hasanagic, M. (2018) 'A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective', International Journal of Production Research. Taylor & Francis, 56(1–2), pp. 278–311. doi: 10.1080/00207543.2017.1402141.

Govindan, K., Soleimani, H. & Kannan, D., (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. European Journal of Operational Research, 240(3), pp.603–626. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0377221714005633 [Accessed August 10, 2017].

Govindan, K; Jahn, PC; Garg K. (2016). 'Product recovery optimization in closed-loop supply chain to improve sustainability in manufacturing'. International Journal of Production Research. 54 (5), 1463-1486

Govindana K., Soleimanib H., Kannanc D.. (2015). 'Reverse logistics and closed-loop supply chain:

A comprehensive review to explore the future'. European Journal of Operational Research. 240 (3), 603–626.

Grant, D. B. and Banomyong, R. (2010) 'Design of closed-loop supply chain and product recovery management for fast-moving consumer goods', Asia Pacific Journal of Marketing and Logistics. Emerald Group Publishing Limited, 22(2), pp. 232–246. doi: 10.1108/13555851011026971.

Greyson, J., 2007. An economic instrument for zero waste, economic growth and sustainability. Journal of Cleaner Production, 15(13), pp.1382–1390. Available at: http://www.sciencedirect.com/science/article/pii/S0959652606002733 [Accessed April 13, 2017].

Guest, G. and Mclellan, E. (2010) 'Field Methods Distinguishing the Trees from the Forest ':, Field Methods, 15(2). doi: 10.1177/1525822X03251188.

Guimarães, L.R., Junior, J.E.P. & Vieira, D.R., 2013. Effectiveness of SLA Project with Spare Parts Management: The case of a telecom equipment industry. The Journal of Modern Project Management, 1(2). Available at: http://journalmodernpm.com/index.php/jmpm/article/view/32 [Accessed August 25, 2017].

Gupta, A. & Evans, G.W., 2009. A goal programming model for the operation of closed-loop supply chains. Engineering Optimization, 41(8), pp.713–735.

Guptaa S., Palsule-Desaic O. (2011). 'Sustainable supply chain management: Review and research opportunities'. IIMB Management Review. 23 (4), 234–245.

Gusmerotti, N. M. et al. (2019) 'Drivers and approaches to the circular economy in manufacturing firms', Journal of Cleaner Production. Elsevier Ltd, 230, pp. 314–327. doi: 10.1016/j.jclepro.2019.05.044.

Guthrie, J. and Abeysekera, I. (2006) 'Content analysis of social, environmental reporting: what is new?', Journal of Human Resource Costing & Accounting, 10(2), pp. 114–126. doi: 10.1108/14013380610703120.

Hagelüken, C. & Corti, C.W., 2010. Recycling of gold from electronics: Cost-effective use through "Design for Recycling." Gold Bulletin, 43(3), pp.209–220. Available at: http://link.springer.com/10.1007/BF03214988 [Accessed August 23, 2017].

Halldorsson, A. et al. (2007) 'Complementary theories to supply chain management', Supply Chain Management, 12(4), pp. 284–296. doi: 10.1108/13598540710759808.

Halog, A., 2009. Models for evaluating energy, environmental and sustainability performance of biofuels value chain. International Journal of Global Energy Issues, 32(1/2), p.83. Available at: http://www.inderscience.com/link.php?id=27975 [Accessed August 10, 2017].

Halstenberg, F.A., Lindow, K. & Stark, R., 2017. Utilization of Product Lifecycle Data from PLM Systems in Platforms for Industrial Symbiosis. Procedia Manufacturing, 8(October 2016), pp.369–376. Available at: http://dx.doi.org/10.1016/j.promfg.2017.02.047.

Han, X., Feng, B. and Pu, X. (2015) 'Modelling decision behaviours in pricing game of closed-loop supply chains', Journal of the Operational Research Society. Palgrave Macmillan UK, 66(6), pp. 1052–1060. doi: 10.1057/jors.2014.77.

Hasani, A., Zegordi, S.H. & Nikbakhsh, E., 2015. Robust closed-loop global supply chain network design under uncertainty: the case of the medical device industry. International Journal of Production Research, 53(5), pp.1596–1624. Available at: http://www.tandfonline.com/doi/abs/10.1080/00207543.2014.965349 [Accessed August 25, 2017].

Hashemi, V., Chen, M. & Fang, L., 2014. Process planning for closed-loop aerospace manufacturing

supply chain and environmental impact reduction. Computers & Industrial Engineering, 75, pp.87–95. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0360835214001855 [Accessed August 25, 2017].

Haskins, C., 2007. A Systems Engineering Framework for Eco–Industrial Park Formation. Systems Engineering, 10(1), pp.83–97. Available at: http://doi.wiley.com/10.1002/sys.20063 [Accessed August 10, 2017].

Hawkins, T.R. & Matthews, D.H., 2009. A Classroom Simulation to Teach Economic Input−Output Life Cycle Assessment. Journal of Industrial Ecology, 13(4), pp.622–637. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2009.00148.x [Accessed August 10, 2017].

Hawkins, T.R. et al., 2013. Comparative Environmental Life Cycle Assessment of Conventional and Electric Vehicles. Journal of Industrial Ecology, 17(1), pp.53–64.

He, Y. (2017) 'Supply risk sharing in a closed-loop supply chain', International Journal of Production Economics, 183, pp. 39–52. doi: 10.1016/j.ijpe.2016.10.012.

He, Y., (2015). 'Acquisition pricing and remanufacturing decisions in a closed-loop supply chain'. International Journal of Production Economics, 163(September 2014), pp.48–60. Available at: http://dx.doi.org/10.1016/j.ijpe.2015.02.002.

Herold, D. M. (2018) 'E c o n o m i c s , M a n a g e m e n t a n d S u s t a i n a b i l i t y Demystifying the link between institutional theory and stakeholder theory in sustainability reporting', 3, pp. 6–19. doi: 10.14254/jems.2018.3-2.1.

Hesse-Biber S. & Leavy P. (2004). 'Approaches to Qualitative Research, a Reader on Theory and practice'. Oxford University Press. P.17

Heydari, J., Govindan, K. and Jafari, A. (2017) 'Reverse and closed loop supply chain coordination by considering government role', Transportation Research Part D: Transport and Environment, 52, pp. 379–398. doi: 10.1016/j.trd.2017.03.008.

Hitt, M. A. (2011) 'Relevance of strategic management theory and research for supply chain management', Journal of Supply Chain Management, 47(1), pp. 9–13. doi: 10.1111/j.1745-493X.2010.03210.x.

Hong, X, Xu L, Du P. and Wang W. (2015) 'Joint advertising, pricing and collection decisions in a closed-loop supply chain', International Journal of Production Economics, 167, pp. 12–22.

Howell, B. (2021) 'Top 7 Most Polluting Industries', The Eco experts, 29 April. Available at: https://www.theecoexperts.co.uk/blog/top-7-most-polluting-industries (Accessed: 25 May 2021)

Hu, Z.-H. et al., 2014. Sustainable Rent-Based Closed-Loop Supply Chain for Fashion Products. Sustainability, 6(10), pp.7063–7088. Available at: http://www.mdpi.com/2071-1050/6/10/7063/ [Accessed April 17, 2017].

Huaibo, C. (2016) 'Closed Loop Supply Chain Optimization Model of Green Fast Consumer Goods Based on Multi Objective Game Theory', Journal of Computational and Theoretical Nanoscience, 13(11), pp. 7939–7946. doi: 10.1166/jctn.2016.5795.

Humbert, S. et al., 2009. Life cycle assessment of two baby food packaging alternatives: glass jars vs. plastic pots. The International Journal of Life Cycle Assessment, 14(2), pp.95–106. Available at: http://link.springer.com/10.1007/s11367-008-0052-6 [Accessed August 23, 2017].

Hysing, E. (2013). Representative democracy, empowered experts, and citizen participation: Visions of green governing. Environmental politics, 22(6), 955-974.

Iassinovskaia, G., Limbourg, S. & Riane, F., 2017. The inventory-routing problem of returnable

transport items with time windows and simultaneous pickup and delivery in closed-loop supply chains. International Journal of Production Economics, 183, pp.570–582. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527316301323 [Accessed August 23, 2017].

Idris F., Abdullah M., Ashari M., Hussain N. (2003). Integrating resource-based view and stakeholder theory in developing the Malaysian excellence model: a conceptual framework. Singapore Management Review (Vol. 25, Issue 2)

Ignaciuk, P., 2015. Discrete-Time Control of Production-Inventory Systems With Deteriorating Stock and Unreliable Supplies. IEEE Transactions on Systems, Man, and Cybernetics: Systems, 45(2), pp.338–348. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=6882253 [Accessed August 23, 2017].

Instituto Nacional de Estadística y Geografía (2015). 'Mexico en cifras'. Available at: https://www.inegi.org.mx/app/areasgeograficas/?ag=31 Accesed: 08 August 2019

Iriarte, A., Rieradevall, J. & Gabarrell, X., 2012. Transition towards a more environmentally sustainable biodiesel in South America: The case of Chile. Applied Energy, 91(1), pp.263–273. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0306261911005964 [Accessed August 10, 2017].

Irland, L.C., 2007. Developing Markets for Certified Wood Products: Greening the Supply Chain for Construction Materials. Journal of Industrial Ecology, 11(1), pp.201–216. Available at: http://dx.doi.org/10.1162/jiec.2007.1052.

Iung, B. and Levrat, E. (2014) 'Advanced maintenance services for promoting sustainability', Procedia CIRP, (22), pp. 15–22.

Ivanov, D. et al. (2017) 'Minimization of disruption-related return flows in the supply chain', International Journal of Production Economics, 183, pp. 503–513. doi: 10.1016/j.ijpe.2016.03.012.

Jena, S. K. and Sarmah, S. P. (2015) 'Measurement of consumers' return intention index towards returning the used products', Journal of Cleaner Production, 108, pp. 818–829. doi: 10.1016/j.jclepro.2015.05.115.

Jensen, J.P. & Remmen, A., 2017. Enabling Circular Economy Through Product Stewardship. Procedia Manufacturing, 8, pp.377–384. Available at: http://linkinghub.elsevier.com/retrieve/pii/S2351978917300549 [Accessed August 10, 2017].

Jiliang, Z., Chen, Z. and Branch, B. (2013) 'Building and Application of a Circular Economy Index System Frame for Manufacturing Industrial Chain', 5(24), pp. 5646–5651. doi: 10.1007/978-3-642-38445-5_144.

Johannsdottir L. (2014). 'Transforming the linear insurance business model to a closed-loop insurance model: A case study of Nordic non-life insurers'. Journal of Cleaner Production. 83 (15), 341–355.

Kalaitzidou, M. A., Longinidis, P. and Georgiadis, M. C. (2015) 'Optimal design of closed-loop supply chain networks with multifunctional nodes', Computers & Chemical Engineering, 80, pp. 73–91. doi: 10.1016/j.compchemeng.2015.05.009.

Kalmykova, Y., Sadagopan, M., & Rosado, L. (2018). Circular economy - From review of theories and practices to development of implementation tools. Resources, Conservation and Recycling, 135(February 2017), 190–201. https://doi.org/10.1016/j.resconrec.2017.10.034

Kang, K., Wang, X. and Ma, Y. (2017) 'A Collection-Distribution Center Location and Allocation Optimization Model in Closed-Loop Supply Chain for Chinese Beer Industry', Mathematical Problems in Engineering. Hindawi, 2017, pp. 1–15. doi: 10.1155/2017/7863202.

Ketchen, D. J. and Giunipero, L. C. (2004) 'The intersection of strategic management and supply chain management', Industrial Marketing Management, 33(1), pp. 51–56. doi: 10.1016/j.indmarman.2003.08.010.

Ketokivi, M.A. and Schroeder, R.G. (2004), "Strategic, structural contingency and institutional explanations in the adoption of innovative manufacturing practices", Journal of Operations Management, Vol. 22 No. 1, pp. 63-89.

Khan S., Malik A. (2014) Environmental and Health Effects of Textile Industry Wastewater. In: Malik A., Grohmann E., Akhtar R. (eds) Environmental Deterioration and Human Health. Springer, Dordrecht

Khatamia, M; Mahootchib, M; Farahani, R. (2015). 'Benders' decomposition for concurrent redesign of forward and closed-loop supply chain network with demand and return uncertainties'. Transportation Research Part E: Logistics and Transportation Review. 79 (1), 1-21.

Kim, T. and Glock, C. H. (2014) 'On the use of RFID in the management of reusable containers in closed-loop supply chains under stochastic container return quantities', Transportation Research Part E: Logistics and Transportation Review, 64, pp. 12–27. doi: 10.1016/j.tre.2014.01.011.

