Global Food Industry Supply Chains in Times of Crisis Through a Sustainable Supply Chain Lens

The reaction of the food industry in Western Europe

Beatriz Pérez Horno

Eleanor Roberts

Leadership and Organisation
Degree of Master of Arts (60 credits) with a Major in Leadership and Organisation
Master Thesis with a focus on Leadership and Organisation for Sustainability (OL646E), 15 credits
Spring 2020
Hope Witmer
**Title:** Global Food Industry Supply Chains in Times of Crisis Through a Sustainable Supply Chains Lens - *The Reaction of the Food Industry in Western Europe.*

**Authors:** Beatriz Pérez Horno, Eleanor Roberts

**Main field of study:** Leadership and Organisation

**Type of degree:** Degree of Master of Arts (60 credits) with a Major in Leadership and Organisation

**Subject:** Master Thesis with a focus on Leadership and Organisation for Sustainability (OL646E), 15 credits

**Period:** Spring 2020

**Supervisor:** Hope Witmer
Abstract

The impact of the current global pandemic is felt worldwide, across all industries. However, research has shown that the food industry has been particularly affected, exposing supply chain vulnerability, and therefore the need for resilience and proper management in future. The study aims to understand how supply chains in the food industry in Western Europe are managed and how they react to overcome challenges that relate to the existing crisis. Furthermore, it intends to use the current circumstances as a learning opportunity for sustainable supply chain development in the future. To analyse present conditions, interviews with professionals in food supply chains were conducted. These allowed the researchers to uncover the implemented practices and the difficulties faced and understand their relation to Sustainable Supply Chain Management (SSCM) and Supply Chain Resilience (SCRES), including how these professionals foresee the future of the food industry in the short- and long-term. The different organisations were divided in two groups: short and long supply chains, to understand the differences and commonalities among these. The analysis of the responses highlighted that the main focus of these organisations was the financial wellbeing of all stakeholders. This shared aim, ensured by collaboration, shorter supply chains, and digitalisation, enabled quick performance adaptation to new regulations and implementation of shared initiatives for collective survival. The researchers conclude that companies should implement sustainable supply chain practices holistically by considering environmental, social, and economic aspects, to address the future climate dilemma, with a special focus on resilience within the economic pillar of SSCM. To avoid the reiteration of a global supply chain collapse, the findings point to the need for better control of the supply chain network, more advanced planning for digital transformation, and building close relationships among all stakeholders, founded on trust and reciprocal collaboration. Further research to be considered is the need to uncover the rationale behind decision-making and to understand the suppliers’ perspective.

Key words: Sustainable Supply Chain Management, Supply Chain Resilience, food industry, crisis response
# Table of Contents

1. Introduction .................................................................................................................. 1

   1.1. Background.............................................................................................................. 1
       1.1.1. Global food supply chains ............................................................................. 1
       1.1.2. Effects of Covid-19 on food supply chains ................................................... 1

   1.2. Research problem .................................................................................................. 2

   1.3. Aim ......................................................................................................................... 2

   1.4. Research questions ............................................................................................... 3

   1.5. Previous research .................................................................................................. 3
       1.5.1. Supply Chain Resilience .............................................................................. 3
       1.5.2. Sustainable Supply Chain Management .......................................................... 5
       1.5.3. The food industry before Covid-19 ................................................................. 7
       1.5.4. The food industry during Covid-19 ................................................................. 8
       1.5.5. The forecasted food industry after Covid-19 .................................................... 9

   1.6. Layout .................................................................................................................... 10

2. Theory .......................................................................................................................... 11

   2.1. Global Supply Chain Management ....................................................................... 11

   2.2. Network theory ...................................................................................................... 11

   2.3. Crisis Theories ...................................................................................................... 12
       2.3.1. Risk and Crisis Management ....................................................................... 12
       2.3.2. Resilience ...................................................................................................... 13

   2.4. The role of sustainability in supply chains ............................................................ 14

3. Methodological Framework ......................................................................................... 15

   3.1. Ontological and Epistemological Approach .......................................................... 15

   3.2. Research Design .................................................................................................... 15

   3.3. Methods and Methodology .................................................................................. 15
       3.3.1. Data Collection ............................................................................................. 15
       3.3.2. Data Analysis ............................................................................................... 16

   3.4. Reliability and Validity .......................................................................................... 16

   3.5. Limitations ............................................................................................................ 17

4. Analysis ......................................................................................................................... 19

   4.1. Presentation of Interviewees ................................................................................. 19

   4.2. Global food supply chain management ................................................................. 21
       4.2.1. Difficulties ..................................................................................................... 22
       4.2.2. Solutions ....................................................................................................... 22

   4.3. Network analysis ................................................................................................... 24

   4.4 Response to crisis: Crisis management and SCRES .................................................. 25
       4.4.1. Practices ........................................................................................................ 25
       4.4.2. Drivers .......................................................................................................... 27
       4.4.3. Barriers ......................................................................................................... 28

   4.5. The role of sustainability in supply chains: SSCM ................................................ 29
       4.5.1. Practices ........................................................................................................ 29
       4.5.2. Drivers .......................................................................................................... 31
Table of Tables

Table 1: List of interviewees and their relationship to Food Supply Chain Management .......... 19
Table 2: Analysis of interviewees responses ................................................................. 21
Table 3: PESTLE Analysis ......................................................................................... 25
Acknowledgements

The researchers would like to thank the academic staff of Malmö University Urban Studies department, with special recognition of Hope Witmer’s invaluable input and words of advice. Additionally, the authors are grateful for the influence of their SALSU 2019-20 course mates; the openness and diversity of experiences within the class made for an unparalleled learning environment.

Immense gratitude is owed to the interviewees for participating and supporting our research, especially considering the difficulties of the current situation and the limited time available.

Lastly, the authors would like to express immeasurable thanks to their friends, families, and housemates, whose support and endless patience has made this thesis possible.
Glossary

**Bullwhip effect:** A swift contraction in demand that provokes an amplified reaction in upstream SC activities that becomes increasingly severe as disruption in demand propagates up the chain of suppliers.

**Daisy chain:** Shifting the production around the network to create a system that is flexible enough to produce every item, even if one facility is disrupted.

**Just-in-time supply chains:** An inventory and management strategy that lines up raw materials from suppliers directly with production schedules to increase efficiency and reduce waste. Goods are ordered only as they are needed for production, reducing inventory costs and helping with demand anticipation.

**Risk pooling:** The reduction in overall risk volatility by accumulating multiple risks, reducing operational demand volatility.

Abbreviations

**BCP:** Business Continuity Plan.

**Covid-19:** CoronaVirus Disease 2019.

**FAO:** Food and Agriculture Organisation

**FSC:** Food Supply Chain

**GSC:** Global Supply Chain

**LCA:** Life Cycle Analysis.

**SC:** Supply Chain

**SCRES:** Supply Chain Resilience.

**SCRM:** Supply Chain Risk Management.

**SDG:** Sustainable Development Goal.

**SSCM:** Sustainable Supply Chain Management.

**WHO:** World Health Organisation

**WTO:** World Trade Organisation
1. Introduction

The impact of the Covid-19 pandemic continues to be felt worldwide, across all industries. This pandemic has resulted in a global financial crisis (Cagle, 2020; Reeves, Lang, & Carlsson-Szlezak, 2020; WTO, 2020b), and currently, the path to recovery is unclear. Food industry supply chains have been drastically affected by these events (Ayittey, Ayittey, Chiwero, Kamasah, & Dzuvor, 2020). There has been a dramatic change in consumer behaviour, with an increased focus on food, resulting in amplified pressure on food retail establishments to ensure that their shelves are stocked, and certain producers in the supply chain have struggled to meet demand (Morton, 2020).

Concurrently, the food service industry is facing an altogether different issue, with restaurants and cafes being closed worldwide. The crisis has shown both the vulnerability and weakness of current food supply chains and the necessity for resilience and proper management. This research will analyse the varying reactions of global food supply chains in Western Europe, considering what roles Supply Chain Resilience (SCRES) and Sustainable Supply Chain Management (SSCM) play in a crisis response.

1.1. Background

1.1.1. Global food supply chains

Due to globalisation, many companies have worldwide networks, entailing an extended and complex supply chain, which involves longer and geographically expanded supply networks, longer lead times, and additional actors (Chkanikova, 2012). This, together with global competition, weakens the system and increases the chances for things to go wrong (Chkanikova, 2012; Fernandes, 2020). To increase competitiveness, these SCs require tight coordination and lean operations, not only in production and inventory, but within all areas of the SC, to confront issues such as demand unpredictability, overstock or understock, and consequent higher costs (Carden, Maldonado, & Boyd, 2018; Sheffi, 2015).

1.1.2. Effects of Covid-19 on food supply chains

Humanity currently faces one of the biggest global crises in over a century, greater than the 2007/8 economic crisis and the beginning of the Great Depression (Cagle, 2020; Petetin, 2020) and this heavily impacts the food industry. All decisions taken will shape the post-Covid scenario regarding the economy, politics, society, and culture (Fernandes, 2020; Harari, 2020). In such globally interconnected systems, the impact of this crisis affects all actors, regardless of the provenance of the disruption (Fernandes, 2020; Sheffi, 2015). The severity of the effects varies across companies, based on factors such as the existence of alternative suppliers, the reliance on just-in-time production or accumulated inventories (Pinner, Rogers, & Samandari, 2020). This disruption in global food systems and resources has entailed a torrent of effects throughout all different levels of supplier networks (Ayittey et al., 2020; Chkanikova, 2012; Fernandes, 2020), as consumers have reverted to a situation of uncertainty, whereby they must ensure that they can fulfil their basic physiological needs (Berlin-Broner & Levin, 2020).

Covid-19 has led to major economic disruption for the EU, with effects such as global supply shock, customer demand shock, and the impact of liquidity constraints, as well as financial destabilisation of firms and individual households (Ayittey et al., 2020; European Commission, 2020; Fernandes, 2020; Gormsen & Koijen, 2020). The restrictive measures to halt the spread of Covid-19 have dramatically affected the EU’s food supply system. Supply chains have suddenly lost vital links, leading to large quantities of food waste (Cagle, 2020). To prevent this from reoccurring, the EU Commissioner for Agriculture emphasises the need to make agriculture more resilient and reduce the distance from “farm to fork” (Sánchez Nicolás, 2020). Moreover, the virus has revealed some flaws of the current global and unsustainable SCs in the food industry, based on long, specialised chains and strong dependence on migrant workers. According to a senior policy officer of the World Wildlife Fund, the “farm to fork”
strategy should not wait any longer, aiming for resilient, sustainable, and robust food systems (Sánchez Nicolás, 2020). Furthermore, even though some companies spread resources through several countries to minimise risks and become more flexible, in spite of higher costs (Fernandes, 2020), the crisis has changed how companies structure these networks (Gutiérrez, 2020; Reeves et al., 2020). In some cases, chains have become more localised (Cappelli & Cini, 2020; Fernandes, 2020). However, the European Commission has called for close collaboration between governments and a decisive, coordinated economic response (European Commission, 2020; Fernandes, 2020). There is a need for all countries and companies to work together to ensure the crisis is as short and limited as possible (European Commission, 2020). “If each government does its own thing in complete disregard of the others, the result will be chaos and a deepening crisis.” (Harari, 2020). Therefore, the European Commission is monitoring the impact on European industries and trade, together with national authorities and industry representatives, with a particular focus on the vital sectors of food production and supply (European Commission, n.d.).

1.2. Research problem

The current pandemic offers the opportunity to learn from Supply Chain Management in a crisis. The global crisis has drastically impacted the world economy and supply networks. The main problem derives from this impact and the lack of information regarding how supply chains can recover, especially with required adaptations to current working and societal conditions. Hence, the topic has potential practical implications for the future climate crisis.

The novelty of the pandemic and the current crisis situation reduces the applicability of previous crisis management strategies and reduces the ability to forecast demand, so organisations must rethink both their SCs and their strategies (Wetsman, 2020). Although organisations are currently focusing on this prevailing crisis, the impending climate crisis is likely to result in deeper and more frequent recessions (Gormsen & Koijen, 2020; Griffin, 2020; Reeves et al., 2020). There are many similarities between the current economic crisis and the impending climate crisis, as well as some differences (Appendix 1), all of which must be understood to ensure that the actions taken now are beneficial in the long-term (Harari, 2020; Sheffi, 2015). Hence, these crises can be the perfect driver and opportunity for companies to implement sustainability in their manufacturing processes to confront climate change and the economic crisis concurrently.

According to Watts (2020), the ‘normal’ way of doing business must change, investing in natural-life-supporting systems. Although sustainable goals have often been sidestepped in the past, the current crisis has shown the ability of organisations to adapt to rapidly changing situations and to rethink their business models and strategies in order to survive (ibid.). Sustainability helps companies gain competitive advantage, differentiate, avoid risks, and adapt to new regulations, but most importantly, reduce costs (Ellen Macarthur Foundation, n.d.). Therefore, there is a need for a “green”-recovery that will make societies more resilient to the likely impending climate crisis while helping them overcome the economic recession (Persson, 2020). Furthermore, the food industry is vital to sustain society, and therefore it is a priority to study the industry and ensure resilience. For this reason, the research purpose is to identify how organisations in the food industry experience the current crisis in terms of difficulties faced, practices implemented, and resilience or preparation plans for the future. This will allow the researchers to analyse the learnings, which could be implemented in advance of future crises to improve the response, and perhaps even mitigate the effects.