Kirchherr, J. et al. (2018) 'Barriers to the Circular Economy: Evidence From the European Union (EU)', Ecological Economics. Elsevier, 150(August), pp. 264–272. doi: 10.1016/j.ecolecon.2018.04.028.

Kirchherr, J., Reike, D. and Hekkert, M. (2017) 'Conceptualizing the circular economy: An analysis of 114 definitions', Resources, Conservation and Recycling, 127(April), pp. 221–232. doi: 10.1016/j.resconrec.2017.09.005

Klemes J, Lozano R. (2016). Journal of Cleaner Production. Available: https://www.journals.elsevier.com/journal-of-cleaner-production/. Last accessed 13th Jan 2017.

Kogg, B. & Mont, O., 2012. Environmental and social responsibility in supply chains: The practise of choice and inter-organisational management. Ecological Economics, 83, pp.154–163. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921800911003569 [Accessed August 10, 2017].

Korhonen, J. et al. (2018) 'Circular economy as an essentially contested concept', Journal of Cleaner Production. Elsevier Ltd, 175, pp. 544–552. doi: 10.1016/j.jclepro.2017.12.111.

Kothari, C.R. (2004) 'Research Methodology. Methods and Tecniques'. Available at: http://www2.hcmuaf.edu.vn. Last accessed: 17th Feb 2017.

Krapp, M., Nebel, J. & Sahamie, R., 2013. Using forecasts and managerial accounting information to enhance closed-loop supply chain management. OR Spectrum, 35(4), pp.975–1007. Available at: http://link.springer.com/10.1007/s00291-013-0345-4 [Accessed August 23, 2017].

Krikke H, Bloemhof-Ruwaard J, Wassenhove, L. (2010). 'Concurrent product and closed-loop supply chain design with an application to refrigerators'. International Journal of Production Research. 41 (16), 3689-3719.

Krippendorff, K. (2004). Content analysis. In E. Barnouw, G. Gerbner, W. Schramm, T. L. Worth, & L. Gross (Eds.),International encyclopedia of communication(Vol. 1, pp. 403-407). New York, NY: Oxford University Press. Accesed from: http://repository.upenn.edu/asc_papers/226

Kuhn, T.S. (1962). 'The structure of Scientific revolutions'. Chicago: The University of Chicago Press.

Kumar, A. & Rahman, S., 2014. RFID-enabled process reengineering of closed-loop supply chains in the healthcare industry of Singapore. Journal of Cleaner Production, 85, pp.382–394. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652614003928 [Accessed August 25, 2017].

Kumar, D.T., Soleimani, H. & Kannan, G., 2014. Forecasting return products in an integrated forward/reverse supply chain utilizing an ANFIS. International Journal of Applied Mathematics and Computer Science, 24(3), pp.669–682. Available at: http://www.degruyter.com/view/j/amcs.2014.24.issue-3/amcs-2014-0049/amcs-2014-0049.xml [Accessed August 23, 2017].

Kumar, R. (2011). 'Research Methodology: a step-by-step guide for beginners'. Available at: http://www.sociology.kpi.ua/wp Last accessed: 2nd Feb 2017.

Kumar, S. & Malegeant, P., 2006. Strategic alliance in a closed-loop supply chain, a case of manufacturer and eco-non-profit organization. Technovation, 26(10), pp.1127–1135. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0166497205001094 [Accessed August 23, 2017].

Kumar, S. & Putnam, V., 2008. Cradle to cradle: Reverse logistics strategies and opportunities across three industry sectors. International Journal of Production Economics, 115(2), pp.305–315. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0925527308001898 [Accessed August 10, 2017].

Kumar, S. and Yamaoka, T. (2007) 'System dynamics study of the Japanese automotive industry closed loop supply chain'. Journal of Manufacturing Technology Management, 18(2), pp. 115–138.

Kumar, S., J. Himes, K. and P. Kritzer, C. (2014) 'Risk assessment and operational approaches to managing risk in global supply chains', Journal of Manufacturing Technology Management. Emerald Group Publishing Limited , 25(6), pp. 873–890. doi: 10.1108/JMTM-04-2012-0044.

Kwon, G.-R., Woo, S.H. & Lim, S.-R., 2015. Industrial ecology-based strategies to reduce the embodied CO2 of magnesium metal. Resources, Conservation and Recycling, 104, pp.206–212. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344915300689 [Accessed August 10, 2017].

Lahti, T., Wincent, J. and Parida, V. (2018) 'A definition and theoretical review of the circular economy, value creation, and sustainable business models: Where are we now and where should research move in the future?', Sustainability (Switzerland), 10(8). doi: 10.3390/su10082799.

Lenzen, M. & Peters, G.M., 2009. How City Dwellers Affect Their Resource Hinterland. Journal of Industrial Ecology, 14(1), pp.73–90. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2009.00190.x [Accessed August 10, 2017].

Li, C., 2013. An integrated approach to evaluating the production system in closed-loop supply chains. International Journal of Production Research, 51(13), pp.4045–4069. Available at: http://www.tandfonline.com/doi/abs/10.1080/00207543.2013.774467 [Accessed August 23, 2017].

Li, W., Wu, H. and Deng, L. (2015) 'Decision-Making Based on Consumers' Perceived Value in Different Remanufacturing Modes', Discrete Dynamics in Nature and Society. Hindawi, 2015, pp. 1–8. doi: 10.1155/2015/278210.

Lieder M. and Rashid A. (2016) 'Towards circular economy implementation: A comprehensive review in context of manufacturing industry'. Journal of Cleaner Production, 115, pp. 36–51.

Lifset, R. & Eckelman, M., 2013. Material efficiency in a multi-material world. Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences, 371(1986). Available at: http://rsta.royalsocietypublishing.org/content/371/1986/20120002 [Accessed August 10, 2017].

Lind, S., Olsson, D. & Sundin, E., 2014. Exploring inter-organizational relationships in automotive component remanufacturing. Journal of Remanufacturing, 4(1), p.5. Available at: http://journalofremanufacturing.springeropen.com/articles/10.1186/2210-4690-4-5 [Accessed August 23, 2017].

Linton, J.D., Yeomans, J.S. & Yoogalingam, R., 2002. Supply planning for industrial ecology and remanufacturing under uncertainty: a numerical study of leaded-waste recovery from television disposal. Journal of the Operational Research Society, 53(11), pp.1185–1196. Available at: https://doi.org/10.1057/palgrave.jors.2601418.

Liu, H., Ke, W., Wei, K., Gu, J. and Chen, H. (2010), "The role of institutional pressures and organizational culture in the firm's intention to adopt internet-enabled supply chain management systems", Journal of Operations Management, Vol. 28 No. 5, pp. 372-384.

Liu, L., Wang, Z., Xu, L., Hong, X. and Govindan, K., (2017) 'Collection effort and reverse channel choices in a closed-loop supply chain', Journal of Cleaner Production, 144, pp. 492–500. doi: 10.1016/j.jclepro.2016.12.126.

Low JSC, Tjandra TB, Lu WF and Lee HM (2016) 'Adaptation of the product structure-based integrated life cycle analysis (PSILA) technique for carbon footprint modelling and analysis of closed-loop production systems', Journal of Cleaner Production, 120, pp. 105–123.

MacLachlan, I., 2013. Kwinana Industrial Area: agglomeration economies and industrial symbiosis on Western Australia's Cockburn Sound. Australian Geographer, 44(4), pp.383–400. Available at: http://www.tandfonline.com/doi/abs/10.1080/00049182.2013.852505 [Accessed August 10, 2017].

Mahmoudzadeh, M., Sadjadi, S.J. & Mansour, S., 2013. Robust optimal dynamic production/pricing policies in a closed-loop system. Applied Mathematical Modelling, 37(16–17), pp.8141–8161. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0307904X13001637 [Accessed August 23, 2017].

Manzouri, M. et al. (2014) 'Increasing Production and Eliminating Waste through Lean Tools and Techniques for Halal Food Companies', Sustainability. Multidisciplinary Digital Publishing Institute, 6(12), pp. 9179–9204. doi: 10.3390/su6129179.

Mar, A. and Ramo, V. (2006) 'Reconciling institutional theory with organizational theories How neoinstitutionalism resolves five', 19(4), pp. 503–517. doi: 10.1108/09534810610676699.

Matos, S. & Hall, J., 2007. Integrating sustainable development in the supply chain: The case of life cycle assessment in oil and gas and agricultural biotechnology. Journal of Operations Management, 25(6), pp.1083–1102. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0272696307000150 [Accessed August 10, 2017].

Mattila, T.J., Pakarinen, S. & Sokka, L., 2010. Quantifying the Total Environmental Impacts of an Industrial Symbiosis - a Comparison of Process-, Hybrid and Input−Output Life Cycle Assessment. Environmental Science & Technology, 44(11), pp.4309–4314. Available at: http://dx.doi.org/10.1021/es902673m.

Mcareavey D, Hoey J, Leonard R. (2007). 'Designing the closed loop elements of a. material requirements planning system in a low volume, make-to-order company (with case study)'. International Journal of Production Research. 26 (7), 1141-1159.

McDowall, W. et al. (2017) 'Circular Economy Policies in China and Europe', Journal of Industrial Ecology, 21(3), pp. 651–661. doi: 10.1111/jiec.12597.

Mehmet S. (2016). 'Closed-loop Inventory Routing Problem for returnable transport items'. Volume 48, October 2016, Pages 31–45

Mentzer, T.J. and Kahn, K.B. (1995), "A framework of logistics research", Journal of Business Logistics, Vol. 16 No. 1, pp. 231-50

METI (2003) 'Handbook on Resource Recycling Legislation and 3R Trends in 2003', Ministry of Economy Trade and Industry Japan, p. 84. Available at: http://www.meti.go.jp/policy/recycle/main/data/pamphlet/pdf/cRecycle3R.pdf.

Miemczyk, J., Howard, M. and Johnsen, T.E. (2016) 'Dynamic development and execution of closed-loop supply chains: A natural resource-based view', Supply Chain Management: An International Journal, 21(4), pp. 453–469.

Miguel, A. and Haugan, G. L. (2019) 'Journal of Engineering and Determinants of maintenance performance : A resource-based view and agency theory approach', Journal of Engineering and Technology Management. Elsevier, 51(October 2018), pp. 33–47. doi: 10.1016/j.jengtecman.2019.03.001.

Mirabella, N., Castellani, V. and Sala, S. (2014) 'Current options for the valorization of food manufacturing waste: A review', Journal of Cleaner Production, 65, pp. 28–41.

Mitchell, R. K. and Wood, D. J. (2020) 'Toward a Theory of Stakeholder Identification and Salience : Defining the Principle of Who and What Really Counts Author (s): Ronald K . Mitchell , Bradley R . Agle and Donna J . Wood Source : The Academy of Management Review , Vol . 22 , No . 4 (Oct ., 1997), pp . 853-886 Published by : Academy of Management Stable URL : https://www.jstor.org/stable/259247 TOWARD A THEORY OF STAKEHOLDER IDENTIFICATION AND SALIENCE : DEFINING THE PRINCIPLE OF WHO AND WHAT REALLY COUNTS', 22(4), pp. 853–886.

Mitchell, R.K., Agle, B.R. and Wood, D.J. (1997), "Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts", Academy of Management. The Academy of Management Review, Vol. 22 No. 4, p. 853.

Mitnick, B. (1986) The theory of agency and organizational analysis. Unpublished working paper, University of Pittsburgh

Molecular Diversity Preservation International., A. et al., 2009. Sustainability., Molecular Diversity Preservation International. Available at: https://researchbank.rmit.edu.au/view/rmit:22113 [Accessed August 10, 2017].

Morana, R. and Seuring, S. (2011) 'A Three level framework for closed-loop supply chain Management—Linking society, chain and actor level', Sustainability, 3(4), pp. 678–691.

Mulrow, J.S. et al., 2017. Industrial Symbiosis at the Facility Scale. Journal of Industrial Ecology, 21(3), pp.559–571.

Munodawafa, R. T. (2019) 'A Systematic Review of Eco-Innovation and Performance from the Resource-Based and Stakeholder Perspectives'.

Nasir, M.H.A. et al., 2017. Comparing linear and circular supply chains: A case study from the construction industry. International Journal of Production Economics, 183, pp.443–457. Available at: http://linkinghub.elsevier.com/retrieve/pii/S092552731630113X [Accessed August 10, 2017].

Neuendorf, K. A. and Kumar, A. (2015) 'Emerging trends in content analysis', The International Encyclopedia of Political Communication, 1(May), pp. 1–10. doi: 10.1002/9781118541555.wbiepc065.

Nie, J. et al., 2013. Collective Recycling Responsibility in Closed-Loop Fashion Supply Chains with a Third Party: Financial Sharing or Physical Sharing? Mathematical Problems in Engineering, 2013, pp.1–11. Available at: http://www.hindawi.com/journals/mpe/2013/176130/ [Accessed August 23, 2017].

Niero, M. & Olsen, S.I., 2016. Circular economy: To be or not to be in a closed product loop? A Life Cycle Assessment of aluminium cans with inclusion of alloying elements. Resources, Conservation and Recycling, 114, pp.18–31. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0921344916301604 [Accessed August 10, 2017].

Noya, I. et al., 2017. Environmental assessment of the entire pork value chain in Catalonia – A

strategy to work towards Circular Economy. Science of The Total Environment, 589, pp.122–129. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0048969717304436 [Accessed August 10, 2017].

O'Connor, M., Garnier, G. and Batchelor, W. (2013) 'Life Cycle Assessment of Advanced Industrial Wastewater Treatment Within an Urban Environment', Journal of Industrial Ecology, 17(5), p. n/a-n/a. doi: 10.1111/jiec.12029.

O'Connor, M.P. et al., 2016. A Strategy for Material Supply Chain Sustainability: Enabling a Circular Economy in the Electronics Industry through Green Engineering. ACS Sustainable Chemistry & Engineering, 4(11), pp.5879–5888. Available at: http://dx.doi.org/10.1021/acssuschemeng.6b01954.

O'Gorman and Macintosh, (2015). 'Research Methods for Business and Management: A guide to writing your dissertation', Edition: 2nd, Chapter: 4, Publisher: Goodfellow Publishers Ltd. pp.50-74.

O'Reilly, S. and Kumar, A. (2016) 'Closing the loop', The International Journal of Logistics Management, 27(2), pp. 486–510.

OECD (2018), 'Business Models for the Circular Economy. Opportunities and Challenges from a Policy Perspective'. OECD/2018 Link Business Models (Accesed on 29 August 2019)

OECD (2019), 'Enterprises by business size (indicator)'. doi: 10.1787/31d5eeaf-en (Accessed on 11 August 2019)

Office for National Statistics (2019). 'Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland'. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland Accesed: 08 August 2019.

Oliver, C. (1997). Sustainable Competitive Advantage: Combining Institutional and Resource- Based Views. Strategic Management Journal. 18: 697-713

Olugu EU, Wong KY, Shaharoun AM, Udoncy E, Wong Yew K and Mohamed A. (2010) 'A comprehensive approach in assessing the performance of an automobile closed-loop supply chain', Sustainability, 2(4), pp. 871–889.

Ouardighi, F. El & Erickson, G., 2015. Production capacity buildup and double marginalization mitigation in a dynamic supply chain. Journal of the Operational Research Society, 66(8), pp.1281–1296. Available at: http://link.springer.com/10.1057/jors.2014.99 [Accessed August 23, 2017].

Pagotto, M. and Halog, A. (2015) 'Towards a circular economy in Australian Agri-food industry: An application of input-output oriented approaches for analyzing resource efficiency and competitiveness potential', Journal of Industrial Ecology, 20(5), pp. 1176–1186.

Pandey, P. K. et al. (2016) 'A new closed loop heating system for composting of green and food wastes', Journal of Cleaner Production, 133, pp. 1252–1259. doi: 10.1016/j.jclepro.2016.05.114.

Pansera, M., Genovese, A., & Ripa, M. (2021). Politicising Circular Economy: what can we learn from Responsible Innovation?. Journal of Responsible Innovation, forthcoming.

Park J, Sarkisb J, Wuc Z. (2010). 'Creating integrated business and environmental value within the context of China's circular economy and ecological modernization'. Journal of Cleaner Production. 18 (15), 1494–1501.

Paydar, M.M., Babaveisi, V. & Safaei, A.S., 2017. An engine oil closed-loop supply chain design considering collection risk. Computers & Chemical Engineering, 104, pp.38–55. Available at:

http://linkinghub.elsevier.com/retrieve/pii/S0098135417301552 [Accessed August 25, 2017].

Pearce, D. and Turner, K. (1990). 'Economics of Natural Resources and the Environment'. Harvester Wheatsheaf, Hemel Hempstead, Ch.9

Pedram, A. et al. (2017) 'Integrated forward and reverse supply chain: A tire case study', Waste Management, 60, pp. 460–470. doi: 10.1016/j.wasman.2016.06.029.

Pelletier, N. & Tyedmers, P., 2010. Life cycle assessment of frozen tilapia fillets from indonesian lake-based and pond-based intensive aquaculture systems. Journal of Industrial Ecology, 14(3), pp.467–481.

Pelton, R.E.O. & Smith, T.M., 2015. Hotspot Scenario Analysis. Journal of Industrial Ecology, 19(3), pp.427–440. Available at: http://doi.wiley.com/10.1111/jiec.12191 [Accessed August 10, 2017].

Perl, E. & Vorbach, S., 2009. Environmental information for sustainable supply chains. Progress in Industrial Ecology, An International Journal, 6(1), p.44. Available at: http://www.inderscience.com/link.php?id=26582 [Accessed August 10, 2017].

Perrow, C. (1986) 'Economic theories of organization', 45, pp. 11–45.

Prendeville et al (2016) 'Makespaces: From Redistributed Manufacturing to a Circular Economy', Available at: Https://www.researchgate.net/publication/299749017.Las accessed: 3 Aug 2016).

Preston (2012). 'A Global redesign? Shaping the Circular economy'. Available at: http://s3.amazonaws.com/. Last accessed: 25 Dec 2016.

Prieto-Sandoval, V., Jaca, C. and Ormazabal, M. (2018) 'Towards a consensus on the circular economy', Journal of Cleaner Production. Elsevier Ltd, 179, pp. 605–615. doi: 10.1016/j.jclepro.2017.12.224.

Puyvelde, S. et al. (2012). The Governance of Nonprofit Organizations: Integrating Agency Theory with Stakeholder and Stewardship Theories. Non-profit and Voluntary Sector Quarterly, 41(3), pp. 431–451.

Radhi, M. and Zhang, G. (2016) 'Optimal configuration of remanufacturing supply network with return quality decision', International Journal of Production Research. Taylor & Francis, 54(5), pp. 1487–1502. doi: 10.1080/00207543.2015.1086034.

Ramaswami, A. et al., 2012. A Social-Ecological-Infrastructural Systems Framework for Interdisciplinary Study of Sustainable City Systems. Journal of Industrial Ecology, 16(6), pp.801–813. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2012.00566.x [Accessed August 10, 2017].

Ramezani, M. and Kimiagari, A. M. (2016) 'Simultaneous optimization of operational and financial decisions to closed-loop supply chain network under uncertainty', Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture. SAGE PublicationsSage UK: London, England, 230(10), pp. 1910–1924. doi: 10.1177/0954405415578723.

Ran, W. et al. (2016) 'A Study of the Closed-Loop Supply Chain Coordination on Waste Glass Bottles Recycling', Mathematical Problems in Engineering. Hindawi, 2016, pp. 1–9. doi: 10.1155/2016/1049514.

Ren, H. et al., 2015. PlantBottleTM Packaging program is continuing its journey to pursue bio-mono-ethylene glycol using agricultural waste. Journal of Renewable and Sustainable Energy, 7(4), p.41510. Available at: http://aip.scitation.org/doi/10.1063/1.4929336 [Accessed August 10, 2017].

Rizos, V. et al. (2017) The Circular Economy: A review of definitions, processes and impacts. CEPS Research Report No 2017/8, April 2017. Available at: http://aei.pitt.edu/85892/.

Robinson, H. S. et al. (2006) 'STEPS: A knowledge management maturity roadmap for corporate sustainability', Business Process Management Journal, 12(6), pp. 793–808. doi: 10.1108/14637150610710936.

Rodríguez-Fernández, M., Gaspar-González, AI, Sánchez-Teba, EM. (2020) Sustainable social responsibility through stakeholder's engagement. Corporate Social Responsibility Environment Management. 27: 2425– 2436.

Rogers, K., Purdy, L., Safayeni, F. and Duimering, P. (2007), "A supplier development program: rational process or institutional image construction?", Journal of Operations Management, Vol. 25 No. 2, pp. 556-572.

Romero, D. and Molina, A. (2014) 'Forward - green virtual enterprises and their breeding environments: Sustainable manufacturing, logistics and consumption', in IFIP Advances in Information and Communication Technology. Springer Science + Business Media', pp. 336–346.

Rowley, J. and Slack, F. (2004) 'Conducting a literature review', Management Research News, 27(6), pp. 31–39.

Royeen, C.B., Jensen, G.M., Fapta and Harvan, R.A. (2011) 'Leadership in Interprofessional health education and practice'. Available at: https://books.google.co.uk. Last accessed: 21st Feb 2017

Ruiz Puente, M.C., Arozamena, E.R. & Evans, S., 2015. Industrial symbiosis opportunities for small and medium sized enterprises: preliminary study in the Besaya region (Cantabria, Northern Spain). Journal of Cleaner Production, 87, pp.357–374. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652614010889 [Accessed August 10, 2017].

Salemdeeb, R., Al-tabbaa, A. & Reynolds, C., 2016. The UK waste input – output table: Linking waste generation to the UK economy. Waste Management & Research, 34(10), pp.1089–1094.

Salviano, O. & Andres, F., 2017. On Long-Term Optimal Production-Inventory Plan for a Closed Loop Supply Chain.

Saunders, M., Lewis, P. and Thornhill, A. (2009) 'Research methods for business students', 5th edition, Pearson education limited, Harlow

Sauvé, S., Bernard, S. & Sloan, P., 2016. Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. Environmental Development, 17, pp.48–56. Available at: http://linkinghub.elsevier.com/retrieve/pii/S2211464515300099 [Accessed August 10, 2017].

Saxena, P., Singh, S.R. & Sangal, I., 2016. An Integrated Production Inventory Model for Repairable Items with Uncertain Lead Time. Indian Journal of Science and Technology, 9(41). Available at: http://www.indjst.org/index.php/indjst/article/view/84244 [Accessed August 23, 2017].

Sayogo, D.S. et al., 2015. Challenges and requirements for developing data architecture supporting integration of sustainable supply chains. Information Technology and Management, 16(1), pp.5–18. Available at: http://link.springer.com/10.1007/s10799-014-0203-3 [Accessed August 10, 2017].

Scavarda, A.J. et al., 2009. The development and implementation status of RFID in China. International journal of business excellence., Inderscience Enterprises Ltd. Available at: http://econpapers.repec.org/article/idsijbexc/v_3a2_3ay_3a2009_3ai_3a3_2f4_3ap_3a317-329.htm [Accessed August 10, 2017].

Scott, W. R., Smith, K. G. and Hitt, M. A. (2004) 'Institutional Theory : Contributing to a Theoretical Research Program Institutional Theory : Contributing to a Theoretical Research Program Chapter prepared for Great Minds in Management : The Process of Theory', Great minds in management: The process of theory development, (January 2005), pp. 460–485. doi:

10.1126/science.1182238.

Sekaran U. (2003). 'Research Methods for Business: A Skill building approach'. Available at: http://iaear.weebly.com/uploads. Last accessed: 13th Jan 2017.

Seuring, S., & Müller, M. (2008). 'From a literature review to a conceptual framework for sustainable supply chain management'. Journal of cleaner production, 16(15), 1699-1710.

Seuring, S., 2004. Industrial ecology, life cycles, supply chains: differences and interrelations. Business Strategy and the Environment, 13(5), pp.306–319. Available at: http://doi.wiley.com/10.1002/bse.418 [Accessed August 10, 2017].

Seuring, S., 2004. Integrated chain management and supply chain management comparative analysis and illustrative cases. Journal of Cleaner Production, 12(8–10), pp.1059–1071. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652604000721 [Accessed August 10, 2017].

Sgarbossa, F. and Russo, I. (2017) 'A proactive model in sustainable food supply chain: Insight from a case study', International Journal of Production Economics, 183, pp. 596–606. doi: 10.1016/j.ijpe.2016.07.022.

Shaharudin, M. R. et al. (2017) 'Product return management: Linking product returns, closed-loop supply chain activities and the effectiveness of the reverse supply chains', Journal of Cleaner Production, 149, pp. 1144–1156. doi: 10.1016/j.jclepro.2017.02.133.

Shankman N. (1999). Reframing the Debate Between Agency and Stakeholder Theories of the Firm. Journal of Business Ethics. 19, pages319–334

Shearman, D. J., & Smith, J. W. (2007). The climate change challenge and the failure of democracy. Greenwood Publishing group.