1.3. Aim

The main purpose of this research is to understand how supply chains in the food industry in Western Europe react to overcome challenges that relate to the existing crisis. Utilising two sustainable supply chain models - SSCM and SCRES - this research uncovers how the learnings from this current pandemic
crisis can be applied to sustainable development of supply chains in anticipation of the upcoming climate crisis. The pandemic entails a unique window of opportunity for radical transformation of the food industry towards a more resilient and sustainable future (Galanakis, 2020; Petetin, 2020; Sarkis, Cohen, Dewick, & Schröder, 2020). For this reason, the following research will discuss these characteristics within the SC through the lenses of SSCM and SCRES.

1.4. Research questions

In order to research the problem outlined above, this study answers the following question(s):

Main RQ: How are organisations in the food industry in Western Europe managing their supply chains in response to global crisis?

RQ 1: What are the key characteristics of global food supply chains and what are the main difficulties for these chains during a crisis?
RQ 2: Which aspects of SSCM and SCRES are organisations implementing to overcome the difficulties in their food supply chains?
RQ 3: How do professionals working with food industry supply chains perceive the future of these chains, both in the short and long-term in relation to sustainable development?

1.5. Previous research

Despite the short time frame since the start of the Covid-19 crisis, experts have already conducted a small body of research (e.g. Gern & Hauber, 2020; Gormsen & Kojjen, 2020; Nicola et al., 2020). However, this has mostly focused on medical research, consumer perspectives, or the global economy, rather than on an individual business perspective. Furthermore, these studies have been conducted reactively, given the circumstances, so there is no complete body of research available. Despite a thorough literature review, the authors of this study are not aware of any previous research, in which the responses of food industry supply chains to this crisis have been analysed. Although both governments and experts have mentioned the need to implement long-term thinking and consider the climate crisis, little has been discussed with regard to the environmental and social impacts of the survival measures taken. Therefore, there is a need to understand how the crisis is perceived and the extent to which sustainability is considered.

Before this study, a literature review around the concepts of SSCM and SCRES was conducted to grasp the associated practices, as well as the drivers and barriers for implementation within FSCs. This will also help when comparing and understanding how the pandemic has affected sustainable practices.

1.5.1. Supply Chain Resilience

Strong companies can survive and even thrive as a result of preparation and effective disruption management. A prevention plan accelerates a response, with pre-organised teams, plans, and pre-stocked secondary suppliers to reduce the probability of a large-scale disruption (Ponomarov & Holcomb, 2009). Resilience is understood as the capacity of a system to absorb disturbance and reorganise while changing to maintain its essential function, structure, and identity (Carpenter, Walker, Anderies, & Abel, 2001). In other words, the amount of change the system can undergo and the degree to which it can self-organise, learn, and adapt (Christopher & Peck, 2004).

If one applies this concept to organisations, it addresses the capability to anticipate, prepare, and respond to unexpected adverse situations, adapting to change and disruption to survive and prosper (Carden et al., 2018; Vecchi & Vallisi, 2019). These resilient companies invest in response strategies, either
defensive or progressive, creating assets (Carden et al., 2018). Investments in resilience can provide value and support growth, avoid loss of trust and reputation, cover unknown uncertain events, and bring competitive advantage even if no disruption ever occurs (Jüttner & Maklan, 2011). Resilience helps companies to compete and improve collaboration, coordination, and communication (Purvis, Spall, Naim, & Spiegler, 2016) and can be understood as a way to ensure economic sustainability. In some companies during the 2007/8 crisis, not only did internal departments collaborate more closely but also externally with logistics providers and competitors (Sheffi, 2015). Moreover, Supply Chain Resilience is a critical component in supply chain risk management (Dani & Deep, 2009). This multi-dimensional phenomenon entails an opportunity for SCs to be more competitive while addressing disruptions (Jüttner & Maklan, 2011). Therefore, managers must plan and design a SC network that can anticipate events and adapt while they maintain control over structure and function (Vecchi & Vallisi, 2019).

1.5.1.1. Practices

Resilience is considered indispensable to manage unpredictable challenges (Reeves et al., 2020). While there are several definitions of resilience, this paper will focus on the definition posited by Jüttner and Maklan (2011), whereby resilience is discussed within four competencies: flexibility, velocity, visibility, and collaboration.

Improving flexibility is key for resilient SCs. It encompasses redundancy and is the ability of the supply chain to absorb any changes caused by disruption or crisis (Jüttner & Maklan, 2011). An example of redundancy in the SC is having more than one factory developing the same product and decoupling safety stock activities from random variations, as, due to the global SC, inventories accumulate in many points (ibid.). Although redundancy does not allow for economies of scale, it is prudent to have at least two suppliers with different risk profiles (Sheffi, 2015). In the long-term, organisations can increase flexibility by information sharing and relationship building with each link of the SC, while also ensuring that they can easily reconfigure the SC if needed (Manders, Caniëls, & Ghijsen, 2016; Stevenson & Spring, 2007). Flexibility can also be seen as the capability to react quickly to disruptions (Ponomarov & Holcomb, 2009). For this reason, it is closely linked to velocity.

Velocity can be understood as the speed at which a SC can react to an event (Jüttner & Maklan, 2011). While flexibility emphasises the ability to respond and the subsequent efficacy of the adaptation, velocity focuses on efficiency and speed of recovery (ibid.). Velocity can either refer to the time it takes for a product to travel from one end of the supply chain to the other, or the speed of adaptation required (Christopher & Peck, 2004).

Visibility is another vital competence for SCRES, and organisations can increase this aspect by focusing on internal visibility, carrying out an analysis of the SC to ensure awareness of its strengths and weaknesses (Purvis et al., 2016). An organisation should also aim to increase visibility both upstream and downstream in the SC. Both can be achieved by collaboration, the first requires communication with customers to ensure production based on demand instead of projections, while the second demands information sharing to prepare for any potential risks (Christopher & Peck, 2004).

An organisation can also work to nurture social capital within the SC network in such a way that the culture becomes one of openness and trust, whereby collaboration is more natural for all parties within the SC (N. Johnson, Elliott, & Drake, 2013). Social capital refers to the amount of non-material assets that facilitate co-operation within and among groups based on characteristics such as trust, reciprocity, and solidarity (Praszkier & Nowak, 2012). Collaboration is vital to SCRES and is perhaps the most important competence during a crisis (Jüttner & Maklan, 2011). It facilitates flexibility, velocity, and visibility, by ensuring that the entire network is communicating and helping one another to adapt and survive (Christopher & Peck, 2004).
1.5.1.2. Drivers

As a result of recent globalisation, all actors within global supply chains are dependent upon and connected to one another, leading to complex networks, in which any disruption can expose the entire chain to unprecedented risk. As mentioned, SCRM is a large field of research and practice, whereas resilience is only recently beginning to become a focus (Jüttner & Maklan, 2011; Purvis et al., 2016). The definition of resilience provides an insight into one of the key drivers for implementing SCRES; it is “the ability of a system to return to its original state or move to a new, more desirable state after being disturbed” (Christopher & Peck, 2004, p. 4). This potential improvement is an attractive prospect for organisations, and therefore is a key driver to implement SCRES. A lack of collaboration among the SC network increases the SC vulnerability, as organisations can become isolated or may choose to keep hidden a potential impending risk (Christopher & Peck, 2004). Furthermore, this lack of collaboration can also increase costs if a product is produced unnecessarily or in excess quantities (ibid.). SCRES would assist organisations to avoid these issues, thus there are clear economic incentives for organisations that invest in SCRES, despite the costs associated with implementation (Chunsheng, Wong, Yang, Shang, & Lirn, 2019).

1.5.1.3. Barriers

There are many possible barriers to implementing SCRES. Pereira, Christopher, and Da Silva (2014, p. 632) noted that the most discussed barriers include “complexity,” “lack of information,” and “lack of flexibility”. Another often discussed barrier for implementing SCRES is the increased costs for the focal organisation. This becomes even more prominent during an economic crisis when organisations lack disposable revenue to implement these measures (Purvis et al., 2016). Although there are long-term financial benefits (Chunsheng et al., 2019), it may not be feasible to invest in SCRES during times of low cash flow. Another potential barrier for SCRES is the reluctance of organisations within the SC to be open with one another (Jüttner & Maklan, 2011), hindering visibility within the SC and therefore reducing resilience.

1.5.2. Sustainable Supply Chain Management

SSCM can be defined as the strategic inclusion of sustainability into all stages of the supply chain and life cycle, considering all three dimensions of sustainable development and different stakeholder needs (Marques, 2019; Miyazaki, 2014). With regard to the incorporation of sustainability within food industry supply networks, there are several practices, drivers, and barriers.

1.5.2.1. Practices

Regulatory frameworks and evolving consumer opinions result in improved social and environmental supply chain practices among multinational corporations, with the implementation of stringent codes of conduct for suppliers. To conform, supply chain management commitment is crucial, building effective and efficient relationships up- and down-stream with a focus on green practices (Green, Zelbst, Meacham, & Bhadauria, 2012). Therefore, some companies in the food industry are implementing SSCM by purchasing certified sustainable agricultural products and supporting sustainable farming in developing countries, on which the food industry depends for the obtainment of raw materials (Miyazaki, 2014). Sustainable supply chain practices vary by country and industry, but with regard to the food industry, there are many key environmental and social measures such as emissions reduction, minimising energy use and waste, improving worker safety, and the abolition of inequalities and poverty (Gupta & Palsule-Desai, 2011; Liu, Zhang, Hendry, Bu, & Wang, 2018; Marshall, McCarthy, Heavey, & McGrath, 2015; Miyazaki, 2014)

Auditing is the most utilised tool for enforcing and supervising these practices within SCs (Gupta & Palsule-Desai, 2011; Miyazaki, 2014). Focal firms can use their power and influence to encourage sustainability among their suppliers. Selecting suppliers properly, ensuring compliance with codes of
conduct, facilitating the adoption of lean production methods, and encouraging them to motivate employees for improved efficiency are all methods for this. However, to oversee this, organisations must develop standards, certifications, and new policies (Marshall et al., 2015), as well as establish measurement and reward systems for joint development and long-term relationship building. Furthermore, they must demand a minimum quality-based result (Kumar & Garg, 2017; Miyazaki, 2014). Collaboration and communication between managers and suppliers are vital, and can be encouraged by inclusive decision-making, raised awareness among all stakeholders, and education (Miyazaki, 2014). In addition, there is evidence that these audits increase in number during economic crises (Sheffi, 2015). By auditing their suppliers, organisations are not seeking to change their behaviour but rather to ensure that their practices meet a sufficient standard of sustainability, again considering all three pillars. This encourages collaboration between the supplier and focal organisation, resulting in long-term relationships with a foundation of trust and openness. In this manner, these relationships can provide a sustainable competitive advantage (Chkanikova, 2012).

It is necessary to develop well-functioning relationships and assess suppliers based on sustainable criteria, alongside conventional standards. There are four levels of sustainable sourcing strategies, the most basic of which requires choosing suppliers with similar health and safety and environmental standards (Hamner, 2006). The most developed involves monitoring all suppliers and results in collaborative and synergistic relationships (ibid.). When trying to introduce sustainability, multisource increases the risks due to larger supplier numbers (N. Johnson et al., 2013). In the food industry, food security is critical, therefore data regarding how the production is carried out is imperative (Manning, 2018). Thus, to ensure situational awareness and risk management (Christopher & Peck, 2004), traceability and controls of SC are tightened (Karutz, Riedner, Vega, Stumpf, & Damert, 2018).

Many regions rely on global supply chains. Therefore, the current “efficient” systems can also cause harm by reducing access of small-scale producers and family farmers to viable markets, as well as resulting in higher levels of food loss and waste (Braun, 2020). Furthermore, there can be food safety concerns, and the higher energy intensity and heavier ecological footprint associated with the lengthening of food chains (ibid.). Strengthened links between farms, markets, and consumers can be an important source of income growth and job creation in both rural and metropolitan areas (FAO, 2017). Food systems that link farmers to urban communities can help alleviate rural poverty and assist agricultural development, connecting small-scale producers and supermarkets through mutually beneficial agreements, giving importance to the development of local food systems (ibid.). Since the challenges facing food and agriculture are interconnected, addressing them will require national and international policy approaches (Braun, 2020). “More risk-informed, inclusive, and equitable resilience and development processes will be essential in preventing and resolving conflicts around the world” (FAO, 2017, p. 142). For companies to become more sustainable and manage risk in the long-term, the right balance between global and local supply chains needs to be found (Braun, 2020).