Shi, L., Wu, K.-J. and Tseng, M.-L. (2017) 'Improving corporate sustainable development by using an interdependent closed-loop hierarchical structure', Resources, Conservation and Recycling, 119, pp. 24–35. doi: 10.1016/j.resconrec.2016.08.014.

Shibin KT., Dubey R., Gunasekaran A. (2020). Examining sustainable supply chain management of SMEs using resource-based view and institutional theory. Annals of Operations Research 290(4)

Shirvanimoghaddam, K. et al. (2020) 'Death by waste: Fashion and textile circular economy case', Science of the Total Environment. doi: 10.1016/j.scitotenv.2020.137317.

Shook, C., Adams, G., Ketchen, D. Jr and Craighead, C. (2009), "Towards a 'theoretical toolbox' for strategic sourcing", Supply Chain Management: An International Journal, Vol. 14 No. 1, pp. 3-10.

Sodhi, ManMohan S. (2015). Conceptualizing Social Responsibility in Operations Via Stakeholder Resource-Based View. Production and Operations Management 24.9

Soleimani H, Seyyed-Esfahani M., Shirazi MA. (2016). 'A new multi-criteria scenario-based solution approach for stochastic forward/reverse supply chain network design'. Annals of Operations Research. 242 (2), 399-421.

Soleimani, H., Seyyed-Esfahani, M. and Kannan, G. (2014) 'Incorporating risk measures in closed-loop supply chain network design', International Journal of Production Research, 52(6), pp. 1843–1867. doi: 10.1080/00207543.2013.849823.

Souza, G.C. (2012) 'Closed-loop supply chains: A critical review, and future Research', Decision Sciences, 44(1), pp. 7–38.

Spence, A. M., & Zeckhauser, R. (1971) Insurance, information, and individual action. American

Economic Review, 61, 380-387.

Sprecher, B. et al., 2017. Novel Indicators for the Quantification of Resilience in Critical Material Supply Chains, with a 2010 Rare Earth Crisis Case Study. Environmental Science and Technology, 51(7), pp.3860–3870.

Stearns, P. N. (2018) The Industrial Revolution in World History. Routledge. doi: 10.4324/9780429494475.

Steinke, L. & Fischer, K., 2016. Extension of multi-commodity closed-loop supply chain network design by aggregate production planning. Logistics Research, 9(1), p.24. Available at: http://link.springer.com/10.1007/s12159-016-0149-4 [Accessed August 23, 2017].

Stewart, R. and Niero, M. (2018) 'Circular economy in corporate sustainability strategies: A review of corporate sustainability reports in the fast-moving consumer goods sector', Business Strategy and the Environment, 27(7), pp. 1005–1022. doi: 10.1002/bse.2048.

Stock, J. (1997), "Applying theories from other disciplines to logistics", International Journal of Physical Distribution & Logistics Management, Vol. 27 Nos 9/10, pp. 515-39.

Storey, D.J. (1994), 'Understanding the Small Business Sector', Routledge, London, pp. 7-47;112-159.

Strazza C, Magrassi F, Gallo M, Del Borghi A. (2015). 'Life Cycle Assessment from food to food: A case study of circular economy from cruise ships to aquaculture'. Sustainable Production and Consumption. 2 (1), 40-51.

Su, B. et al. (2013) 'A review of the circular economy in China: Moving from rhetoric to implementation', Journal of Cleaner Production. Elsevier Ltd, 42, pp. 215–227. doi: 10.1016/j.jclepro.2012.11.020.

Su, B., Heshmati, A., Geng, Y. and Yu, X. (2013) 'A review of the circular economy in china: Moving from rhetoric to implementation', Journal of Cleaner Production, 42, pp. 215–227.

Subramanian, R. and Subramanyam, R. (2012) 'Key Factors in the Market for Remanufactured Products', Manufacturing & Service Operations Management. INFORMS , 14(2), pp. 315–326. doi: 10.1287/msom.1110.0368.

Subulan, K., Taşan, A.S. & Baykasoğlu, A., 2015. Designing an environmentally conscious tire closed-loop supply chain network with multiple recovery options using interactive fuzzy goal programming. Applied Mathematical Modelling, 39(9), pp.2661–2702. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0307904X14005411 [Accessed August 25, 2017].

Supply Chain Council (2010). Supply chain operations reference (SCOR) model. Cypress Inc. Publishing, Texas, United States.

Toyasaki, F., Wakolbinger, T. and Kettinger, W. J. (2013) 'The value of information systems for product recovery management', International Journal of Production Research. Taylor & Francis Group , 51(4), pp. 1214–1235. doi: 10.1080/00207543.2012.695090.

Tseng, M.-L. & Bui, T.-D., 2017. Identifying eco-innovation in industrial symbiosis under linguistic preferences: A novel hierarchical approach. Journal of Cleaner Production, 140, pp.1376–1389. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652616316122 [Accessed August 10, 2017].

Tsiliyannis C. (2016). 'A fundamental law relating stock and end-of-life flow in cyclic manufacturing'. Journal of Cleaner Production. 127 (1), 461–474.

Tukker A. (2015). 'Product services for a resource-efficient and circular economy – a review'. Journal of Cleaner Production. 97 (1), 76–91.

Turki, S. et al. (2017) 'Optimization and Analysis of a Manufacturing–Remanufacturing–Transport–Warehousing System within a Closed-Loop Supply Chain', Sustainability, 9(4), p. 561. doi: 10.3390/su9040561.

Van Slyke, D. M. (2007) 'Agents or stewards: Using theory to understand the government-nonprofit social service contracting relationship', Journal of Public Administration Research and Theory, 17(2), pp. 157–187. doi: 10.1093/jopart/mul012.

Vendries Algarin, J. et al., 2015. Disaggregating the Power Generation Sector for Input-Output Life Cycle Assessment. Journal of Industrial Ecology, 19(4), pp.666–675. Available at: http://doi.wiley.com/10.1111/jiec.12207 [Accessed August 10, 2017].

Verstegen L., Schneider M. (2003). Institutional Investor Power and Heterogeneity: Implications for Agency and Stakeholder Theories. Sage Journals. 42(4):398-429.

Vivaldini, M. and Pires, S.R.I. (2016) 'Sustainable logistical operations: The case of McDonald's biodiesel in brazil', International Journal of Logistics Systems and Management, 23(1), p. 125.

Vlachos, D., Georgiadis, P. and Iakovou, E. (2007) 'A system dynamics model for dynamic capacity planning of remanufacturing in closed-loop supply chains', Computers & Operations Research, 34(2), pp. 367–394.

Walker; H. Sisto & L.; McBain, D (2008). 'Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors'. Journal of Purchasing and Supply Management. 14 (1), 69–85.

Walliman N. (2011). 'Research Method: The Basic'. London : Routledge. pp 78

Wang P, Jiang Z, Geng X and Hao S (2013), 'Dynamic Material Flow Analysis of Steel Resources in China Based on Circular Economy Theory'. Advanced Materials Research, Vol. 813, pp. 64-71, 2013

Wang, H. (2016). 'Reshaped circular economy model of low-cost competitive advantage in china: Based on two-oriented society' - IEEE Xplore document. Available at: http://ieeexplore.ieee.org. Last accessed: 8th Dec 2016.

Wang, K. et al., 2015. Remanufacturer–Manufacturer Collaboration in a Supply Chain: The Manufacturer Plays the Leader Role. Asia-Pacific Journal of Operational Research, 32(5), p.1550040. Available at: http://www.worldscientific.com/doi/abs/10.1142/S0217595915500402 [Accessed August 23, 2017].

Wang, W. et al., 2015. Reward-penalty mechanism for closed-loop supply chains under responsibility-sharing and different power structures. International Journal of Production Economics, 170, pp.178–190. Available at: http://dx.doi.org/10.1016/j.ijpe.2015.09.003.

Waughray D, Davos 2013: circular economy offers opportunities for Latin America | Guardian Sustainable Business | The Guardian. Available at: https://www.theguardian.com/sustainable-business/davos-2013-circular-economy-opportunities-latin-america [Accessed April 13, 2017].

Waxenberger, B. and Spence, L.J. (2003), "Reinterpretation of a metaphor: from stakes to claims", Strategic Change, Vol. 12, pp. 239-49.

Webster, K., 2013. What Might We Say about a Circular Economy ? Some Temptations to Avoid if Possible. World Futures, 69(7–8), pp.542–554.

Wei, J. et al. (2015) 'Pricing and collecting decisions in a closed-loop supply chain with symmetric and asymmetric information', Computers & Operations Research, 54, pp. 257–265. doi: 10.1016/j.cor.2013.11.021.

Weick, K.E. (1995). 'Sense making in organizations. Sage, London

White, H. (1985) Agency as control. In J. Pratt & R. Zeckhauser (Eds.), Principals and agents: The structure of business (pp. 187-214). Boston: Harvard Business School Press

Widmer, T. and Prior, D. (2019) 'Institutional Isomorphism, Institutional Logics and Organisational Fields: An Institutionalist Perspective on Circular Economy', Proceedings of the Spring Servitization Conference 2019, (May).

Wilhelm, M. M. et al. (2016) 'Sustainability in multi-tier supply chains: Understanding the double agency role of the first-tier supplier', Journal of Operations Management, 41, pp. 42–60. doi: 10.1016/j.jom.2015.11.001

Wilhite, A. et al., 2014. Military supply chains and closed-loop systems: resource allocation and incentives in supply sourcing and supply chain design. International Journal of Production Research, 52(7), pp.1926–1939. Available at: http://www.tandfonline.com/doi/abs/10.1080/00207543.2013.787173 [Accessed August 25, 2017].

Winkler, H. & Kaluza, B., 2006. Sustainable supply chain networks - A new approach for effective waste management. WIT Transactions on Ecology and the Environment, 92, pp.501–510.

Worn Again (2017). http://wornagain.info/. Last accessed: 6th Jan 2017.

WRAP (2016). 'Quantification of food surplus, waste and related materials in the supply chain'. Available at: http://www.wrap.org.uk. Last accessed: 8th Dec 2016).

WRAP (2017). 'WRAP and the circular economy'. Available at: http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy. Last accessed: 6th Feb 2017.

WRAP. (n.d.). 'Food and Drink Circular Economy'. Available at: www.wrap.org.uk/textiles. Last accessed: (17 April 2017).

WRAP. (n.d.). 'Textiles Circular Economy'. Available at: www.wrap.org.uk/textiles. Last accessed: (17 April 2017).

Yamzon, A. et al., 2016. Optimal planning of incentive-based quality in closed-loop supply chains. Clean Technologies and Environmental Policy, 18(5), pp.1415–1431. Available at: http://link.springer.com/10.1007/s10098-016-1103-5 [Accessed August 23, 2017].

Yang, Y., & Konrad, A. M. (2011). Understanding diversity management practices: Implications of institutional theory and resource-based theory. Group & Organization Management, 36(1), 6-38.

Yazıcı, E. et al., 2016. A New Extended MILP MRP Approach to Production Planning and Its Application in the Jewelry Industry. Mathematical Problems in Engineering, 2016, pp.1–18. Available at: http://www.hindawi.com/journals/mpe/2016/7915673/ [Accessed August 23, 2017].

Yi, P. et al., 2016. Dual recycling channel decision in retailer oriented closed-loop supply chain for construction machinery remanufacturing. Journal of Cleaner Production, 137, pp.1393–1405. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652616310009 [Accessed August 25, 2017].

Yu, Y. et al., 2016. Global Implications of China's Future Food Consumption. Journal of Industrial Ecology, 20(3), pp.593–602. Available at: http://doi.wiley.com/10.1111/jiec.12392 [Accessed August 10, 2017].

Yuan, K.F. et al., 2015. Inventory decision-making models for a closed-loop supply chain system with different decision-making structures. International Journal of Production Research, 53(1), pp.183–219. Available at: http://www.tandfonline.com/doi/abs/10.1080/00207543.2014.946160 [Accessed August 23, 2017].

Yuan, Z. & Shi, L., 2009. Improving enterprise competitive advantage with industrial symbiosis: case study of a smeltery in China. Journal of Cleaner Production, 17(14), pp.1295–1302. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652609001127 [Accessed August 10, 2017].

Yuan, Z., Bi, J. & Moriguichi, Y., 2008. The Circular Economy: A New Development Strategy in China. Journal of Industrial Ecology, 10(1-2), pp.4–8. Available at: http://doi.wiley.com/10.1162/108819806775545321 [Accessed April 28, 2017].