Moreover, to develop systems that encourage “sustainability, growth, equity, and resilience”, national policy change must play a vital role in shaping these new food systems (Rawe et al., 2019, p. 8). According to Rawe et al. (2019), Western European food systems are characterised by having small to industrial-sized farms; high concentration at both ends of the food supply chain; high greenhouse gas emissions from agricultural production; and high levels of food waste. The needed policies in these countries must be oriented towards high standards and strict controls on food quality and safety to incentivise and encourage sustainable and resilient food production, more efficient water-use, and alternative energy, and to reduce food waste (Rawe et al., 2019). This collaboration is key for the survival of companies and can either be (1) between internal business units; (2) between industries; (3) among competitors, creating alliances around the SDGs; (4) between businesses and the United Nations, encouraging multi-sectoral efforts based on UN initiatives; and (5) between nations (Chkanikova, 2012; Vati, n.d.).
1.5.2.2. Drivers

The universally growing environmental and ethical awareness is one of the many reasons for incorporating comprehensive sustainability goals into corporate behaviour (Carter, Hatton, Wu, & Chen, 2019). However, the predominant motivations for companies to move towards sustainable management include:

(1) To gain a competitive advantage, since SSCM enhances reputation and corporate image performance (Liu et al., 2018; Miyazaki, 2014; Wooten & James, 2008).
(2) A reactive response to external pressures from government regulations and potential competitors or to increasing pollution levels (Liu et al., 2018; Marques, 2019; Miyazaki, 2014).
(3) A rise in consumer consciousness and the consequent higher sales through the creation of a responsible reputation (Miyazaki, 2014).
(4) The increasing geographical dispersion of the supply chain, which makes traditional mechanisms ineffective (Marques, 2019) and favours risk management (Chen, Ji, & Wei, 2019; Miyazaki, 2014).

1.5.2.3. Barriers

However, these organisations also face barriers that make the implementation of SSCM measures difficult, such as:

(1) A lack of legislative framework, and ineffective existing regulation to force industries to adopt sustainable policies. Moreover, health and safety are prioritised when defining new ways of producing in the food industry (Miyazaki, 2014).
(2) A need for large investment, considering there is a lack of financial support and a consequent lack of new technologies (Miyazaki, 2014).
(3) The fear of failure, due to the subsequent increase in prices for their products and uncertainty of the consumer’s willingness to pay (Miyazaki, 2014).
(4) The difficulty to measure and monitor supplier practices, especially in complex chains, combined with low willingness to communicate and exchange information from some suppliers since it is seen as an exposure of their weaknesses (Marques, 2019). Furthermore, environmental regulations in developing countries can be mild and poorly enforced, with low minimum standard levels. Suppliers in these countries lack drivers, such as financial opportunity and information to improve their company’s sustainability performance, which makes it harder for the focal organisation to ensure the sustainability of their entire SC.

1.5.3. The food industry before Covid-19

The food supply chain comprises the processes, operations, and organisations responsible for the production and distribution of food products. This includes either fresh agricultural products or processed food, taking the food from its raw material state to the end consumer (Dani & Deep, 2009; Van Der Vorst, 2000). The benefits of globalisation within supply chains have been widely discussed, allowing developed countries to produce at a lower cost and benefit from economic opportunities; while lifting developing countries out of poverty to some degree (Jenny, 2020). Although the factors that shape the FSC change due to the fast-changing pace of the world, there are a number that are repeated across the different studies from the last decade. The main ones are (1) globalisation (Dani & Deep, 2009; Mena & Stevens, 2010); (2) the growth of these chains and their product portfolio, concluding in organisational complexity (Mena & Stevens, 2010); (3) sustainability and their corporate social responsibility, especially among these global chains due to new legislation and other external pressures (Dani & Deep, 2009; Mena & Stevens, 2010); and (4) the economic situation, with emphasis on the power of economic crisis, such as the one in 2008 (Mena & Stevens, 2010).
1.5.4. The food industry during Covid-19

Although the 2007/8 crisis cannot be compared with the current situation, due to the latter’s global impact and larger shock to supply chains (Fernandes, 2020), the earlier crisis demonstrated the dependence of organisations on suppliers of capital to “support themselves, their suppliers, and ensure customer demand” (Sheffi, 2015, p. 340). There is no doubt that Covid-19 has exposed the fragility of the food industry and provoked an unprecedented global economic recession (Petetin, 2020; Sarkis et al., 2020) that demands a revision of current food systems and the development of “resilient, sustainable and democratic agri-food systems” (Petetin, 2020, p. 1).

Due to the international trade inherent in current food supply chains, there is concern among Western countries, due to the dependency on foreign countries (Jenny, 2020). The lockdown of many countries has affected harvesting, production, processing, transport, logistics, and consumption patterns, resulting in increased raw material costs (Jenny, 2020; Petetin, 2020). Producers and the retail industry appear to be the most able to solve the demand fluctuation as they are the main source of food (Petetin, 2020). However, they are also among the most affected and therefore most vulnerable groups during the pandemic, as discussed below:

(1) Producers. Even though their work is key, as they provide the raw materials, the pandemic has exposed their dependence on other actors to sell their products. Covid-19 has also resulted in a lack of seasonal workers to harvest food, due to border restrictions (Kolodinsky, Sitaker, Chase, Smith, & Wang, 2020; Petetin, 2020) and animal feed and ingredients are affected, especially if these are imported (Shahidi, 2020). Nevertheless, some small family farms have been thriving, especially those who sell vegetables and fruit boxes directly to consumers (Kolodinsky et al., 2020; Petetin, 2020). This new way of approaching customers gives them power and information regarding the provenance of their food (Petetin, 2020).

(2) Restaurants. The closing of several businesses over long periods has not only resulted in bankruptcies and permanent closures, but also has affected demand forecasts (Kolodinsky et al., 2020; Petetin, 2020) and increased pressure on retail (Hobbs, 2020). Due to the difference in retail and service products, it is difficult to repurpose produce, and the loss in demand from restaurants is not adequately compensated for by retailers (Petetin, 2020).

(3) Retailers. They have dealt with major pressure, as demand has risen and there is a need to guarantee sufficient stock of all products (Nicola et al., 2020; Petetin, 2020). In addition, panic-buying had a significant impact on product shortages in the early weeks of the crisis (Cohen, 2020; Hobbs, 2020; Naja & Hamadeh, 2020; Nicola et al., 2020; Petetin, 2020; Shahidi, 2020).

(4) Transportation, delivery and distribution. Logistics operations are affected by the halt of trucks and containers at borders and a limitation in exports, which increase food waste (Hobbs, 2020; Naja & Hamadeh, 2020; Petetin, 2020).

Widely mentioned among researchers is the unpreparedness of current food supply chains for reshaping after the shift in demand. The lack of value of “just-in-time supply chains” in this situation has also been discussed, since these chains require high levels of coordination and effectiveness from all actors (Hobbs, 2020; Petetin, 2020; Sarkis et al., 2020). If just one sector is impacted, it results in a ripple effect that disturbs all others. It could be argued therefore that the pandemic was a test for current food systems, and the result is not positive (Petetin, 2020).

The lack of preparation has caused further effects in the food supply network. The main mentioned are the following:

(1) Demand fluctuation. Consumers, and even nations, began to stockpile food products because of the fear of disruption in supply chains (Cohen, 2020; Hobbs, 2020; Nicola et al., 2020; Petetin, 2020; Shahidi, 2020). Moreover, the purchased products changed, with high demand on products such as flour, and the reduction in demand of others (Hobbs, 2020; Naja & Hamadeh, 2020; Petetin, 2020), in particular, healthy and organic products (Kolodinsky et al., 2020). These variations needed to be tackled through swift adjustments with increased product flows and a focus on short-term reactions (Hobbs, 2020). Furthermore, consumers have shifted their behaviour by ordering online (Galanakis, 2020; Hobbs, 2020) or choosing smaller stores and
local suppliers (Hobbs, 2020). Disruptions in the flow of money affect the ability of consumers to purchase goods from retailers and of manufacturers to purchase parts and products from suppliers; this too affects demand, leading to a ‘bullwhip effect’ (Fernandes, 2020; Sheffi, 2015). In these cases, SC managers have to confront demand volatility - poor forecast accuracy, that will demand reactive tactics rather than a planned strategy - and a lack of visibility of the current market demand; this uncertainty leads to complex trade-offs (Sheffi, 2015).

(2) Food security. The FAO (Food and Agriculture Organisation) is suggesting specific strategies and measures regarding food security to implement in the SC. Moreover, regulations have been developed by governments and policymakers to control these (Galanakis, 2020).

(3) Food waste. Although some researchers mention the increase in food waste among producers (Petetin, 2020), others opine that food thrown away in households has reduced considerably (Jribi, Ismail, Doggui, & Debbabi, 2020). However, to ensure this continues long-term, there is a need to raise awareness and educate the population (Jribi et al., 2020).

(4) Digitalisation. Most workers are working from home and communicating online; this includes different actors within supply chains. Therefore, IT is a key element that is shaping the current reactions to Covid-19 and that will influence future scenarios (Sarkis et al., 2020). Furthermore, this enables decentralised manufacturing operations (Sarkis et al., 2020).

(5) Sustainability. The biggest cause of deterioration of the environment is unsustainable consumption and production behaviours, particularly in industrialised countries (Cohen, 2020; Galanakis, 2020). To tackle the increase in production demands, producers are introducing larger quantities of pesticides and fertilisers, which cause a setback for sustainable agriculture. However, it is thought this is merely a short-term measure to fix current problems and that sustainability will become a priority again in the long-term (Petetin, 2020).

The WHO (World Health Organisation), together with the FAO and WTO (World Trade Organisation), highlight the importance of solidarity and responsibility to enable all countries to work together and guarantee food safety and improve global welfare (WTO, 2020a).

1.5.5. The forecasted food industry after Covid-19

The crisis can act as a trigger, after which new, sustainable enterprises will emerge to facilitate a future that thrives within the planetary boundaries (Elkington, 2020). For future action, it is suggested that a new model for multilevel food governance is created, where a wide variety of actors are involved in the rebuilding and delivery of food systems based on sustainability and a food democracy model (Galanakis, 2020; Petetin, 2020; Sarkis et al., 2020). The pandemic, which has aggravated the existing weaknesses and tensions of global food supply chains, has forced the industry to rethink its systems. There is a need to give citizens the opportunity to actively participate in the construction of these new systems that will alter the way food is produced and consumed. Food democracy empowers society to transform food systems to reflect their values, selling sustainable products. It decentralises systems and gives an opportunity to focus on sustainability, local production, and development of stronger links between retailers and farms (Petetin, 2020). Collaborative and long-term supply chain relationships and partnerships with suppliers can help to reduce transaction costs, provide access to resources and expertise, and consequently boost productivity (Hobbs, 2020). Moreover, this will not only benefit food security but also will entail an improvement in cost efficiency and hence help companies to deal with the recession (Galanakis, 2020).

Although neither the short nor long-term impacts of the crisis can be predicted with any degree of certainty (Fernandes, 2020; Irwin, 2020), most researchers agree on the following characteristics of the future scenario:

(1) Reconsideration of food priorities. The growth in unemployment and decrease in household income is going to force consumers to shift their buying patterns (Kolodinsky et al., 2020; Petetin, 2020). Moreover, it is considered that, post-Covid-19, the new ‘normal’ will encourage healthy and nutritious diets (Cohen, 2020; Galanakis, 2020; Kolodinsky et al., 2020; Naja & Hamadeh, 2020; Petetin, 2020) and will make consumers more price sensitive (Hobbs, 2020).
2. Online demand. Due to health and security concerns, the amount of online orders has increased exponentially and therefore forced supermarkets to adapt to these increasing online demands, which may remain post-crisis (Galanakis, 2020; Hobbs, 2020; Petetin, 2020).

3. Shortened supply chains. The reduction of intermediaries to improve cost efficiency can mean reduced packaging, processing, and food miles and increased importance of farmers in the food system (Hobbs, 2020; Petetin, 2020). Food grown locally will help increase previously mentioned sustainable and healthier consumption patterns (Petetin, 2020). It will also impact transportation and distribution networks (Hobbs, 2020).

4. Local production. Linked to the previous characteristics, production is expected to become more local and hence encourage seasonal and healthy consumption (Hobbs, 2020; Kolodinsky et al., 2020; Petetin, 2020) and support the recovery of local economies (Hobbs, 2020; Kolodinsky et al., 2020). Moreover, the pandemic brings about a chance to train and develop skills for local workers, improving their working conditions and helping them receive decent wages. This ensures a reliable and long-lasting source of labour, helping to reduce local unemployment. There is a need to support these small family farms and SMEs for rural vitality (Petetin, 2020). Nevertheless, price and convenience remain strong drivers when shaping consumption patterns, which could result in a reversion to global SCs in the long run (Hobbs, 2020; Sarkis et al., 2020).

5. Food safety. This topic will be important not only for producers, retailers, and consumers (Galanakis, 2020), but also for governments and policymakers (Cohen, 2020).

6. The emergence of plant-based food. Due to the current health and stock issues, there has been a growth in the production and consumption of plant-based products and alternative proteins (Galanakis, 2020).