Zainal, Z. (2007) 'Case study as a research method'. Malaysia: Jurnal Kemanusiaan. Available at: http://psyking.net/htmlobj-3837/case_study_as_a_research_method.pdf Last accessed: 10th Feb 2017.

Zeballos, L.J. et al., 2014. Multi-period design and planning of closed-loop supply chains with uncertain supply and demand. Computers & Chemical Engineering, 66, pp.151–164. Available at: http://linkinghub.elsevier.com/retrieve/pii/S009813541400074X [Accessed August 23, 2017].

Zeng, H. et al., 2017. Institutional pressures, sustainable supply chain management, and circular economy capability: Empirical evidence from Chinese eco-industrial park firms. Journal of Cleaner Production, 155, pp.54–65. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652616317139 [Accessed August 10, 2017].

Zhalechian M, Tavakkoli-Maghaddam R, Zahiri B and Mohammadi M (2015). 'Sustainable design of a closed-loop location-routing-inventory supply chain network under mixed uncertainty'. Transportation Research Part E: Logistics and Transportation Review. Volume 89, May 2016, Pages 182–214

Zhang, C. (2016) 'Small and medium-sized enterprises closed-loop supply chain finance risk based on evolutionary game theory and system dynamics', Journal of Shanghai Jiaotong University (Science). Shanghai Jiaotong University Press, 21(3), pp. 355–364. doi: 10.1007/s12204-016-1733-0.

Zhang, P. et al. (2014) 'Designing contracts for a closed-loop supply chain under information asymmetry', Operations Research Letters, 42(2), pp. 150–155. doi: 10.1016/j.orl.2014.01.004.

Zhang, Z.Z., Wang, Z.J. & Liu, L.W., 2015. 'Retail services and pricing decisions in a closed-loop supply chain with remanufacturing'. Sustainability (Switzerland), 7(3), pp.2373–2396.

Zhu, H. (2006). Strategic green supply chain based on circular economy - a new view for sustainable manufacturing in china. 28. 289-292.

Zhu, Q. & Cote, R.P., 2004. Integrating green supply chain management into an embryonic eco-industrial development: a case study of the Guitang Group. Journal of Cleaner Production, 12(8–10), pp.1025–1035. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652604001015 [Accessed August 10, 2017].

Zhu, Q., Geng, Y. & Lai, K., 2010. Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. Journal of Environmental Management, 91(6), pp.1324–1331. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0301479710000411 [Accessed August 10, 2017].

Zhu, Q., Geng, Y. and Lai, K. (2011) 'Environmental supply chain cooperation and its effect on the circular economy practice-performance relationship among Chinese manufacturers'. Journal of Industrial Ecology, 15(3), pp. 405–419.

Zhu, Q., Geng, Y. and Lai, K. (2011) 'Environmental Supply Chain Cooperation and Its Effect on the Circular Economy Practice-Performance Relationship Among Chinese Manufacturers', Journal of Industrial Ecology. Blackwell Publishing Inc, 15(3), pp. 405–419. doi: 10.1111/j.1530-9290.2011.00329.

Ziegler, F. et al., 2011. Extended Life Cycle Assessment of Southern Pink Shrimp Products Originating in Senegalese Artisanal and Industrial Fisheries for Export to Europe. Journal of Industrial Ecology, 15(4), pp.527–538. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2011.00344.x [Accessed August 10, 2017].

Ziegler, F. et al., 2013. The Carbon Footprint of Norwegian Seafood Products on the Global Seafood Market. Journal of Industrial Ecology, 17(1), pp.103–116. Available at: http://doi.wiley.com/10.1111/j.1530-9290.2012.00485.x [Accessed August 10, 2017].

Zink, T., & Geyer, R. (2017). Circular economy rebound. Journal of Industrial Ecology, 21(3), 593-602.

Zohal, M. & Soleimani, H., 2016. Developing an ant colony approach for green closed-loop supply chain network design: a case study in gold industry. Journal of Cleaner Production, 133, pp.314–337. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959652616305558 [Accessed August 25, 2017].

Zu-Jun, M., Zhang, N., Dai, Y. and Hu, S. (2016) 'Managing channel profits of different cooperative models in closed-loop supply chains'. Omega, 59, pp. 251–262.

Appendices

Appendix A: Participant Invitation Letter (English)

The University Of Sheffield.

Sheffield University Management School.

Date: _____

To: _____

My name is Karla Tun and I am a Ph.D. researcher in Logistics and Supply Chain at The University of Sheffield.
The title of my current research is "Understanding Stakeholder perspective in the implementation of the Circular Supply Chain". My research aim is to understand the perspectives of different Stakeholder along the Supply Chain for Textile and Food Industry.
The principle objectives in my research are the following:
1. Understand the main challenges and opportunities to overcome in the implementation of Circular Economy practices.
2. Find incentives to implement Circular models in the supply chain.
3. Examine how business dynamics in the Circular economy change in developing countries compared with developed countries.
4. Analyse the supply chain processes in a circular economy considering the perspectives of different stakeholders involved.

My research is in the stage of data collection which I will obtain through Semi-Structure Interviews with people working in companies / organisations related with the Sectors that will be analysed (Textile and Food).
For this reason, I would like to invite you to be part of this research. If you agree, I will be in contact by email to send you more information.

I hope to hear from you soon.

Sincerely yours
M.Sc. Karla Ileana Tun Gongora
Ph.D. Researcher in Logistics and Supply Chain at The University of Sheffield
Email: kitungongora1@sheffield.ac.uk
Mobile: (+44) 79 47608753

Appendix B: Participant Invitation Letter (Spanish)

The University Of Sheffield.

Fecha: _____

Para: _____

Mi nombre es Karla Tun Gongora y actualmente me encuentro realizando un doctorado en Logística y en administración de la cadena de suministro en la Universidad de Sheffield en el Reino Unido.
El título de mi investigación actual es: "Understanding Stakeholder perspective in the implementation of the Circular Supply Chain" ("Entendiendo la perspectiva de las partes involucradas en la implementación de la cadena de suministro Circular"). La meta de esta investigación es entender las diferentes perspectivas de los distintos actores involucrados en las cadenas de suministro de Textiles y Alimentos.

Entre los principales objetivos de mi investigación se encuentran los siguientes:
1. Entender los principales retos y oportunidades que deben de superarse para la implementación de prácticas más sustentables (Economía Circular).
2. Encontrar incentivos para que se puedan implementar más modelos basados en Economía Circular en las diferentes empresas / Organizaciones.
3. Examinar como la dinámica de los negocios en términos de Economía Circular cambia en países desarrollados, así como en países en vía de desarrollo.
4. Analizar los diferentes procesos en la cadena de suministro en términos de Economía Circular considerando la perspectiva de los diferentes actores involucrados.

Mi investigación se encuentra en la etapa de recolección de datos el cual de acuerdo a la Metodología se realizará por medio de Entrevistas Semi-estructuradas con personas relacionadas con compañías u organizaciones trabajando en los sectores que serán analizados. (Textiles y Alimentos).
Por esta razón y debido al interés de su empresa u organización en prácticas más sustentables, me gustaría invitarlo a participar en una entrevista en persona que durará alrededor de 45 a 60 minutos en los cuales se mantendrá el anonimato de sus respuestas y el nombre de la compañía. La información recolectada será exclusivamente para fines de esta investigación.

Quedo pendiente de sus comentarios.

Saludos Cordiales
M.Sc. Karla Ileana Tun Gongora
Ph.D. Researcher in Logistics and Supply Chain at The University of Sheffield
Email: kitungongora1@sheffield.ac.uk / Celular: (+44) 79 47608753

Appendix C: Research Consent Form – English

The University Of Sheffield.

Sheffield University Management School.

Research consent Form – Interview

Please tick the appropriate boxes

☐ Taking Part
☐ I have been given the opportunity to ask questions about the project
☐ I understand that the researcher will be taking notes and will use an audio-recording device if I agree to it.
☐ I agree to be audio-recorded
☐ I understand that my participation is voluntary, I can withdraw from the study at any time and I do not have to give any reasons for why
☐ I no longer want to take part. Withdrawing from the study will not affect the participation in the research in any way.
☐ I understand that any information which might potentially identify me will not be used in published materials.

Use of information I provide
☐ I understand that my words may be quoted (in an anonymous way) in publications, reports, web pages, and other research outputs.

We can use the information you provide legally.
☐ I agree to assign the copyright I hold in any materials related to this study to Karla Ileana Tun Góngora.

Name of the participant: _____Signature: _____
Name of Interviewer: _____Signature: _____
Date: _____

Appendix D: Research Consent Form – Spanish

The University Of Sheffield.

Sheffield University Management School.

Forma de consentimiento para Investigación – Entrevista

Por favor pon una "X" en los cuadros apropiados.

☐ Tomar parte en el estudio
☐ He leído y entendido la hoja de información para la investigación.
☐ Se me ha dado la oportunidad de hacer preguntas acerca del proyecto.
☐ Estoy de acuerdo en tomar parte en el estudio. Entiendo que el investigador tomar notas y usara un aparato de grabación de sonido si estoy de acuerdo.
☐ Estoy de acuerdo que se realice audio grabación
☐ Entiendo que mi participación es voluntaria y que me puedo retirar en cualquier momento del estudio sin tener que dar una explicación. Retirarse del estudio no afectara de ninguna manera la participación.
☐ Entiendo que cualquier información que potencialmente pueda identificarme no será utilizada para el estudio.

Uso de la información que proporcione

☐ Entiendo que mis palabras pueden ser citadas (Como "anónimo") en publicaciones, reportes, páginas webs y otros resultados académicos y de investigación.

Podemos usar la información que nos ha proporcionado legalmente.

☐ Estoy de acuerdo en asignar la propiedad intelectual de los resultados de este estudio a Karla Ileana Tun Góngora.

Nombre del participante: _____

Firma: _____

Fecha: _____

Appendix E: Participant Information sheet – English

The University Of Sheffield.

Sheffield University Management School.

Participation Information Sheet

Title of the research: "UNDERSTANDING STAKEHOLDER PERSPECTIVE IN THE IMPLEMENTATION OF THE CIRCULAR SUPPLY CHAIN"

Thank you for the time you spend reading the following information. This is an invitation to take part in a research study. Before you decide whether to participate, it is important for you to understand why this research study is being done and what it will involve. Please take the time to read the following information carefully. Feel free to ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?
The aim of this research is to understand the view of all the stakeholders involved around the Supply Chain in order to understand the challenges and opportunities to overcome. The purpose of the analysis is to find innovative business models in the Circular economy approach as well as to understand the complete operation across the Supply Chain.

Why have I been invited?
You have been asked to participate in this investigation because we are looking for people who is actively involved inside an organisation which activities are related with Circular Economy practices. The objective is to understand their opinion by answering questions about their perspective of their activities by using a semi structure interview.

Do I have to take part?
It is up to you whether to take part or not. If you do not wish to take part in any aspect of this investigation, you do not have to take part. Participation is completely voluntary. You will have adequate opportunity to withdraw at any moment and without giving any reason.

What will happen if I do take part? What do I have to do?
If you choose to take part in this research, you will be asked to sign a 'Consent Form'. This is a form you sign to say that you understand why the study is being done, that you understand what you are expected to do and what the researchers will do with the information they will collect.

What are the possible risks and disadvantages of taking part in the pilot study?
No expected risks are foreseen whilst participating in the study.

What are the possible benefits of my participation?
The information we will collect from you and other organisations will help to create an analysis of the supply chain in order to contribute with the research in this field and to generate information to improve and create incentives for the organisations to encourage them to implement more Circular Economy practices.

Will my taking part in the pilot study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Any information about you which is disseminated will have your name removed so that you cannot be recognised from it and all references to you will be anonymised. All information which is collected about you will be kept strictly confidential, and in accordance with the Data Protection Act (1998). Data will be kept securely by the researcher in a password-protected PC.
The audio recordings of the interview during this research will be used only for analysis and for illustration in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings.

How long will the interview take?
The semi-structured interview consists in around 20 open questions about the actual practices that you or your company are implementing and also about future plans and challenges to overcome in Circular economy. It is expected to last around 30 to 45 minutes.

Who has reviewed the project?
The project has been inspected and approved by the University of Sheffield Management School Ethics Committee in accordance with the University of Sheffield Ethics Policy. This policy can be inspected at:
http://www.sheffield.ac.uk/ris/other/committees/ethicscommittee

This research is being conducted by Karla Ileana Tun Gongora from Management School of the University of Sheffield and is supervised by Dr. Andrea Genovese and Dr. Robert Marchand.

Contact for further information
If you have any questions of would like any additional information, please do not hesitate to contact the researcher as detailed below. Your interest in the project is highly appreciated.