Although the current situation is a result of Covid-19, there is likely to be another economic crisis soon, possibly linked to the potential climate crisis (Gormsen & Kojjen, 2020; Reeves et al., 2020). Therefore, this crisis situation can provide a good opportunity to implement change, since there is likely to be less resistance from followers (Pinner et al., 2020). While sustainability can provide an opportunity to reduce operating costs and free up scarce capital locked in the SC, some actions taken to aid recovery may delay climate action; these include low prices for high-carbon emitters, the struggle to reconcile sustainable action with the economic need for recovery, the delay in capital allocation to new energy-efficient solutions, and national rivalries (Sheffi, 2015). Therefore, there is a need to reinforce national and international alignment and collaboration on sustainability, cost-efficiency, and digital transformation. This would provide organisations with new opportunities to make their operations more resilient and more sustainable with shorter SCs, higher energy efficiency in manufacturing and processing, and increased digitisation (Pinner et al., 2020).

1.6. Layout

The following chapter discusses the theoretical background utilised in the analysis. It begins with a review of global supply chain management, network theories, crisis theories, and sustainable SCs. Chapter 3 discusses the methodology utilised in this research study. Chapter 4 consists of an analysis of the answers of interviewees, which are studied through the theoretical lenses outlined in Chapter 2. Chapter 5 then answers the previously discussed Research Questions, before the research concludes in Chapter 6, with a discussion of limitations of the study and recommendations for further research.
2. Theory

This chapter introduces the theoretical concepts utilised in the research analysis. The chosen theories can be applied to discuss the current actions of organisations in the food industry within the context of Sustainable Supply Chain Management (SSCM) and Supply Chain Resilience (SCRES). For a better understanding of these, it is important to know the areas and the repercussions of global supply chains and the importance of networks.

2.1. Global Supply Chain Management

Global sourcing entails an increasing number of companies involved in the supply chain and a consequent organisational complexity that makes systems more fragile (Chkanikova, 2012). These supply chains are networks of suppliers, sub-suppliers, and service providers that collaborate in the development and manufacturing, assembling, and distribution of a product and each of its different parts and materials (Craighead, Blackhurst, Rungtsanatham, & Handfield, 2007). The location of all these services vary depending on the strategy utilised, whether these practices are either vertically integrated or outsourced (Bénassy-Quéré, Decreuse, Fontagne, & Khoudour-Castéras, 2012) and the consequent different actors are connected from origin to destination by flows of material, information, and money (Craighead et al., 2007). Despite its several benefits, GSC also entails some risks such as material availability, pricing risks, lack of supplier control, risks in timelines and shipments, and product quality (Leat & Revoredo-Giha, 2013). Due to this increased complexity, SCM has gained increasing importance. Supply chain management is defined by Mentzer et al. (2001, p. 18) as “the systemic, strategic coordination of the traditional business functions and tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole”. However, this definition is thought to be too focused on the financial outcome (Carter & Easton, 2011).

Some management strategies are becoming more focused on collaboration, such as a supply-base continuity. This aims to ensure common prosperity for all actors involved in the value chain, allowing them to thrive, reinvest, innovate, and grow (Craighead et al., 2007). The elements of continuity are de-commoditisation, traditional supplier development, reduced supplier risk, and transparency improvements (Pagell, Wu, & Wasserman, 2010). The first involves explicitly treating a supplier or entire chain as suppliers of strategic input, in spite of the product they provide, to help companies achieve strong competitive advantage in the long-term perspective (Appendix 2; Pagell et al., 2010). It involves long-term contracts and pay above market prices (ibid.). The second refers to supplier training to benefit both parties: reducing supplier risk by switching towards other suppliers and differentiating, making the products and processes more sustainable within the same price range, as well as transparency to provide full accounting for flows of money. According to Andersen, Christensen, and Damgaard (2009), these relationships are shaped by the following components: (1) Quality, frequency, and scope of communication; (2) role specification and work coordination (such as green codes of conduct, types of contract etc.); (3) the nature of planning horizons (long-term production schedules); and (4) trustworthiness. This last characteristic leads to the ability to share and exchange information, which is one key driver for companies to engage in collaborative relationships with suppliers (N. Johnson et al., 2013). Even though building and maintaining such partnerships is costly and risky (Chkanikova, 2012), inter-organisational learning enables the creation of inter-firm competitive advantage (Chkanikova, 2012) and inter-firm collaborative relationships help companies create sustainability resources and competences that otherwise would not be possible to acquire (Jüttner & Maklan, 2011).

2.2. Network theory

Networks are vital for any organisation to operate successfully. A business network is, in its most simple form, the connections and relationships between two or more organisations - nodes - connected by edges (Newman, 2008). Taking a network perspective when considering a supply chain allows for an
understanding of the interdependencies at play (Kembro & Selviaridis, 2015). Typical SC relationships require a high level of planning and scheduling to ensure that disruptions are less likely, and also involve reliance on other members in the SC (Thompson, Zald, & Scott, 2003). Social capital is embedded in social networks, inherent in the structure of relations between and among actors, as discussed in 1.5.1.1.

The PESTLE framework provides an understanding of the environment in which companies are operating. It stands for the analysis of political, economic, social, technological, legal, and environmental factors (G. Johnson, Scholes, & Whittington, 2008). The first highlights the role of governments; the second, the macro-economic factors; social refers to changing cultures and demographics; technological analyse automations and innovations; legal embraces legislative frameworks; and lastly, environmental looks at all causes regarding the SDGs and climate crisis (ibid.).

Business networks require time, effort, and trust to create, but they can bring benefit to the parties involved. Networks can serve organisations in a variety of ways; improving efficiency and effectiveness and increasing flexibility among others (Castañer & Oliveira, 2020; Galaskiewicz & Wasserman, 1993; Newman, 2008). However, often networks are not exploited to their full potential, with information sharing occurring only between dyadic relationships as opposed to throughout the entirety of the SC (Kembro & Selviaridis, 2015). There are three types of relationships between nodes: coordination, cooperation, and collaboration (Castañer & Oliveira, 2020). The latter of the three is the most beneficial relationship for the parties involved, however it requires high levels of trust, which take time to develop (ibid.).

2.3. Crisis Theories

2.3.1. Risk and Crisis Management

A crisis is a significant, inevitable, and unexpected event that is out of the company’s control and disrupts normal operations, entailing negative consequences if not properly handled (Coombs & Holladay, 2010). Despite the variety in typology (Aktouf, 2009), this research focuses on the current economic and humanitarian crisis, which can be categorised as both a demand and supply risk, external to the firm but internal to the network, and an environmental risk, external to the network (Christopher & Peck, 2004). It could also be argued that the impact is so wide-reaching, the pandemic poses an internal risk, due to a large number of employees becoming ill or self-isolating. In this way it is clear to see that the framework for this categorisation is not always applicable to real situations, and to prepare for risks, organisations must be resilient. However, crisis management is a critical organisational function applied to mitigate or lessen the potential damage caused by such unstable situations (Coombs & Holladay, 2010) and divided in three response phases: pre-crisis, where potential disruptions and their likelihood of occurrence are detected; crisis management; and post-crisis, where lessons are examined to avoid future similar events (Hagen, Statler, & Penuel, 2013).

Global enterprises are exposed to large numbers of risks, both directly and indirectly, through their complex and lean network of suppliers. These risks can be managed through a risk management strategy: a corporate-wide approach to business practice, based on clear protocols, responsibilities, and priorities (Mikušová & Horváthová, 2019). A risk management plan starts with the identification of relevant risks and opportunities, assessing the likelihood and magnitude of impact, followed by the creation of a managing strategy (Dani & Deep, 2009). Behavioural readiness and early warning systems, identified by the crisis management team are required to identify a potential crisis at the latent phase (Jüttner & Maklan, 2011). An organisational crisis is unlikely to happen, but it entails a major threat (Christopher & Peck, 2004). Its cause, effect, and solution are uncertain, however, if it occurs, it requires swift action (Ponomarov & Holcomb, 2009). As important as the creation of a plan, is the monitoring and learning phase (Coombs & Holladay, 2010). Organisations can use the time to consider the cause of the disruption, any improper response, and how future crises can be avoided (Mikušová & Horváthová, 2019). Often, when responding to a crisis in a SC, responses can be ad hoc, such as rerouting products around damaged nodes of the network, using different modes of transport,
implementing an emergency procurement procedure, or connecting with secondary suppliers (Sheffi, 2015; Wooten & James, 2008).

To prevent disruptions, businesses have to prioritise suppliers according to their location, financial contribution, the speed of change, and availability (Wooten & James, 2008). Kraljic (1983) describes four types of items in his purchasing portfolios model: leverage, strategic, non-critical, and bottleneck. Strategic items need long-term and close relationships with a smaller number of suppliers due to their high risk and high profit value. Bottleneck items are high risk but low profit impact, so require stock safety strategies and over-ordering when supply is available (Appendix 3; Kraljic, 1983). For these, there is a lack of alternatives, so it is best to change specifications to avoid uniqueness and reduce their complexity (Stevenson & Spring, 2007). Hence, it is beneficial to use fewer suppliers and provide them with long-term contracts, creating commitment for collaboration and mutual survival; however, these relationships are also costly, so multisource could be an option when products are non-strategic (Christopher & Peck, 2004). Some authors suggest that Kraljic’s concept is becoming obsolete when introducing sustainability (Chkanikova, 2012; Seuring & Müller, 2008). There is a suggestion that the concept should be modified for companies to meet associated challenges and elaborate better sustainable purchasing portfolios and strategies, as ‘non-critical’ items may have significant environmental and social impact and require more attention from the focal firm (Chkanikova, 2012). As an alternative, Pagell et al. (2010) propose a Sustainable Purchasing Portfolio Matrix (Appendix 4), which considers the supply risk against the threat posed to the three pillars of sustainability. The critical difference between the two frames is the latter’s subdivision of ‘leveraged goods’ into three progressive levels: strategic commodity, transitional commodity, and true commodity (Pagell et al., 2010). The first group helps companies to build a long-term competitive advantage, and the latter are those where high impact remains in just one pillar of sustainability. This means the last group are easier to switch to alternative suppliers.

A business continuity plan (BCP) is another element of crisis management that enables an organisation to operate at a predetermined minimum capacity level and meet demands during a disaster, by planning, disseminating, executing, then refining (Sheffi, 2015). It determines how to react, who should be involved, and what assets should be prepared ahead of time; each supplier needs an individualised plan of action, focused on operational risks (ibid.). Another similar concept is the preparation plan, which becomes even more important as the volatility of the resources, or of the organisation itself, increases. Flexibility and redundancy are key for reconfiguring suppliers and production schedules (Manders et al., 2016). This can be implemented through the shift to a ‘daisy chain’, the practice of ‘risk pooling’, range forecasting including two or more estimates, or postponement, whereby the material is stocked in an intermediate status and can be developed into different finished goods (Sheffi, 2015).

2.3.2. Resilience

Supply Chain Resilience (SCRES) is an emerging field that builds on Supply Chain Risk Management (SCRM). A key difference between resilience and risk management is related to the likelihood of the disturbance for the SC; SCRM focuses on prevention and mitigation of identifiable risks, whereas SCRES aims to fortify the SC to decrease the potential impact of less-likely, but more significant events (Purvis et al., 2016). There are many varying definitions:

“The ability of a system to return to its original state or move to a new, more desirable state after being disturbed” (Christopher & Peck, 2004, p. 4).

“The adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function” (Ponomarov & Holcomb, 2009, p. 131).

“The ability to survive and thrive through unpredictable, changing and potentially unfavourable events” (Reeves et al., 2020, p. 5).

Yet, all share a similar aspect: the emphasis is on survival and the opportunity for improvement. The SCRES definition used in this paper is that of Jüttner and Maklan (2011), which considers SCRES within four competencies: flexibility, velocity, visibility, and collaboration. This definition is optimal,
since the focus on these four competencies is expanded to include the supply chain in its entirety, as opposed to just considering the focal organisation (Leat & Revoredo-Giha, 2013). To create a sustained advantage, the firm must actively work to incorporate resilience in the SC (Purvis et al., 2016). Little research has been carried out on established supply chains and their resilience, but rather the emphasis has been on temporary supply chains, implemented in response to an event (N. Johnson et al., 2013). The commonality among all research on SCRES is the importance placed on the ability of the supply chain to operate at the same or a better level than before the disruption event (Jüttner & Maklan, 2011).

2.4. The role of sustainability in supply chains

Sustainable Supply Chain Management (SSCM) is a relatively new concept that emerged as a response to the need for implementing sustainability within supply chains in the early 1990s (Marques, 2019). Due to its recency, there is no single definition for SSCM (Carter et al., 2019). However, it is increasingly researched due to the need to achieve economic prosperity within environmental limits (Geng, Mansouri, Aktas, & Yen, 2017). The following can be considered the most influential definitions:

“SSCM is a strategic, transparent integration and achievement of an organisation’s social, environmental and economic goals in the systematic coordination of key inter-organisational business processes for improving the long-term economic performance of the individual company and its supply chains” (Carter & Rogers, 2008, p. 368).

“SSCM is the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development derived from stakeholder requirements” (Seuring & Müller, 2008, p. 1700).