MSc Karla Ileana Tun Gongora
Management School
The University of Sheffield.
Email: kitungongora1@sheffield.ac.uk.

Appendix F: Participant Information sheet – Spanish

Hoja de información de participación

Título de la investigación:
"UNDERSTANDING STAKEHOLDER PERSPECTIVE IN THE IMPLEMENTATION OF THE CIRCULAR SUPPLY CHAIN"
("ENTENDIENDO LA PERSPECTIVA DE LAS PARTES INTERESADAS EN LA IMPLEMENTACIÓN DE LA CADENA DE SUMINISTRO CIRCULAR")

Gracias por tomarse el tiempo para leer la siguiente información. Esta es una invitación para participar en un estudio de investigación. Antes de decidir si participa, es importante que comprenda por qué se está realizando este estudio de investigación y qué implicará. Por favor, tómese el tiempo para leer la siguiente información cuidadosamente. No dude en preguntarnos si hay algo que no está claro o si desea obtener más información.

¿Cuál es el propósito del estudio?
El objetivo de esta investigación es comprender la visión de todas las partes interesadas e involucradas en la cadena de suministro para comprender los desafíos y las oportunidades que se deben superar. El objetivo del análisis es encontrar modelos comerciales innovadores en el enfoque de la economía circular, así como comprender la operación completa en toda la cadena de suministro.

¿Por qué me han invitado?
Se le ha pedido que participe en esta investigación porque estamos buscando personas que participen activamente dentro de una organización cuyas actividades estén relacionadas con las prácticas de Economía Circular. El objetivo es comprender su opinión respondiendo preguntas sobre su perspectiva de sus actividades mediante el uso de una entrevista semi estructurada.

¿Debo participar?
Depende de usted participar o no. Si no desea participar en ningún aspecto de esta investigación, no tiene que participar. La participación es completamente voluntaria. Tendrá la oportunidad adecuada de retirarse en cualquier momento y sin dar ninguna razón.

¿Qué pasará si participo? ¿Qué tengo que hacer?
Si decide participar en esta investigación, se le pedirá que firme un 'Formulario de consentimiento'. Este es un formulario que usted firma para decir que entiende por qué se está realizando el estudio, que entiende acerca de lo que se espera que haga y lo que harán los investigadores con la información que recopilarán.

¿Cuáles son los posibles riesgos y desventajas de participar en el estudio piloto?
No se prevén riesgos esperados mientras se participa en el estudio.

¿Cuáles son los posibles beneficios de mi participación?
La información que recopilaremos de usted y otras organizaciones ayudará a crear un análisis de la cadena de suministro con el fin de contribuir con la investigación en este campo y generar información para mejorar y crear incentivos para que las organizaciones los alienten a implementar más prácticas de Economía Circular.

¿Sería confidencial mi participación en el estudio piloto?
Sí. Toda la información sobre su participación en este estudio se mantendrá confidencial. Cualquier información sobre usted que se disemine tendrá su nombre eliminado para que no pueda ser reconocido y todas las referencias a usted serán anónimas. Toda la información recopilada sobre usted se mantendrá estrictamente confidencial, y de conformidad con la Ley de Protección de Datos (1998). Los datos serán guardados de forma segura por el investigador en una PC protegida por contraseña.
Las grabaciones de audio de la entrevista durante esta investigación se usarán solo para el análisis y transcripción de la entrevista semi estructurada, estos datos servirán para uso de ilustraciones en presentaciones de conferencias y conferencias. No se hará ningún otro uso sin su permiso por escrito, y nadie fuera del proyecto tendrá acceso a las grabaciones originales.

¿Cuánto tiempo durará la entrevista?
La entrevista semiestructurada consiste en alrededor de 20 preguntas abiertas sobre las prácticas reales que usted o su empresa están implementando y también sobre los planes futuros y los desafíos a superar en la economía circular. Se espera que dure entre 45 y 60 minutos.

¿Quién ha revisado el proyecto?
El proyecto ha sido inspeccionado y aprobado por el Comité de Ética de la Escuela de Administración de la Universidad de Sheffield de acuerdo con la Política de Ética de la Universidad de Sheffield. Esta política se puede inspeccionar en:
http://www.sheffield.ac.uk/ris/other/committees/ethicscommittee
Esta investigación está siendo dirigida por Karla Ileana Tun Gongora de la escuela de Administracion de la Universidad de Sheffield, y está supervisada por el Dr. Andrea Genovese (a.genovese@sheffield.ac.uk) y el Dr. Robert Marchand (r.marchand@sheffield.ac.uk).

Contacto para más información
Si tiene alguna pregunta sobre si desea obtener información adicional, no dude en ponerse en contacto con el investigador como se detalla a continuación. Su interés en el proyecto es muy apreciado.

MSc Karla Ileana Tun Gongora
Doctoral Researcher in Logistics and Supply Chain
Management School
The University of Sheffield.
Email: kitungongora1@sheffield.ac.uk

Appendix G: Semi-structure Interview – English

The University Of Sheffield.

Sheffield University Management School.

"UNDERSTANDING STAKEHOLDER PERSPECTIVE IN THE IMPLEMENTATION OF THE CIRCULAR SUPPLY CHAIN"

Interviewee: _____
M / F: _____
Position: _____
Company / Organisation: _____

Qualitative interview introduction

Length: 45-60 minutes

Aim: The aim of this research is to understand the view of stakeholders involved in Supply Chains in specific industries about the opportunities and challenges related to the implementation of Circular Economy practices. The purpose of the analysis is to identify innovative business models in the transition towards the Circular Economy as well as to understand their complete operations across the SC.
Written consent to participate in this research will be obtained through an appropriate form that the interviewee will sign. A brief introduction about the objectives of the research will be provided to the participant.

Theory support

The questions were formulated taking into consideration the lenses of three management theories, in order to interpret findings through these frameworks.

Resource-based view (RBV) theory

The semi-structured interview was created following the guidelines of Resource-based View (RBV) theory which purpose is to determine the current resources available in a company/organisation in order to build a competitive advantage. By resources, this theory refers to all the assets, processes, information, capital, equipment, which are within the control of the company.
RBV theory will help to formulate questions related with past and current available resources in the companies/organisations in order to understand how these resources were/are/will be utilised in order to create a competitive advantage and also how these resources will help with the implementation of Circular Economy practices.

Agency Theory

Using an Agency Theory framework, the problems that can arise in the interaction between principal and agents within supply chains, due to unaligned goals or desires, will be investigated.

Specific self-interests of individual businesses or organisations sometimes might lead to conflicts; for this reason the questions that will be formulated using as lens this theory will cover topics such as attitudes, views, and coordination between different parties in the supply chain in the accomplishment of their own goals.

Stakeholder Theory

The main theory that will be utilised in order to formulate the questions will be Stakeholder Theory; the principal aim of this research is to understand the coordination between all the stakeholders involved in a Supply chain. Stakeholder theory will help to identify internal and external groups of stakeholders in a specific supply chain and characterise them according to several dimensions.

Expected findings in the Semi Structured Interviews

The semi-structured interviews will allow us to:

i. Know about the resources currently used in the companies / organisations and how these resources influence the performance in terms of implementation of Circular Economy practices, as well as how these resources will help in the future to achieve more sustainable practices.
ii. Recognise all the current practices related with Circular economy along the supply chain.
iii. Understand the relationship with their stakeholders, how they work to align both goals and expectations and the problems they face to work together.
iv. Acknowledge of the possible future implementations and principal barriers to overcome.
v. Comprehend new solutions, practices, and perspectives of all the stakeholders involved in Circular Economy practices.

Semi Structure Interview guide

Warm up Questions

- Thank you for agreeing to participate in this research study.

The researcher will confirm the confidentiality of the research and the fact that the conversation will be recorded.

i. Before we start with the interview, would you like to ask something about the research study or this meeting?

Invite interviewee to briefly tell about him/herself.

ii. General information about background to understand his/her role in the organization / company.

Introduction / Understanding of the topic.

i. Have you ever heard about the term "Circular Economy"? (If yes, please explain in your own words the concept)
ii. Explain more about the organization / company / Project (aim, motivation, why, what, what for, who) What are the desired outcomes?

Current Practices (Theory: NRBV)

i. What is your company/organization doing in terms of waste management or by-products management?
ii. Which do you consider are the current Circular Economy practices that your company/organization) is implementing in the following supply chain stages?
    - Getting Raw Materials
    - Production / Processing
    - Handling & Storage
    - Distribution
    - Disposal
    - Recovery / Recycling/ Transformation Post consumer
iii. Why do you consider such practices are based on Circular Economy principles? Please explain.

Past Practices (Theory: NRBV)

i. In the past, did you consider different practices than the current ones within the waste/by-product's management domain? (If yes, name and explain all the past practices)
ii. (In case that you had any modification in your practices). Why you decided to change?

Future Plans (Theory: NRBV, Stakeholder Theory)

i. Are you involved in redesigning the supply chain to include more sustainable practices in your company / organization? Does this include involving new stakeholders or actors that you are not currently using?

If yes, explain in detail about all the possible implementations.

ii. How do you see the company / organization in short, medium and Long term talking about implementation of Circular Economy practices?
    - Short Term
    - Medium Term
    - Long Term

Barriers and resources (Theory: NRBV)

i. What are the principal barriers (I.e. Legal, economic, social, etc.) that your company / organization faces in implementing CE practices?
ii. Have you ever had any problems with regulations when you tried to implement CE practices in the past few years? Please explain.
iii. Can you think of any future problems to your organization / Company related with the use of CE practices?

Collaboration with Stakeholders (Theory: Stakeholder Theory, Agency Theory)

i. What is the current relationship with your stakeholders regarding Circular Economy practices?
ii. To what extent stakeholders from your supply chain are involved in your objectives to implement more sustainable practices?
iii. Sometimes goals of stakeholders from your supply chain can be different than yours or conflicting with yours. Did you face any problem with your stakeholders when it came to the implementation of CE practices? Please provide some examples of any previous or current problem.
iv. Do you think that your stakeholders might help you to achieve your aim of implement CE practices? How do you think they can be helpful?
v. How do you think that the relationship with your stakeholder might be improved to align the goals with your company talking about CE practices?

Benefits and Opportunities to Implement CE Practices (Theory: NRBV).

i. What benefits does your company receive from the implementation of CE Practices (mainly Socially and Economically).
ii. Is there any opportunity that your company/Organization could take more economical advantages from the implementation of new practices?

End of conversation / Cool down

Appendix H: Semi-structure Interview – Spanish

Guía para entrevista semi-structurada

Preguntas de Introducción

Gracias por acceder a participar en este estudio de investigación.
El entrevistador confirmará la confidencialidad de la investigación y el hecho de que la investigación será grabada.

i. Antes de empezar con la entrevista, ¿le gustaría preguntar algo acerca del estudio o de esta entrevista?

Invitar al entrevistado a hablar brevemente acerca de él o ella.
Información general acerca de los antecedentes para entender el rol del entrevistado dentro de la organización / compañía.

Introducción / Entendiendo el tema

i. ¿Has escuchado hablar del término Economía Circular (Circular Economy)?
   (Si la respuesta es positiva, por favor explica con tus propias palabras el concepto)
ii. Explica más acerca de la organización, compañía o proyecto (Metas, motivaciones, porque, para que, quienes están dentro de la organización). ¿Cuáles son los resultados esperados?

Practicas actuales

i. Que está haciendo tu empresa / compañía en términos de administración de basura/residuos o en administración de productos derivados de otros.
ii. ¿Cuáles son las practicas actuales de economía circular que consideras que tu compañía / organización está implementando en las siguientes etapas de la cadena de suministro?
    - Obtención de Materias primas
    - Producción / procesamiento
    - Manejo y Almacenaje
    - Distribución
    - Eliminación de basura.
iii. ¿Por qué consideras que estas prácticas están basadas en los principios de la Economía Circular? Por favor explica.

Practicas anteriores

i. En el pasado, ¿Has considerado diferentes prácticas que las actuales en términos de desperdicio o administración de subproductos?

Si la respuesta es positiva, nombra y explica las prácticas pasadas.

ii. (En caso de que hayan tenido una modificación de sus prácticas, ¿Porque decidieron cambiarlas?).

Planes Futuros

i. ¿Estas involucrado (a) en el rediseño de la cadena de suministro para incluir practicas más sustentables en tu empresa u organización? ¿Esto

incluiría involucrar a nuevos asociados/actores en tu cadena de suministro que actualmente no estés usando?

ii. Si la respuesta es positiva, explica a detalle las posibles implementaciones.

iii. ¿Como ves a tu empresa u organización en corto, mediano y largo plazo hablando en términos de implementación de Economía circular?