In these definitions, the concept is understood as the strategic inclusion of sustainability into all stages of the supply chain, considering all three dimensions of sustainable development - environmental, social, and economic - and the different stakeholder needs when establishing and developing goals (Marques, 2019; Miyazaki, 2014). For the purpose of this research, SSCM will be defined using the latter definition, as the first places emphasis on the motivation being economic gain (Carter & Rogers, 2008), whereas the latter highlights all three pillars of sustainability at all stages of the SC.
3. Methodological Framework

3.1. Ontological and Epistemological Approach

Ontology can be described as the assumptions held by individuals regarding “what reality is like and the basic elements it contains” (Silverman, 2014, p. 53). The data is analysed through the concepts of SSCM and SCRES. Therefore, from an ontological perspective, it can be said that the study has adopted a relativist approach. This is because “the truth of the statements is relative to the conceptual frameworks within which we collect and analyse data” (6 & Bellamy, 2012, p. 55). These new theories are constantly reconsidered and revised, hence there are multiple truths and understandings of sustainable supply chain management and resilience. Therefore, they are also relative to the time in which they are studied but might be interpreted in a different way in the future. This is particularly important in the current context of this research, within a global pandemic which continues to develop, the researchers want to understand how SSCM and SCRES are applied at this point in time, to be able to use the learnings from this in future.

Alternatively, epistemology describes how knowledge about the nature of reality (ontology) is generated. Hitchcock and Hughes (1995, p. 19) define epistemology as “assumptions about the form knowledge takes, [and] the ways in which knowledge can be attained and communicated to others.” This research takes an interpretivist approach: the researchers are conscious of the impact the interviewees’ interpretation of supply chain management in a pandemic has on the ‘truth’ that is uncovered (6 & Bellamy, 2012).

3.2. Research Design

In order to address the research problem outlined above, the researchers carried out an inductive, qualitative study, utilising semi-structured interviews. Inductive research allows the authors to answer an open question, and this method is useful when there is little previous research on a topic (6 & Bellamy, 2012). This study treats each interviewee as an individual case, representative of distinct organisations, and carries out “between-case analysis,” comparing these cases to understand the common themes (6 & Bellamy, 2012, p. 78). This cross-sectional research design allows the researchers to gather data from a number of cases and provides more data, across which to compare behaviours and attitudes (Bryman, 2012). A disadvantage of this type of research design is the inability to demonstrate causation when discussing variables (ibid.), however, for the purpose of this research it is sufficient to discuss correlation within the interpretivist approach that this research takes.

3.3. Methods and Methodology

3.3.1. Data Collection

The data was collected through semi-structured interviews, conducted remotely, and then recorded and transcribed to allow a more thorough consideration of the interviewees’ answers and to reduce personal researcher bias (Bryman, 2012). This study implemented purposive sampling, with an initial goal of maximum variation sampling, that was supplemented through additional opportunistic sampling (ibid.). This meant the researchers had a clear idea of the desired sample and aimed to gather as many interviewees within the criteria as possible. As a result, the end sample includes individuals, who work within the management of a supply chain, CEOs or founders of food companies, and consultants, who work with food organisations and their supply chains. For a full list of interviewees, see Table 1.

The professional social media platform LinkedIn was used to reach initial interviewees. During these interviews, the researchers were also able to acquire new potential interviewees by asking for contact details of other professionals, who were willing to help. Therefore, a big collaborative network based on weak ties was built to ensure as many perspectives as possible, from both SMEs and large multinationals, and to facilitate a broader and more integrative study (Bryman, 2012). The flexibility of
semi-structured interviews allowed for additional questions to interviewees if something particularly interesting or unusual was discussed, however the interview guide (Appendix 5) meant that all interviewees were asked the same base questions. This method allowed the researchers to gain a detailed understanding from interviewees and ask for any necessary clarification, while interviewees could speak openly about their experiences (Silverman, 2014). A sample of interviews is available in the Appendices (Appendix 6). All interviews were between 40 minutes and an hour in duration.

When discussing sustainability, there is a risk that some interviewees may temper their answers due to social desirability bias (Bryman, 2012). This is a risk in this research, since organisations do not want to be seen as incompetent in their response or inactive with regard to sustainability. Further, some organisations may feel reluctant to share their actions without confirmation of the confidentiality of their answers. This potential bias effect is an unavoidable feature of interviews around this topic, however, the researchers attempted to mitigate this risk by ensuring that all interviewees were aware of the anonymity of their answers before beginning the questions. This was an attempt to reduce the desire of interviewees to be viewed as more socially acceptable.

3.3.2. Data Analysis

An initial sample of seven interviews was analysed using elements of grounded theory (Bryman, 2012). This allowed the researchers to inductively develop their hypotheses based on the data (Silverman, 2014). This initial sample was analysed and coded using ‘in vivo’ coding, where the researchers discussed the emerging thematic groupings from this sample using the words and phrases of the interviewees, as well as grouping similar phrases (Bryman, 2012). The researchers then used these themes and organised them within the concepts of SSCM and SCRES, in order to explore how organisations manage their SCs in a time of crisis (Silverman, 2014). The authors did not initially utilise the SCRES and SSCM frames to the analysis to ensure that they were not looking only for the relevant data (ibid.). Using the grounded theory approach of memo writing also allowed the researchers to expand on the themes and facilitate easier discussion, analysis, and comparison (Charmaz & Wertz, 2011), additionally organising the data with reference to difficulties faced and potential solutions for these. The next step was to carry out analysis on the remaining interviews using the pre-established themes and adapting them as necessary. The researchers then refined the themes further and collated the data to show the responses within the concepts of SSCM and SCRES (Table 2).

This inductive analysis allowed the researchers to consider whether organisations adhere to the concepts of SSCM and SCRES during a crisis, and whether a sustainable solution results in better performance. These frames were chosen because they allow the researchers to analyse the current food industry supply chains and categorise their actions. During the analysis, the researchers found that not all actions were able to be placed into one individual category. In these cases, the authors discussed the data points individually and tried to place them in the most appropriate group, also noting that it could be seen from another perspective. Despite this difficulty of the analysis, the method still allows for an overview of the management strategies of supply chains within these conceptual frameworks.

3.4. Reliability and Validity

Reliability refers to the “consistency with which measures are used,” where the most important factor is replicability, understood as the probability that the same result can be achieved with the same study if it is repeated with the same methods and measures (6 & Bellamy, 2012, p. 94). It can be considered within three areas: stability, internal reliability, and inter-observer consistency (Bryman, 2012). To ensure inter-observer consistency, the researchers worked together on the initial analysis to uncover the thematic groupings and used these themes to create a framework that could be used as a guide for the remainder of the analysis, also using transcripts to reduce the chance of introducing inferences on the data. Due to the currency of the crisis and the volatility of the situation, the stability of the study is relatively low, since the responses of the interviewees might change drastically in a short time period, once out of the acute stage of the crisis. However, if the study were repeated at the current point in time, it is likely that the results would be the same due to the high level of validity.
Validity is “the degree to which our statements approximate to truth” (6 & Bellamy, 2012, p. 21). The next elements expose the degree of validity of the study:

1. This study is credible because there was a thorough literature review carried out before interviews were conducted. This influenced the selection of cases and informed the researchers about pre-existing theories and studies. All participants of the research have a high knowledge and are relevant for the study.

2. Transferability is defined as whether a study’s results “apply to other contexts” (Bryman, 2012, p. 49). In this case, the results are quite specific to the food industry, due to the crisis affecting this industry in a different way than others. However, due to the in-depth focus on globalised supply chains during a crisis, there is scope for the findings to apply to other industries and there is transferability for future crises across all supply chains.

3. Concerning its dependability, this research could not be applied to past crises, due to the massive humanitarian impact combined with the level of globalisation among supply chains, but it can be used for potential future disruptions, due to the likelihood of these having similar characteristics to the current crisis. External validity would be secured when these future crises have the size and repercussion of the one faced during this study.

3.5. Limitations

One limitation of this study is the inability to conduct interviews face-to-face. A benefit of face-to-face interviews is the ability to analyse the full reaction of the interviewee, including body language or facial expressions (Silverman, 2014). Although interviews conducted remotely via video allowed for analysis of facial reactions, there was a loss of other unspoken content (Archibald, Ambagtsheer, Casey, & Lawless, 2019). Additionally, interviews were sometimes interrupted by connection problems, causing distraction for both interviewer and interviewee and interrupting the thought process of the speaker.

Due to the pandemic being an ongoing event, this presents a limitation for the research as it prevents a holistic dataset being gathered that represents all stages of the situation. However, the benefit of exploring responses during the midst of a crisis situation and capturing those views at this specific point will be valuable for future study due to the immediacy of the responses during the time of crisis. Additionally, there was some difficulty with contacting food retail multinationals, due to their lack of time because of additional pressures related to the crisis and also a reluctance to share their practices. To ensure that there was a comparable mixture of both SMEs and large corporations, some shorter interviews (40 minutes) were conducted or additionally via email to gather supplementary data. Although email interviews do allow interviewees more time to contemplate their responses, the nature of the questions is such that the researchers did not consider this to be an issue in terms of validity of the data.

Furthermore, the currency of the pandemic meant there was a lack of peer-reviewed research. The researchers chose to utilise some reliable news sources, such as the BBC, to show the background and relied on peer-reviewed sources for the theoretical frameworks.

The fact that there are two researchers carrying out interviews could present a limitation due to a variance in interview styles (Bryman, 2012). However, to counteract this, the researchers ensured that the interview guide was detailed enough to allow for comparability of data and furthermore, the validity increases by having two perspectives of the analysis.

Lastly, some interviews were conducted in Spanish. There is, therefore, a chance of inferring one’s own meaning when translating the interview quotations. All quotations from these interviewees, specified in Table 1, are translated from Spanish to English by the researchers. In addition, the original recording is available upon request.
4. Analysis

4.1. Presentation of Interviewees

The main aim of the paper is to understand how global food supply chains are being managed in such exceptional circumstances, in relation to its application to sustainable supply chain development. Thus, 22 interviews have been conducted with a variety of sustainable supply chain professionals, all of whom are involved with supply chains of food companies that have globally distributed suppliers. Although all SCs included in the study are global, interviewees A–K represent SMEs with shorter and less complex SCs, while interviewees L–V represent larger organisations with longer SCs. This chapter presents the different outcomes and perspectives from the informants, first discussing the difficulties encountered and potential solutions for these followed by an analysis of the organisational networks. The researchers then analyse the informants’ responses regarding Supply Chain Resilience (SCRES) and Sustainable Supply Chain Management (SSCM). Following this, there is a discussion chapter, in which the research questions are answered. For an overview of interviewees’ responses, see Table 2.

Table 1: List of interviewees and their relationship to Food Supply Chain Management

<table>
<thead>
<tr>
<th>Interviewees</th>
<th>Relationship to food supply chain management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee A</td>
<td>CEO at a global supply of green innovation</td>
</tr>
<tr>
<td>Interviewee B</td>
<td>CEO at a plant-based ice cream company and at a superfood’s supplier</td>
</tr>
<tr>
<td>Interviewee C</td>
<td>Head of sustainability in a Scandinavian plant-based company and CEO of an organisation in the food industry</td>
</tr>
<tr>
<td>Interviewee D</td>
<td>Professor of Agri-Food and Supply Chain Security</td>
</tr>
<tr>
<td>Interviewee E (Spanish)</td>
<td>Co-founder of a Spanish plant-based company</td>
</tr>
<tr>
<td>Interviewee F</td>
<td>Supply Chain Specialist for a plant-based food company</td>
</tr>
<tr>
<td>Interviewee G</td>
<td>Consultant with food companies &amp; foodservice brands on plant-based, cultivated, &amp; fermented foods</td>
</tr>
<tr>
<td>Interviewee H (Spanish)</td>
<td>COO &amp; Co-founder of a Spanish sustainable protein bar company</td>
</tr>
<tr>
<td>Interviewee I (Spanish)</td>
<td>Founder of a Spanish platform that connects the end consumer directly with local producers</td>
</tr>
<tr>
<td>Interviewee J (Spanish)</td>
<td>Co-founder of a tool that connects local producers with the final customer</td>
</tr>
<tr>
<td>Interviewee K</td>
<td>Sustainability professional in agri-foods projects</td>
</tr>
<tr>
<td>Interviewees</td>
<td>Relationship to food supply chain management</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Interviewee L (Spanish)</td>
<td>Supply chain and purchasing at a big Spanish food retailer</td>
</tr>
<tr>
<td>Interviewee M</td>
<td>CEO of a supply chain management consultancy</td>
</tr>
<tr>
<td>Interviewee N</td>
<td>Senior Buying Manager at a multinational supermarket chain</td>
</tr>
<tr>
<td>Interviewee O (Spanish)</td>
<td>Senior expert in sustainable supply chains in charge of generating codes of conducts and implementing sustainability in big food companies.</td>
</tr>
<tr>
<td>Interviewee P</td>
<td>Sustainable supply chain consultant in the food industry</td>
</tr>
<tr>
<td>Interviewee Q (Spanish)</td>
<td>Global supply chain at a British-Dutch transnational consumer goods company</td>
</tr>
<tr>
<td>Interviewee R (Spanish)</td>
<td>Supply Chain Project Manager at a global French food retailer (via email)</td>
</tr>
<tr>
<td>Interviewee S</td>
<td>Risk and crisis management consultant</td>
</tr>
<tr>
<td>Interviewee T (Spanish)</td>
<td>Director of Environmental Sustainability at a consultancy whose clients are big European supermarkets</td>
</tr>
<tr>
<td>Interviewee U</td>
<td>Supply Chain at a big British retail company</td>
</tr>
<tr>
<td>Interviewee V (Spanish)</td>
<td>Head of supply chain in an international snack company (via email)</td>
</tr>
</tbody>
</table>
4.2. Global food supply chain management

Despite a preeminent focus on profit and survival, the most important commonality within these companies’ attitudes is their commitment and care for their suppliers, building a collaborative atmosphere, which, as mentioned by Jüttner and Maklan (2011), is helpful for competence creation. Interviewee N stated that they have “personal relationships” with suppliers and “treat [them] fairly.” Although the companies considered in this research differ in size, organisational structure, and strategies, they all belong to the global food industry, with suppliers in more than one country and usually following an outsourcing strategy. This global network enables them to grow, manufacture their products, and utilise a huge variety of raw materials that would not have been possible otherwise (Interviewees B, H, I and U).

Supplier relationships varied depending on the focal organisation’s values and strategy. When categorising the different companies by their values and structure, there are two groups: large enterprises on one hand, and smaller organisations on the other. Most companies with sustainability in their core strategy tend to have long-term contracts with all their suppliers, helping them thrive and empowering a supply-base continuity, aiming to ensure common growth (Interviewees C, E, G, H, I, J, K, and M). Therefore, these relationships follow the elements of continuity with the incorporation of de-commoditisation when establishing these long-term contracts with all members of the value chain and being transparent (ibid.). However, Interviewee P mentioned that “there are a few tensions there because most businesses want to commoditise their inputs (...) but the majority of companies are relying on non-commoditised inputs.” Their relationships are also shaped by the principles of Andersen et al. (2009) with green codes of conduct, long-term production plans, and emphasis on trust. Even though trust plays...
a major role, these last companies have already assessed that the conditions of these suppliers are compatible with their core values (Interviewee E, G, I, and J).

4.2.1. Difficulties

While GSCs bring many benefits to organisations within the food industry, during the current crisis there have been many difficulties associated with global sourcing (Interviewee E, G and I). The complexity of global FSCs means that systems can be more fragile than their locally sourced counterparts (Chkanikova, 2012). This was demonstrated by Interviewees, who discussed difficulties with transport and border control in terms of regulations being more stringent (Interviewees H, I, Q and T) as well as the increasing cost of transport and the decreasing availability of drivers or shipping crews (Interviewees G and P). Many SCM strategies focus on collaboration, to ensure that the benefits are spread throughout the value chain and helping all actors grow and thrive (Craighead et al., 2007), however the current crisis has exposed vulnerabilities of certain groups over others:

1) One group that was commonly signalled to be vulnerable were the farmers and producers of raw materials (Interviewees D, G, I, K, P and T). Those with more “traditional” production “have realised with this crisis that they should change their production patterns.” (Interviewee J).

There was also a long-term consideration to ensure that farmers and producers stay in business with even small purchases from retailers, in order to keep these businesses in operation (Interviewees N and P). In addition, current border regulations prevent the usual cohort of migrant workers from harvesting farmers’ crops (Interviewee D and T) and as a result, this produce will be wasted in the fields. Thus, farmers have no income and cannot afford to re-sew their fields, which will result in another year of no income for them and food scarcity (Interviewee P and T).

2) In addition to farmers, those businesses in the hospitality industry are also known to be vulnerable due to the current situation: the restaurants and cafes themselves, but also the suppliers of these locations (Interviewees A, B, C, D, E, F, G, J, K, L, P, and T). Interviewee E affirmed that “it has been estimated that in Barcelona and Madrid, 20-30% of the restaurants are going to close permanently (...) just the ones that add value are going to be able to survive”.

The difficulties are discussed further in the next chapter.

The theory exposed a series of risks that were also commonly discussed by the interviewees, although there were additional risks due to the uniqueness of the current crisis. One such risk was demand fluctuation caused by a change in consumption patterns (Petetin, 2020; Interviewees C, E, G, I, K, L, M, O, P, Q, R, and V); this fluctuation was not necessarily due to increased purchase volume, but rather due to volatile purchasing habits, with consumers bulk buying and leaving long gaps between purchases (Interviewees D, P, and T). As all different actors are connected by flows of material and money (Craighead et al. 2007), this has contributed to the development of a bullwhip effect in food supply chains (Interviewee P). Material availability was also a problem for organisations (Leat & Revoredo-Giha, 2013; Interviewee H, I, P, Q, R, and T). In addition, the lack of capacity from some suppliers to be able to double or triple their production in a short time frame (Interviewee L, P and Q) and the necessity to refill the shelves in supermarkets with a higher frequency (Galanakis, 2020; Interviewees A, G, R, and Q) were mentioned as key difficulties.

4.2.2. Solutions

There were a number of potential solutions discussed by interviewees with regards to the future of the food industry and how these numerous challenges can be overcome. Coombs and Holladay (2010) mentioned the importance of the learning phase, where organisations consider how future crises can be avoided (Mikušová, 2019). Hence, this section aims to introduce the interviewee’s perspectives on what the future will look like in order to address the potential for learning from the current crisis. Interviewee J and K mentioned that companies need to change the way they manage, produce, distribute, sell, connect with others, and the ways to retail their products and services, improving their relationship with
all remaining stakeholders (Interviewees C, E, G, H, I, J, K, M, P, and T), particularly with the end consumer, as these are thought to shape the future scenario, and with suppliers (Interviewee J and K). Adding extra value to the product is going to be necessary to survive (Interviewees E, K, and Q). Therefore, regardless of the industry sector, the following solutions or values were repeated by the vast majority:

1) Digitalisation. Although it is thought that most existing companies are not sufficiently digitalised to excel in the current circumstances (Interviewees J, P, and Q), companies see the need to become more digital (Sarkis, 2020): changing the way they approach and sell to the final consumer, innovating both their core strategies and their supply chains (Interviewees A, B, C, E, H, I, J, K, L, M, O, P, and T). The sale of food products through digital platforms and e-commerce has gained significantly more followers in recent months, even used by the elderly, and it is likely to become ingrained permanently (Interviewees B, C, E, G, H, I, J, K, M, O, P, and Q). Even very small local businesses, such as neighbourhood butchers and fruit stores have been selling via platforms like WhatsApp and Facebook (Interviewee E). Digitalisation not only helps companies survive this crisis, but also entails an opportunity to approach new customers and manage stock better (Sarkis, 2020; Interviewees E, G, I, J, K, and U). Interviewee P stated that the creation of a digital channel where all the SC actors have access to the same information would enable companies to be more agile and would facilitate decision-making. Also, to confront further risks in SCM and survive, farmers need to transition to a more automated way of working (Interviewees I and J). Physical stock and shelf life are not needed anymore, and digital platforms can offer an infinite product portfolio for the consumer (Interviewees G and I). Thanks to this, new business models have emerged, such as platforms that connect local producers with the end customer (Interviewees G, I, and J), which exemplifies the next tendency.

2) Shortened Supply Chains. Even though most multinationals will continue to work the same way (Interviewee L and R), there is a tendency of companies to cut their intermediaries and shorten their supply chains (Interviewees C, E, G, H, I, J, K, M, P, T, and U). Interviewee G affirms that “As transportation costs go up, the value of having a shorter supply chain also goes way up”. This entails a benefit when wanting to control and assess all your suppliers and reduce the difficulties specified above regarding delays, border controls, and other disruptions that will create a ripple effect across the entire network (Interviewees B, G, H, and T). Although there is a need to keep some international products due to customer demand year-round (Interviewees B, H, I, and T), companies are trying to switch to locally produced goods. However, as is explained further in section 4.4.3., this can entail some disadvantages for resilience. Moreover, the consumer must consider whether they are willing to pay the price of local produce and sacrifice certain products altogether (Interviewees I and T). This is a very important aspect, as price plays a major role in consumer decisions (Interviewees E, I, K, Q, and T). Shortening supply chains can boost sustainability and resilience (Christopher & Peck, 2004). Nevertheless, it is not only a matter of reducing intermediaries, companies need to make sure that the production practices are sustainable (Interviewees G, I, and J). Interviewee G pointed out that “the crisis underscores the need for alternative forms of food production”.

3) Traceability. Karutz et al. (2018) mentioned the need for tight traceability and controls of SC. When the supply network does not remain local, it is very difficult to assess and control the deliveries (Interviewees B, J, L, O, P, and Q). Therefore, the digitalisation of SC has enabled companies to control these through traceability programs, where they can track where their products come from, their transportation and so on (Interviewees A, P, Q, and T). Moreover, it is thought that traceability is going to be demanded by both legislators and regulators (Interviewee A). This way of managing reduces risks and uncertainty, and brings all actors of the SC closer (ibid.), contributing to the next solution.

4) Transparency. All stakeholders, from the final customer to investors, are calling for transparency and knowledge regarding where their products come from and how operations are handled (Interviewees A, E, G, I, J, P, and T), which will be exposed by their digital presence (Interviewee G). This need to demonstrate transparency is going to force companies to improve
their practices in both resilience and sustainability and to be more exigent with what they are selling, positioning the consumer at the centre of their core strategy (ibid.).

4.3. Network analysis

Networks are growing as companies and industries, which were previously not linked, join forces and act together (Interviewees C, D, E, I, J, M, N, O, Q, T, and U). An example of this is seen in smaller companies, where collaboration is key to disrupt the status quo (Interviewees E, G, I, and J). Interviewee E expressed that “beyond making business, we are looking for a better world, and we know that can only be possible by creating healthy relationships”. Social capital is imperative in this situation, based on solidarity, trust and reciprocity among all groups (N. Johnson et al., 2013; Interviewees E, G, I, and J). It was expressed that organisations should work to have a “social supply chain” instead of an economic focus, to ensure this collaboration (Interviewee P). It could be said that organisations with this collaborative perspective embedded, are more likely to succeed, by seeking partnerships and win-win situations, as well as coming up with innovations and new solutions or ways of thinking (Interviewees A, G, J, K and T). Furthermore, they focus on forming new contractual partnerships and on occasion, going back to the farmer to secure supplies (Interviewees C, E, G, I, K, M, and Q). Interviewee P stated that for companies to properly react to the bullwhip effect in SCs “an important factor is to have good supplier relationships, being able to lean on suppliers when the going gets tough and also support suppliers when they need”. Moreover, according to the FAO (2017), strengthened links between farms, markets, and consumers can entail income growth and job creation in rural and urban areas.

Theory stresses the need to evaluate the external situation in which companies operate (G. Johnson et al., 2008). This analysis is even more important due to the exceptional current circumstances. Following PESTLE theories, the context is the following:
4.4 Response to crisis: Crisis management and SCRES

4.4.1. Practices

4.4.1.1. Flexibility

The studied companies were able to both absorb the disturbance and adapt their business model (Interviewees C, F, M, N, and Q). They have shown flexibility, rearranging suppliers and production schedules (Interviewees A, B, C, E, F, G, I, J, M, Q, T, and U), and redundancy, as they were able to produce the same product with several suppliers to meet demand (Interviewee L, Q, R, and U). These are key to the flexibility competency of resilience (Jüttner & Maklan, 2011). A larger selection of suppliers also helps to manage the rise of demand and quantities in the retail sector. Interviewee P also points out that “if you have a risk with a supplier then you need to have more than one so that you can switch and perhaps have less dependence on certain geographical regions.” A common practice mentioned by interviewees was a process of digitalisation, with varying purposes and benefits. Digital stores allow for a larger portfolio of products to be displayed (Interviewee G and I) and reduce food waste by minimising the production of items that are not in demand, only manufacturing what is ordered by customers (Interviewee E, I, and J). Online shops were seen by many interviewees as a way to open up an alternative and more convenient sales channel for the end-consumer, encouraging continued business (Interviewees B, F, G, I, J, K, M, P, and V). This adaptation in such a large number of studied cases is an unreserved statement of support for the need to have a flexible supply chain during a crisis in order to cope with events such as demand fluctuation or supplier collapse.