- Corto
- Mediano
- Largo Plazo
-

Barreras y recursos

i. ¿Cuáles son las principales barreras (Por ejemplo: Legales, económicas, sociales, ¿etc.)? que tu compañía u organización enfrenta al implementar practicas basadas en Economía Circular?

ii. ¿Alguna vez has tenido algún problema con regulaciones cuando has intentado implementar prácticas de Economía Circular en los últimos años? Por favor explica.

iii. ¿Puedes pensar en algún futuro problema para tu organización / empresa relacionado con el uso e implementación de prácticas relacionadas a la Economía Circular?

Colaboración con asociados

i. ¿Cuál es tu relación actual con tus asociados / diferentes actores en tu cadena de suministro en términos de prácticas relacionadas con Economía Circular?

ii. ¿En qué medida se encuentran tus asociados / diferentes actores en tu cadena de suministro involucrados en tus objetivos para implementar practicas más sustentables?

iii. En ocasiones, las metas de tus asociados son diferentes a las tuyas o pueden encontrarse en conflicto con las metas de tu empresa / organización. ¿Has enfrentado algún problema con tus socios /asociados cuando has intentado implementar prácticas de Economía Circular? Por favor menciona algunos ejemplos de algún previo o problema actual.

iv. ¿Crees que tus socios / asociados pueden ayudarte a lograr la meta de implementar prácticas de Economía Circular? ¿Cómo crees que puedan ser de ayuda?

v. ¿Cómo crees que la relación con tus socios / asociados pueda ser mejorada para alinear sus metas junto con las metas de tu empresa / organización en términos de prácticas de Economía Circular?

Beneficios y oportunidades

i. ¿Qué beneficios recibe tu compañía / organización de la implementación de prácticas basadas en Economía Circular? (Principalmente sociales y económicas)

ii. ¿Hay alguna oportunidad de que tu empresa / organización pueda tener más ventajas económicas de la implementación de nuevas prácticas?

Fin de la entrevista / Agradecimiento.

Appendix I: Top 50 Food companies per size in Yucatan according to DENUE

No	Company name	Main activity	Size	Location	Website	Corporate report
1	BEPENSA BEBIDAS PONIENTE	Conservation of fruits and vegetables by processes other than freezing and dehydration	Large	Mérida	Y	Yes
2	BIMBO PLANTA MERIDA	Industrial bakery	Large	Mérida	Y	Yes
3	BOTANAS LA LUPITA	Preparation of snacks	Large	Mérida	Y	NA
4	CRIO	Slaughter of livestock, birds and other edible animals	Large	Kanasín	Y	NA
5	DONDE	Preparation of biscuits and pasta for soup	Large	Mérida	Y	NA
6	HIDROGENADORA YUCATECA	Preparation of edible vegetable oils and fats	Large	Mérida	Y	NA
7	IASSA	Preparation of sausages and other preserves of meat of cattle, birds and other edible animals	Large	Mérida	Y	NA
8	INDUSTRIA SALINERA DE YUCATAN SA DE CV PLANTA LAS COLORADAS	Preparation of condiments and dressings	Large	Río Lagartos	Y	NA
9	LA ANITA	Preparation of condiments and dressings	Large	Mérida	Y	NA
10	PLANTA PROCESADORA DE AVES DIVISION PENINSULA	Slaughter of livestock, birds and other edible animals	Large	Umán	Y	NA
11	ABASTOS DE MERIDA	Slaughter of livestock, birds and other edible animals	Medium	Mérida	Y	NA
12	ALIMENTOS BALANCEADOS LORGAM	Production of animal feed	Medium	Mérida	Y	NA
13	BARCEL PLANTA MERIDA	Preparation of snacks	Medium	Mérida	Y	NA
14	EL YUCATECO SALSAS Y CONDIMIENTOS	Conservation of stews and other foods prepared by processes other than freezing	Medium	Kanasín	Y	NA
15	GAMESA PLANTA YUCATAN	Preparation of biscuits and pasta for soup	Medium	Mérida	Y	NA
16	HARINAS DEL SURESTE	Preparation of wheat flour	Medium	Mérida	Y	NA
17	PLANTA INDUSTRIAL	Corn flour elaboration	Medium	Mérida	Y	NA
18	PROSUSA	Preparation of sausages and other preserves of meat of cattle, birds and other edible animals	Medium	Umán	N	NA
19	QUALTIA ALIMENTOS OPERACIONES	Preparation of sausages and other preserves of meat of cattle, birds and other edible animals	Medium	Mérida	Y	NA
20	AGROYUC	Slaughter of livestock, birds and other edible animals	Medium	Tizimín	N	NA
21	ALIMENTOS BALANCEADOS LORGAM	Production of animal feed	Medium	Mérida	N	NA
22	ALIMENTOS ZU	Cutting and packing meat from livestock, poultry and other edible animals	Medium	Mérida	N	NA
23	PLANTA PROCESADORA DE CITRICOS	Preparation of concentrates, powders, syrups and flavor essences for beverages	Medium	Mérida	Y	NA
24	ATLANTIDA DEL SUR	Preparation and packaging of fish and seafood	Medium	Mérida	Y	NA
25	FRUTAS CONCENTRADAS SAPI DE CV	Preparation of concentrates, powders, syrups and flavor essences for beverages	Medium	Ticul	Y	NA
26	GRUPO PORCICOLA MEXICANO	Production of animal feed	Medium	Umán	Y	NA
27	INDUSTRIALIZADORA DE ALIMENTOS DEL SURESTE	Traditional bakery	Medium	Mérida	N	NA
28	MALTA TEXO DE MÉXICO	Production of animal feed	Medium	Umán	Y	NA
29	P C P DEL SURESTE	Production of animal feed	Medium	Umán	Y	NA
30	PESCAMEX	Preparation and packaging of fish and seafood	Medium	Progreso	N	NA
31	PROVI	Production of animal feed	Medium	Mérida	Y	NA
32	REPOSTERÍA FINA TERE CAZOLA	Traditional bakery	Medium	Mérida	Y	NA
33	AVENA RIVERO	Preparation of breakfast cereals	Small	Mérida	Y	NA
34	BOTANAS TORRITOS	Preparation of snacks	Small	Mérida	Y	NA
35	DAIRY QUEEN	Traditional bakery	Small	Mérida	Y	NA
36	EMPACADORA DORANTES	Preparation of sausages and other preserves of meat of cattle, birds and other edible animals	Small	Mérida	Y	NA
37	ENLACE COMERCIAL Y LOGISTICO BARBS	Preparation of other foods	Small	Umán	Y	NA
38	FORRAJES Y GRANOS AGROPECUARIOS DE YUCATAN PLANTA	Production of animal feed	Small	Muna	Y	NA
39	GRANJAS KAKI PLANTA DE ALIMENTOS	Production of animal feed	Small	Kanasín	Y	NA
40	INDUSTRIA AGRÍCOLA MAYA, S.A. DE C.V.	Preparation of condiments and dressings	Small	Mérida	Y	NA
41	KIMPEN	Preparation of concentrates, powders, syrups and flavor essences for beverages	Small	Mérida	Y	NA
42	MYN NUTRICIÓN ANIMAL ESPECIALIZADA	Production of animal feed	Small	Mérida	Y	NA
43	PANIFICADORA EL RETORNO SUCURSAL CORTE SARMIENTO	Traditional bakery	Small	Mérida	Y	NA
44	PANIFICADORA LA MEJOR	Traditional bakery	Small	Tizimín	N	NA
45	AGRIBRANDS PURINA MÉXICO	Production of animal feed	Small	Mérida	Y	NA
46	ALIMENTOS Y BOTANAS HERRERA, S.A. DE C.V.	Preparation of snacks	Small	Mérida	Y	NA
47	BUENAVENTURA	Production of animal feed	Small	Umán	Y	NA
48	CAFE TOSTADO DE EXPORTACION	Preparation of instant coffee	Small	Umán	Y	NA
49	CAIMAN PRODUCTS	Preparation and packaging of fish and seafood	Small	Progreso	Y	NA
50	COMERCIALIZADORA FUEGO MAYA, S. DE R.L. DE C.V.	Conservation of stews and other foods prepared by processes other than freezing	Small	Mocochá	Y	NA

Appendix J: Top 50 list of reviewed Textile companies per size in Yucatan according to DENUE

No	Company name	Main activity	Size	Location	Website	Corporate report
1	DESARROLLO INDUSTRIAL FITEC S DE RL DE CV	Rope manufacturer	Large	Mérida	N	NA
2	HHGROUP MEXICO	Curtain & similar manufacturer	Large	Hunucmá	N	NA
3	HONG HO MEXICO	Confection in series of other outerwear of textile materials	Large	Valladolid	N	NA
4	INDUSTRIAS OXFORD DE MERIDA	Confection in series of other outerwear of textile materials	Large	Mérida	Y	NA
5	JERZEES YUCATAN	Confection in series of other outerwear of textile materials	Large	Tixkokob	N	NA
6	MANUFACTURERA LEE DE MEXICO S DE RL DE CV	Confection in series of other outerwear of textile materials	Large	Acanceh	Y	Yes
7	MONTY INDUSTRIES	Confection in series of other outerwear of textile materials	Large	Motul	Y	NA
8	OPERADORA GANSO AZUL S DE RL DE CV	Uniforms manufacturer	Large	Mérida	Y	NA
9	PLANTA HALACHO	Confection in series of other outerwear of textile materials	Large	Halachó	N	NA
10	SISALTEX	Carpets & Rugs manufacturer	Large	Mérida	N	NA
11	VERTICAL KNITS	Knitting exterior clothes manufacturer	Large	Baca	Y	NA
12	ALABAMA MÉXICO	Confection in series of other outerwear of textile materials	Medium	Conkal	N	NA
13	ALBANY YUCATAN	Curtain & similar manufacturer	Medium	Mérida	N	NA
14	ALEPH FASHION INDUSTRIES SA DE CV	Uniforms manufacturer	Medium	Mérida	N	NA
15	BONY LINGERIE SA DE CV	Confection in series of underwear and sleep	Medium	Mérida	N	NA
16	CIELO MANUFACTURING	Knitting exterior clothes manufacturer	Medium	Tizimín	N	NA
17	GIOTEX	Preparation and spinning of natural soft fibers	Medium	Umán	Y	NA
18	HILOS AGRICOLAS	Preparation and spinning of natural hard fibers	Medium	Mérida	Y	NA
19	LOUIS GARNEAU	Uniforms manufacturer	Medium	Mérida	Y	NA
20	MANUFACTURA TEMAX	Confection in series of other outerwear of textile materials	Medium	Temax	N	NA
21	TEXTIYUC	Confection in series of other outerwear of textile materials	Medium	Ixil	Y	NA
22	FABRICA DE ROPA	Uniforms manufacturer	Medium	Mérida	N	NA
23	GRUPO MATRIX	Threads for sewing and embroidery manufacturer	Medium	Umán	Y	NA
24	GUAYABERAS MÉXICO	Shirts manufacturer	Medium	Mérida	N	NA
25	GUAYABERAS YUCATECAS	Shirts manufacturer	Medium	Mérida	Y	NA
26	JARCIAS Y RAFIAS SA DE CV	Rope manufacturer	Medium	Conkal	N	NA
27	KOMUK	Rope manufacturer	Medium	Umán	N	NA
28	MANUFACTURERA DE ROPA MERIDANA	Uniforms manufacturer	Medium	Mérida	Y	NA
29	MAQUILADORA ARTESANAL YUCATECA	Rope manufacturer	Medium	Tixkokob	Y	NA
30	MAQUILADORA GLATEX GLAMUR TEXTIL	Confection in series of other outerwear of textile materials	Medium	Cacalchén	N	NA
31	MAQUILADORA MODATEX	Confection in series of other outerwear of textile materials	Medium	Sevé	N	NA
32	PCO TEXTILES	Confection in series of other outerwear of textile materials	Medium	Mérida	N	NA
33	RAMS COTTONS	Confection in series of other outerwear of textile materials	Medium	Mérida	Y	NA
34	SAFETY OFF SHORE OF MÉXICO	Other clothes & accessories not classified manufacturer	Medium	Mérida	Y	NA
35	SALMÓN INDUSTRY, S.A. DE C.V.	Confection in series of other outerwear of textile materials	Medium	Mérida	N	NA
36	SOLINOI	Knitting interior clothes manufacturer	Medium	Hunucmá	Y	NA
37	UNISYSTEMS S DE RL DE CV	Uniforms manufacturer	Medium	Tecoh	N	NA
38	VESTIR Y CONFECCION SA DE CV	Shirts manufacturer	Medium	Mérida	Y	NA
39	AUGUSTA SPORTSWEAR DE MEXICO	Confection in series of other outerwear of textile materials	Small	Mérida	Y	NA
40	BASH	Confection in series of other outerwear of textile materials	Small	Chicxulub Pueblo	N	NA
41	COPROTEX	Confection in series of other outerwear of textile materials	Small	Tzucacab	Y	NA
42	GARMETS TEXTIL	Confection in series of other outerwear of textile materials	Small	Halachó	N	NA
43	GUAYABERAS RAVGO	Shirts manufacturer	Small	Mérida	N	NA
44	INDUSTRIAS DEL REYNO BEZALEEL	Knitting exterior clothes manufacturer	Small	Hunucmá	N	NA
45	JARCIAS DIAMANTE	Rope manufacturer	Small	Mérida	Y	NA
46	MAQUILADORA GEMA	Uniforms manufacturer	Small	Tekantó	Y	NA
47	NINA CAROL'S	Confection in series of other outerwear of textile materials	Small	Mérida	Y	NA
48	SPORT DEPOT MATRIZ	Uniforms manufacturer	Small	Mérida	Y	NA
49	SUBLITEX MEX	Handbags, suitcases and similar manufacturer	Small	Mérida	Y	NA
50	TALLER DE CONFECCIONES EL NARANJO	Uniforms manufacturer	Small	Homún	N	NA