There was also discussion of the consequences of having an inflexible supply chain, where products specifically related to animal agriculture have been overproduced. There is no way to stop the production, and no market, in which to sell the produce (Interviewees D, G, I and T). This lack of flexibility has resulted in large amounts of waste, both in terms of capital and energy (ibid.). Interviewee P states that “Companies that are maturer in their supply chain processes are better able to react and also those that have more agile supply chains, so they have not just one source but several sources”. While some interviewees discussed the expansion of their product portfolio (Interviewees A, E, I, and K),

<table>
<thead>
<tr>
<th>PEISTLE</th>
<th>Context during Covid-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political</td>
<td>All companies are suffering political instability characterised by forced isolation, a pause in economic activities, and changes in trade. This causes high uncertainty and a lack of confidence in how to act, as there is no clear guideline of when they will return to “normal” (Interviewees E, G, H, J, L, R, and T).</td>
</tr>
<tr>
<td>Economic</td>
<td>The crisis has caused a recession, market and price volatility, increased unemployment and the bankruptcy of companies, creating a ripple-effect on all dependent organisations and affecting consumption behaviours (Interviewees E, G, I, Q, T, and U).</td>
</tr>
<tr>
<td>Social</td>
<td>Societal behaviour has changed as people are forced to ‘social-distance,’ and this more individualised outlook might raise competition among different countries, while consumers have changed their consumption patterns, which affects all sectors of the SC (All interviewees).</td>
</tr>
<tr>
<td>Technological</td>
<td>Technology has been key in this crisis as it is what has enabled the world to continue functioning. Several companies have approached their consumers digitally, with virtual ordering and delivery gaining popularity that is likely to remain (Interviewees A, B, C, E, G, H, I, J, K, M, Q, and T).</td>
</tr>
<tr>
<td>Legal</td>
<td>New policies and regulations regarding sanitation, border controls and production standards will shape how the market looks in future (Interviewees B, L and O). Nevertheless, these changes will not happen overnight (Interviewees G, I, J and T) and will have to be implemented bottom-up as consumer mindsets must change (Interviewee J, K, and P).</td>
</tr>
<tr>
<td>Environmental</td>
<td>The environment has been affected both positively and negatively due to the changes experienced in supply chains. This will be discussed further in section 4.5.</td>
</tr>
</tbody>
</table>

Table 3: PESTLE Analysis
others mentioned the need to reduce the range-number (Interviewees D, N, and Q). As discussed by Stevenson and Spring (2007), the range-number and range-heterogeneity are reliant on high levels of flexibility, and the former group that are able to expand their portfolio demonstrate a higher degree of flexibility in their SCs.

In relation to the need to find new sources for high-demand products, there are different ways to approach this, with varying risk profiles for the focal firm. Many global companies have maintained their old suppliers, while adapting and incorporating other alternatives to be able to meet increased demand (Interviewees L, R, and U). One option is to contract new suppliers directly, who can supply the relevant raw materials to be produced (Interviewees K, O, Q, and R). This is high risk due to the current difficulties with auditing processes that are both time consuming and difficult to conduct thoroughly via remote methods (Interviewees A, D, G, L, P, and T). An alternative is to use suppliers who can provide finished, branded products, which, while increasing costs, reduces the risk of working with unknown suppliers (Interviewee D). Given the importance of food hygiene and safety regulations at this time, the process of finding quality suppliers is even more important, and technology is key for this to happen successfully (Interviewees A, C, G, J, and M). Regardless of the choice made, it is vital to act in collaboration with suppliers to ensure that the food supply reaches end-consumers and that the SC is flexible enough to deal with demand volatility.

4.4.1.2. Velocity

The velocity of adaptations has also been noted in the SCs. Many of the aforementioned web shops were established in a matter of days (Interviewees B, D, F, G, and U). This velocity is required for rapid change, since those companies without “built in resilience or flexibility to adapt [are] going to die” (Interviewee A). As velocity is the speed with which an item can progress through the length of the supply chain (Christopher & Peck, 2004), there were a number of comments about the benefits of a reduced number of intermediaries, as a way to secure the supply chain and have more control over the process (Interviewees A, G, I, J, K, O, P, and T). This flexibility helps SMEs grow and generate new business models more easily (Interviewees E, G, H, I, and T). “We have grown more than 400% on average these last two months compared to last year” (Interviewee I). This links to Ponomarov and Holcomb (2009), who affirm that uncertain circumstances require swift action. Most small companies have not shown problems when meeting the demand (Interviewees E, G, I) and it is widely seen that they can adapt their operations more easily (Interviewee E, G, and P) due to the simplicity of their chains. This correlates with the theory, where Mikušová and Horváthová (2019) stated that bigger enterprises are exposed to larger numbers of risks due to their complex networks.

4.4.1.3. Visibility

The importance of communication for resilience was accentuated by Interviewees E, G, I, J, and S. Communication can be utilised to facilitate visibility, both internally and externally (Jüttner & Maklan, 2011) and it is also a vital component of successful crisis management (Hart, Heyse, & Boin, 2001). Linked with the digitalisation discussed above, online stores provide an additional channel, via which organisations can communicate with the end-consumer openly and with continual updates relating to stock, building more trust with the end-consumer (Interviewees E, G, I, and S). In traditional crisis management, there is a focus on communication with the media to minimise damage to a company’s reputation (Coombs & Holladay, 2010). However, in this crisis, there is a need to communicate with employees and end-consumers due to the humanitarian nature of this pandemic as opposed to a purely economic crisis, and therefore, for “organisations to have any kind of future at all, they have to retain the trust and confidence of their customers” (Interviewee S). Not only is this communication important for employees and customers, but it must also be actioned for the upstream supply chain to ensure collaboration (Interviewees I and J).
4.4.1.4. Collaboration

The data is in accordance with the theory that mutual support and collaboration are the most beneficial relationships to overcome a crisis. Given that it is possibly the most important characteristic of resilience (Jüttner & Maklan, 2011), it is unsurprising that it was spoken about so commonly among the interviewees, when discussing crisis response. For instance, Interviewee J has developed a technology that allows producers located in a close geographic area to organise and collaborate together. This correlates with Johnson, Elliott, and Drake (2013), who affirmed that exchanging information is one key driver for companies to engage in collaborative relationships with suppliers. There was a clear desire to support suppliers (Interviewees C, E, F, H, I, J, M, N, O, Q, R, and T) and work together to ensure that food was being produced and provided to the end-consumers (Interviewees D, E, I, J, Q, S and U). Within this collaboration, there was repeated mention of the importance of trust, and the fact that, “if you don’t really take care of the relationships, … you will be a loser” (Interviewee M). This correlates with Craighead et al. (2007), who stated that all actors aim to ensure common prosperity and help each other thrive. The creation of these networks helps organisations perform more efficiently and increase flexibility (Castañer & Oliveira, 2020; Galaskiewicz & Wasserman, 1993; Newman, 2008).

4.4.2. Drivers

The current pandemic crisis has exposed the weaknesses of FSCs (Interviewees G, K, P and T). Currently, therefore, the main driver for SCRES would be to enhance recovery and evolve to “a new, more desirable state” after the disruption (Christopher & Peck, 2004). This was echoed by the interviewees, who spoke about the need to adapt and be more resilient, since “the real survivors will be […] the more resilient [organisations]” (Interviewee M). Many interviewees discussed the link with a future climate crisis and the need to become more resilient in advance (Interviewees A, C, D, E, G, I, J, M, O, Q, T, and V). Alongside this acknowledgement of any upcoming climate crisis, interviewees spoke of the change in consumer behaviour and the need to be resilient in the face of this (Interviewees B, D, E, G, I, J, K, M, N, Q, S, and T). Furthermore, there was mention of the long-term benefits that resilience can bring, in spite of the short-term cost and effort required to implement it (Interviewees E, J, S, and T), supporting the notion that the benefits outweigh the associated costs (Chunsheng et al., 2019).

Changes in consumer behaviour have had a major impact on the responses of various organisations in the food industry. As discussed previously, Pagell et al. (2010) introduced a matrix for organisations to transition towards sustainable purchasing behaviours (Appendix 3). The current crisis has had a significant impact on the purchasing habits of the end-consumer, which in turn affects the entirety of the food industry SC.

Convenience goods are much less in demand as a result of the shift to weekly shopping over spot-buying; consumers are less likely to buy products with a short shelf-life (Interviewees D, I, N, and T). These products that were previously high demand items, including energy bars and such that were sold to cafes, have shifted from being commodities to non-critical items that have no great impact on profit (Interviewees F, N, and Q). In these cases, where the product itself is currently not performing well, organisations have to decide whether to prioritise their suppliers’ or their own economic health; one response implemented was to maintain order quantities, in spite of the unnecessary additional cost and subsequent waste product, in order to support the suppliers (Interviewees G, N, and T), with the existence of whole crop purchase contracts (Interviewee T) or with demand-models (Interviewee G and I). This option was justified by the interviewees as a way to protect the supplier relationship (Interviewees I, J, and Q), because they have “quite personal relationships” and they “don’t want them to struggle” (Interviewee N). There is also a long-term consideration here, that if the supplier goes under, the focal firm may struggle to replace the supplier with another whom they trust and with whom they can ensure the same quality (Interviewees H and N).
At the other end of the spectrum, consumer behaviour has shifted to consume certain items in greater quantities, such as pasta, rice, and other long-life products (Interviewees D, E, G, I, K, N, Q, R, and T). In these cases, items that previously were non-critical, have become either bottleneck or perhaps even strategic items for organisations in food retail, resulting in pressure on established supplier relationships and a push to onboard new suppliers to make up for the shortfall (Interviewees D, E, L, Q, T, and V).

4.4.3. Barriers

There were many barriers stated for implementing resilience during a time of crisis. One of the key barriers was the often-repeated statement that the current focus is on short-term survival, as opposed to long-term resilience (Interviewees A, C, E, G, I, K, L, M, N, O, P, Q, R, S, and T). Interviewee G expressed that “And a lot of those companies that are really struggling right now are too focused on survival to really work on any project that has any sort of medium to long term ramifications in general. And they are really focused on the short term”. As discussed by Purvis et al. (2016), there was also mention of the increased costs of measures that would increase resilience, such as multiple suppliers and built-in redundancy of stock (Interviewees A, D, N, Q, S, and V). Furthermore, the lack of collaboration and communication within the supply chain was discussed, with only bilateral relationships between the focal firm and their production, and then between the production and the raw material suppliers (Interviewees B, F and H). This behaviour is in accordance with Kembro and Selviaridis’ (2015) views, that companies do not take full advantage of their network. This was compounded by the current crisis, since suppliers may be reluctant to be open about their fragile situation (Jüttner & Maklan, 2011) and where increased demand results in added tension on the relationship (Interviewees D, G, H, N, and V).

In relation to these supplier relationships, another barrier is the complexity of the SC; organisations are unable to control the suppliers in their chain and the level of visibility is very low, which hinders their resilience (Interviewees B, C, F, and M). Additionally, the food industry faces a unique barrier to resilience that becomes more pronounced during a crisis such as this: health and safety regulations. A number of interviewees discussed the strict regulations that currently govern their processes, and the likelihood of these measures becoming more stringent as a result of the crisis (Interviewees D, H, M, O, Q, and T).

Another difficulty that was discussed related to premium products, sold by a number of the interviewees’ organisations. Whether this is organic, plant-based, or luxury goods, interviewees discussed the increased cost of raw material acquisition and the projected impact of the economic crisis on their sales, when consumers will choose other, more essential products (Interviewees B, F, G and T). Consumers have a lot of power, and their change in priorities and realisation of the unnecessary services and products is going to reshape the market (Interviewee C, E, G, I, J, K, M, P, Q and T). The suppliers of premium products are struggling to deliver their materials, as they are usually produced for restaurants, which remain closed, and are difficult to sell in retail (Interviewees A, C, G, M, Q and T). Furthermore, the border and road controls have delayed the supply systems and are causing problems in logistics and supplies (Interviewees H, I, O and T). Interviewee Q stated that “Secondary products (...) such as shampoos and ice-cream, for instance, are sectors that have been globally impacted” due to decreased demand and more conscious consumption habits. Moreover, Interviewee I expressed that “people have realised they can live without many of the things they had before [...] they are realising what is a primary need and what is a luxury”, and therefore they will reconsider what they buy and how many times they go to restaurants or bars.

A notable aspect of the current crisis is the unprecedented scale and unexpectedness of the situation. The magnitude of its impact was not imagined or previously identified and therefore was not included within the preparation plan (Interviewees P, Q and S); instead there was a “panic reaction” (Interviewees F and T). Sheffi (2015) and Wooten and James (2008) mention that when responding to a crisis in a SC, responses can be ad hoc, rerouting products around damaged networks, implementing emergency procedures, or contracting secondary suppliers. Interviewee Q affirmed that “there is no company that was 100% ready for this”. During a crisis that was not foreseen, there can be a tendency to make rash
decisions (Sheffi, 2015; Interviewee S) and revert to a “fire-fighting” mode where it is difficult to keep a view on the long-term (Interviewee P).

Additionally, the nature of this current crisis as a humanitarian crisis in addition to an economic crisis means that the transferability of the previous measures implemented in the 2007/8 economic crisis is reasonably low (Interviewees A, C, D, K, M, P, and S). Not only are the economic impacts more severe (Fernandes, 2020) but this crisis requires communication in a “human, empathetic manner” much more so than in the previous economic crisis (Interviewee P and S). Moreover, the consequences of both economic crises are different. After the one in 2007/8, consumers went back to their prior consumption behaviours, while in this one, there will likely be unprecedented shifts in these (Interviewee P). The change in consumption patterns prevent organisations from developing accurate risk management plans or strategic forecasts (Interviewees D, N, Q, and T). In all cases, there has been a need to rethink supplier prioritisation and work closely with suppliers to meet demand, agreeing with Wooten and James (2008), who stated that to prevent disruptions there is a need to prioritise these according to their location, financial contribution, the speed of change and availability.