Appendix K: Top 50 list of reviewed Food companies per size in South Yorkshire according to FAME Database

No	Company name	Main Activity	Size	Location	Website	Corporate Report
1	GRUPO BIMBO UK LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Large	Rotherham	Y	NA
2	FRESH-PAK CHILLED FOODS LIMITED	Chilled food products	Large	Barnsley	Y	NA
3	J G PEARS (NEWARK) LIMITED	Production of meat and poultry meat products	Large	Sheffield	Y	NA
4	WOOLLEY BROS. (WHOLESALE MEATS) LIMITED	Processing and preserving of meat	Large	Sheffield	N	NA
5	SARVAL LIMITED	Manufacture of prepared animal feeds for farm animals	Large	Doncaster	Y	Yes
6	PARAGON QUALITY FOODS LTD	Production of meat and poultry meat products	Medium	Doncaster	Y	NA
7	HAYWOOD AND PADGETT LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Medium	Barnsley	N	NA
8	NORTECH FOODS LIMITED	Manufacture of oils and fats	Medium	Doncaster	Y	NA
9	TEAMPARTNER LIMITED	Activities of head offices	Medium	Sheffield	N	NA
10	THOMAS TUCKER LIMITED	Manufacture of sugar confectionery	Medium	Sheffield	Y	NA
11	SARGENTS BAKERIES LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Medium	Doncaster	Y	NA
12	STREET EATS FOOD LIMITED	Manufacture of other food products n.e.c.	Medium	Sheffield	N	NA
13	GO2 FOODS LIMITED	Manufacture of other food products n.e.c.	Medium	Doncaster	Y	NA
14	FOSTERS BAKERY (STAINCROSS) LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Medium	Barnsley	Y	NA
15	KINGASIA FOODS LIMITED	Manufacture of prepared meals and dishes	Medium	Doncaster	N	NA
16	WORLD BUSINESS TRADE LIMITED	Processing and preserving of meat	Small	Doncaster	N	NA
17	SNACK BRANDS LIMITED	Production of meat and poultry meat products	Micro	Sheffield	Y	NA
18	FLORA (UK) LTD	Production of meat and poultry meat products	Micro	Sheffield	N	NA
19	STEEL CITY BREWING LTD	Manufacture of beer	Micro	Sheffield	N	NA
20	A.L.SIMPKIN & CO.LIMITED	Manufacture of cocoa, and chocolate confectionery	Micro	Sheffield	Y	NA
21	HENDERSONS (SHEFFIELD) LIMITED	Manufacture of condiments and seasonings	Micro	Sheffield	Y	NA
22	RHODES OF THORNE LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Doncaster	N	NA
23	GOLDTHORPE'S(CORNMILLERS)LIMITED	Grain milling	Micro	Sheffield	N	NA
24	STANIFORTHS (RAWMARSH) LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Rotherham	Y	NA
25	WRAYS(BUTCHERS)LIMITED	Food retailing and sausage manufacturing	NA	Sheffield	N	NA
26	SUPA AQUATIC SUPPLIES LIMITED	Manufacture of prepared animal feeds for farm animals	Micro	Sheffield	Y	NA
27	WATERALL BROTHERS (SHEFFIELD) LIMITED	Wholesaling and retailing of meat products.	Micro	Sheffield	Y	NA
28	MAXONS LIMITED	Manufacture of sugar confectionery	Micro	Sheffield	Y	NA
29	POTTS (BAKERS) LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Barnsley	Y	NA
30	OLDFIELDS OF BARNSLEY LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Barnsley	N	NA
31	CRUSTY COB SHOP LIMITED(THE)	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Doncaster	N	NA
32	S.D. PARR & COMPANY LIMITED	Other processing and preserving of fruit and vegetables	Micro	Barnsley	Y	NA
33	TEASDALES BAKERS (HOLDINGS) LTD	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Doncaster	Y	NA
34	NORTHERN CATERING BUTCHERS LIMITED	Production of meat and poultry meat products	Micro	Rotherham	Y	NA
35	POTTERS OF BARNSLEY LIMITED	Production of meat and poultry meat products	Micro	Barnsley	Y	NA
36	THE TOPPING PIE COMPANY LIMITED	Manufacture of other food products n.e.c.	Micro	Doncaster	Y	NA
37	THE KELHAM ISLAND BREWERY LIMITED	Manufacture of beer	Micro	Sheffield	Y	NA
38	BARKERS THE BAKERS LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Sheffield	N	NA
39	TEA PROJECTS LIMITED	Production of coffee and coffee substitutes	Micro	Sheffield	N	NA
40	N LEVICK & SON LIMITED	Manufacture of prepared animal feeds for farm animals	Micro	Doncaster	N	NA
41	CONVERSION SERVICES LIMITED	Other processing and preserving of fruit and vegetables	Micro	Doncaster	N	NA
42	ABBEYDALE BREWERY LIMITED	Manufacture of beer	Micro	Sheffield	Y	NA
43	LINCHIPS LIMITED	Processing and preserving of potatoes	Micro	Doncaster	Y	NA
44	MOORES BAKERY LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Doncaster	N	NA
45	THOMAS BAKERS LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Sheffield	N	NA
46	ACORN BREWERY OF BARNSLEY LIMITED	Manufacture of beer	Micro	Barnsley	Y	NA
47	BLYTON ICE CREAM LIMITED	Manufacture of ice cream	Micro	Rotherham	Y	NA
48	YORKSHIRE CRISP COMPANY LIMITED	Manufacture of other food products n.e.c.	Micro	Sheffield	Y	NA
49	TURNER'S BAKERS LIMITED	Manufacture of bread; manufacture of fresh pastry goods and cakes	Micro	Sheffield	Y	NA
50	MANDAFOODS LIMITED	Manufacture of condiments and seasonings	Micro	Barnsley	Y	NA

Appendix L: Top 50 list of reviewed Textile companies per size in per size in South Yorkshire according to FAME Database

No	Company name	Main activity	Size	Location	Website	Corporate report
1	CHRISTYS BY DESIGN LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Medium	Barnsley	Y	NA
2	A.T.C. MANUFACTURING LIMITED	Preparation and spinning of textile fibres	Medium	Barnsley	N	NA
3	EMPIRE TAPES PLC	Manufacture of other wearing apparel and accessories not else where classified	Medium	Rotherham	Y	NA
4	PANACHE CONTRACT LINGERIE LIMITED	Underwear and nightwear for women	Micro	Sheffield	Y	NA
5	WALTER H.FELTHAM & SON LIMITED	Manufacture of canvas goods, sacks, etc.	Small	Sheffield	Y	NA
6	CHRISTY DRESSUP LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Barnsley	N	NA
7	E.RUSSUM & SONS,LIMITED	Manufacture of workwear	Small	Rotherham	Y	NA
8	TAYLORTEX LIMITED	Preparation and spinning of textile fibres	Micro	Rotherham	N	NA
9	DENBY DALE SHIRT CO., LIMITED	Manufacture of workwear	Micro	Barnsley	Y	NA
10	P.D. PATTERN BOOKS LIMITED	Manufacture of carpets and rugs (other than woven or tufted)	Micro	Sheffield	Y	NA
11	MOONLIGHT TEXTILES LIMITED	Manufacture of soft furnishings	Micro	Sheffield	Y	NA
12	P.G.S. SUPPLIES LIMITED	Manufacture of canvas goods, sacks, etc.	Micro	Sheffield	Y	NA
13	STYLE WORKWEAR LTD.	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
14	BUFFALO SYSTEMS LIMITED	Manufacture of women's outerwear, other than leather clothes and workwear	Micro	Sheffield	Y	NA
15	BEAMSHAPE LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
16	CHRISTOPHER JAMES CONTRACTS LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Doncaster	Y	NA
17	ENDURAFLEX LIMITED	Manufacture of workwear	Micro	Barnsley	Y	NA
18	JENE TEX LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Rotherham	Y	NA
19	MOON CLIMBING LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
20	DRAY LUGGAGE LIMITED	Manufacture of luggage, handbags and the like, saddlery and harness	Micro	Doncaster	N	NA
21	EUROBROID LIMITED	Finishing of textiles	Micro	Sheffield	Y	NA
22	S & S CLOTHING (U.K.) LIMITED	Manufacture of workwear	Micro	Rotherham	Y	NA
23	RECOVERY INSULATION LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
24	BLIND BEAUTY LIMITED	Other business support service activities not else where classified	Micro	Sheffield	Y	NA
25	KUSTOMSPORT LIMITED	Finishing of textiles	Micro	Barnsley	Y	NA
26	BLINDMASTERS (SOUTH YORKSHIRE) LIMITED	Manufacture of soft furnishings	Micro	Rotherham	N	NA
27	THROSTLE NEST SADDLERY LIMITED	Manufacture of luggage, handbags and the like, saddlery and harness	Micro	Barnsley	Y	NA
28	FIREENGINES 4 SALE LIMITED	Finishing of textiles	Micro	Doncaster	Y	NA
29	CURTAINS AND BLINDS BY JAYNE LIMITED	Manufacture of household textiles (other than soft furnishings)	Micro	Doncaster	Y	NA
30	FIBRE HARVEST LIMITED	Preparation and spinning of textile fibres	Micro	Sheffield	Y	NA
31	BAG IT DON T BIN IT LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
32	STITCH N PRINT LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
33	MARK PASHLEY LIMITED	Manufacture of soft furnishings	Micro	Doncaster	Y	NA
34	STUDIO 805 LIMITED	Manufacture of men's outerwear, other than leather clothes and workwear	Micro	Doncaster	Y	NA
35	DAMAR WEBBING SOLUTIONS LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
36	ATOMIC 56 LIMITED	Manufacture of men's outerwear, other than leather clothes and workwear	Micro	Sheffield	Y	NA
37	PISTOL BOUTIQUE LIMITED	Finishing of textiles	Micro	Doncaster	Y	NA
38	WHMPARTNERS UK LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	N	NA
39	GORAL AND SON LTD	Manufacture of footwear	Micro	Sheffield	Y	NA
40	CH JEWELLERY LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
41	PATTINGHAMSUPPLIES LTD	Manufacture of women's outerwear, other than leather clothes and workwear	Micro	Barnsley	N	NA
42	DEBBIE CARLISLE LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	Y	NA
43	CHARISMA BLINDS (SOUTH YORKSHIRE) LIMITED	Manufacture of soft furnishings	Micro	Sheffield	Y	NA
44	NBROID & PRINT LIMITED	Finishing of textiles	Micro	Sheffield	N	NA
45	LOOSE COVERS YORKSHIRE LTD	Manufacture of soft furnishings	Micro	Rotherham	Y	NA
46	STATIC CLOTHING UK LTD	Manufacture of other wearing apparel and accessories not else where classified	Micro	Rotherham	Y	NA
47	TALLOWIN LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Sheffield	N	NA
48	SBD APPAREL LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Rotherham	Y	NA
49	CHANDLER & PEACOCK LIMITED	Manufacture of household textiles (other than soft furnishings)	Micro	Sheffield	Y	NA
50	BOWSON INDUSTRIES LIMITED	Manufacture of other wearing apparel and accessories not else where classified	Micro	Doncaster	N	NA

Appendix M: Complete NVIVO coding structure