4.5. The role of sustainability in supply chains: SSCM

4.5.1. Practices

Marques (2019) and Miyazaki (2014) expressed the need to consider all three dimensions of sustainability alongside stakeholder needs when developing measures. Although for most of the multinational companies, this crisis has paused their environmental initiatives, there has been an impact on all three pillars of sustainability.

4.5.1.1. Environmental

Most environmental measures were halted, due to new regulations and the need to meet product demands (Interviewees G, O, and T), yet there is still ongoing concern within this field, especially among those who have sustainability in their core values. The main areas of action were within food waste, emission reduction, packaging solutions, and innovations derived from the shift in consumption patterns.

Food waste has been cited as the most critical environmental problem faced during this crisis. It has been tackled in part by a reallocation of overproduced items (Interviewees A, C, D, E, G, I, J, K, M, O, P, Q, and T). Due to the inability of the service industry to operate as normal, tonnes of production have been thrown away, and some destined for restaurants and cafes has been repackaged and redistributed (Interviewee D, E, F, G, I, P, Q, and T). While some of the products, especially premium ones, could not be successfully re-assigned to retail, as they would not be bought there (Interviewee G, I, P, Q, and T), some others could be managed by donating to charity or food banks (Interviewee E and T) or redistributing it among supermarkets to relieve their rise in demand of certain products (Interviewee E, F and P). Interviewee E expressed that:

"We had already made a lot of operational changes that have enabled us to be very agile, and those surplus stocks from hospitalities, we have solved them by reallocating them to individual chains or distributing them through delivery. A lot of products were also sent to initiatives helping sanitary corps and those more vulnerable. Within retail, we managed to meet the demand, even though it had almost doubled."

However, it is impossible to readjust all the extra quantities (Interviewee P). As mentioned in 4.1.1.1., the meat and dairy industry have not been able to halt processes and so have created a lot of waste, however within the production of fruits and vegetables also “around 40% of the produce will never get to the consumer” (Interviewee I). On the other hand, plant-based products have experienced the opposite. Their manufacturing processes can easily be stopped and adapted, and products can be frozen and stored (Interviewees E, F, and G). Interviewee G mentioned that “on average, inventory and supply
chain issues are going to be reduced for alternative proteins”. Moreover, this industry has gained more followers in the past months (Interviewees A, B, C, E, G, H, and K).

Emissions and energy usage were a commonly mentioned concern among the interviewees. There are many global organisations in the food industry, especially retailers, that are focused on reducing their emissions and are part of the RE100, who commit to being 100% renewable (Interviewee O) including their suppliers’ emissions (Interviewees G, I, O, Q, and T). Most of these are also part of the CDP report, where, together with their suppliers, organisations work to “address the impacts on and risks from climate change, deforestation, and water security” (CDP, 2019). This collaboration is important, since the majority of the impact occurs in the supply chain, creating an average of five times the emissions from their direct operations (ibid.). Some companies are actually investing in purchasing certified sustainable agricultural products and supporting sustainable farming (Interviewees G, I, J, K, O, and T). Nevertheless, due to consumption habits, most companies are still contributing to deforestation (Interviewee T) and returning to pesticides and fertilisers to meet the increased demand (Interviewee G and T).

In addition, it has been seen that there are not that many ecological farmers for some specific products, which makes companies dependent on the few established relationships (Interviewees B, E, G, H, I, J, O, T, and U) and therefore they lack the previously discussed redundancy - a key characteristic of resilience. The current crisis has seen a reduction in intermediaries (Interviewees I and J) and more local production, which results in fewer journeys between manufacturers (Interviewees C, E, G, I, J, K, M, T, and U). Moreover, Interviewee J has provided farmers with a platform that enables them to optimise their logistical operations and therefore reduce the number of deliveries. There has also been a reduction of CO2 emissions and consequent air-pollution due to transport restrictions and increased border controls, stoppages and factory closures, as well as attempts at cleaner production techniques (Interviewee E, G, H, I, J, T and U).

Packaging has also gained attention, not only due to the need to redesign to meet demands, but also going back to single-use plastic (Interviewees H, J, K, O, S, T, and U). Despite some companies already having introduced innovative packaging options such as biodegradable plastics (Interviewees B, E, F, G, H, J, O, P, and Q), they must now return to single use because of health and safety concerns (ibid.).

New business models have emerged during the crisis due to the new consumption patterns from the population and their current awareness and concern around the situation. One such model is the creation of some digital platforms that connect the local producers directly with customers; rethinking the way to approach them (Interviewees I, J, and K). Even though most interviewees believe that the consumer has shifted consumption patterns and shows more environmental concern, some others support the need to raise awareness and educate, together with establishing new regulations (Interviewee I, J and T). Interviewee I stated that “there is a need to shift people’s conscience and that can’t be done overnight, it is very progressive”. However, it is not only the end-consumer, there is also a need to raise awareness among producers, to ensure they understand the importance of sustainability (Interviewee J). This is shifting the industry towards e-commerce, while helping local producers survive and encouraging healthier and more sustainable diets (ibid.). On the other hand, Interviewee T affirmed that consumers usually do not understand the difference between sustainable and unsustainable products, they just notice the price difference. Therefore, it is difficult for them to acknowledge that they should spend more money for a better and healthier product (Interviewee I and T).

4.5.1.2. Social

Social sustainability is of primary concern for organisations when considering the perspective of maintaining jobs and ensuring the survival of businesses. Companies have retained their suppliers and, in most cases, helped them to overcome their difficulties where possible (Interviewees D, G, I, J, N and P). Interviewee J mentioned that:
"We are working towards a more direct supply, fairer, better and more transparent (...) by providing them with a tool that enables them to directly sell to the end consumer."

Furthermore, the reduction of intermediaries in some sustainable companies has economically benefited the producers and helped balancing inequalities, also assisting those in need by donating to charity (Pagell et al., 2010; Interviewees D, E, F, G, I, J, K, O and T). As Christopher and Peck (2004) affirmed, there are benefits in using fewer suppliers and providing them with long-term contracts to create commitment for collaboration and mutual survival. This collaboration has contributed to improving the situation of some producers, especially economically (Interviewees G, I, J, K, O, P, and T). Nevertheless, most companies have remained loyal to their well-known suppliers, with whom they have long-term contracts and good relationships (Interviewee E, G, I, J, Q, and T).

Aggravating the lack of control in these GSC, auditing cannot be undertaken in the traditional way at this time, but companies are communicating with suppliers digitally or via phone (Interviewee T). In order to react quickly, most suppliers have not been monitored and companies must rely on trust (Interviewees A, B, G, L, O, P and T). This conflicts with the theory, which states that the number of audits increases during an economic crisis (Sheffi, 2015). This could be due to the unique nature of the current crisis with enforced social distancing and isolation. Additionally, renewals of audits could not take place either, leaving some producers without an updated licence to work (ibid.). Even though some of these carry on with the production, some others, due to the delicacy of their products, have to stop producing (Interviewees P and T). The raw materials that are mostly affected are perishable products that cannot be stocked and those that cannot stop their flow of production, such as the meat industry (Interviewees E, G, I, J, P, and T).

Despite the inability to audit, almost every company has a code of conduct for their suppliers, which varies in stringency, depending on the size of the supplier and its impact (Interviewee O). Interviewee I affirmed that:

"On the one hand, our producers have to respect animals, people and the environment in all their practices, from not using a series of products that we might know are hazardous for the environment and workers health, to treating workers properly, ensuring they have the appropriate conditions and salaries, etc. (...) also, they are the ones that fix the price of the product."

These also have a minimum quality-based result, with minimum practices adapted to every supplier. In alignment with the strategic commodity level from Pagell et al.’s (2010) purchasing matrix, purchases are made with a consideration of sustainability in all its aspects, to build an organisation’s long-term competitive advantage. Considering demand is no longer predictable and consumption patterns are in constant transformation, products have changed their position on the diagram, prompting the need for a restructure in their supply networks, adjusting the number of suppliers.

4.5.1.3. Economic

The most important aspect within sustainability in such circumstances has been surviving and generating profit (Interviewees A, B, C, G, K, L, M, O, P, and T). Economic sustainability is vital for companies to continue their operations, and larger organisations have also collaborated with some other businesses to ensure they can handle the circumstances and difficulties. Interviewee I said “There is a need for balance. We cannot be totally sustainable to the detriment of the economic impact. If we are not economically sustainable, this is not going to work.”

4.5.2. Drivers

Despite their recent short-termism, companies still identify incentives to develop sustainable solutions, especially for the future. The driving forces to introduce sustainability in their practices differ depending on the individual organisation’s commitment to sustainability. Interviewee P stated “those companies that are looking at sustainability, [...] continue to do things sustainably. Whereas others that didn’t already have that on their radar; they’re certainly not going to be looking at it now”.

31
In addition to the economic benefits incurred, the change in consumer behaviour and their emerging concern for health and security are the main drivers for organisations to make change. Consumers have become more aware of the impact their food has (Interviewees A, B, C, E, G, I, J, K, L, M, N, P, and Q), but despite this, there is confusion and insufficient knowledge regarding what is sustainable and what is not (Interviewees I, J, and T). There is a tendency to think that all eco-products are sustainable, but one must understand where the product comes from, all the places it has gone to, how it is made, and whether it is seasonal, etc. (ibid.). Nevertheless, interviewees shared the view that a tendency in consumers to follow a healthier diet and purchase locally has begun to emerge and will become more common (Interviewee E and K). But Interviewee I acknowledged that there is still more to be done, and “consumers need to change their values.”

The crisis is also mentioned as a force that will push companies to be more sustainable with the likely introduction of new government legislation and policies, specifically in terms of traceability and transparency (Interviewees A, B, D, and O); and a general increase in the involvement of consumers and regulators (Interviewees I, J, and P). On the other hand, economic sustainability, helping the national economies thrive, will be driven by the tendency of consumers to remain their purchases local (Interviewee E, I, J, and T).

Lastly, investors are currently focusing on sustainable companies as it is thought that these will make the best performance in the future, especially considering the climate crisis (Interviewee G). Interviewee G expressed that “alternative proteins have a phenomenal sustainability story and the numbers behind them are incredibly promising and indicative of very substantial environmental advantages and resource input savings over traditional animal agriculture. But we [...] match that sustainability pitch with a business pitch, because ultimately, one element of sustainability that every business pays attention to is profitability.”

4.5.3. Barriers

Many interviewees have disregarded sustainability in their practices, focusing their attention on short- and medium-term measures to overcome the current situation (Interviewees A, C, D, G, K, L, M, N, R, and T). However, some stated that perhaps they will focus more on long-term sustainability and tackling the climate-crisis (Interviewee B, E, and H). Therefore, even though there are several articles and reports from the EU claiming to be implementing measures that will help slow down the climate crisis, companies are doing little to integrate sustainability through the current situation. The most important identified difficulties are related to the lack of supplier control, economic investment and the difficulty for companies to forecast future policies (Interviewees B, L, Q and T).

Due to the current situation, and the nature of globalised and complex SCs, organisations have struggled to audit both existing and new suppliers (Interviewees B, G, H, K, L and T). A frequently suggested alternative is to switch to fewer suppliers in local areas. However, this practice then exposes the entire SC to significant risks due to localised occurrences, such as severe weather events (Interviewee I). Interviewee I also raises the question “Would consumers be willing to pay more and to accept not to have certain products at certain times?” Moreover, companies that were already in the transition to sustainability, implementing measures towards this, had to stop and concentrate in fixing the existing situation (Interviewees G, O, P, and T). Some analysed multinationals, even though they have confirmed to have strict codes of conduct with suppliers and maintain good relationships with them (Interviewees I, J, O, Q, R, T, U, and V), have looked for alternative suppliers, relying on trust, to cope with the rise in demand of certain products (Interviewees L, Q, and R). Hence, it is complicated to assure that these are behaving according to the specified codes of conduct and are taking the appropriate measures for both their work and the environment, as audits continue digitally (Interviewees O, P, and T). Moreover, traceability entails a difficulty, particularly among SMEs.
Moreover, the extra expense that incorporating sustainability within the strategy entails, is a barrier for some small companies that do not have the resources needed (Interviewees B and H). Also, it is difficult for some small suppliers to meet the sustainable demands of their clients (Interviewees B, K, and O), due to this same reason. Hence, there is a need for big companies to economically support these so they can perform what they are required and consequently transform the entire industry towards performing better (Interviewee O).
5. Discussion

There is a need for balance across all levels of sustainability (Interviewees I and U), however, finding the equilibrium between economic concerns, and social and environmental responsibilities can be tough. As seen above, many interviewees have agreed that reaching total sustainability is very difficult. Therefore, companies have clearly prioritised the pillars of sustainability, focusing first on the economic aspects, followed by social and, lastly, environmental. Organisations’ primary concern is ensuring survival and potential growth, not only of themselves, but also of their partners and suppliers. By prioritising economic sustainability over the other pillars, organisations are making a commitment to resilience in place of a holistically sustainable perspective; social and environmental sustainability are secondary concerns, after first ensuring that the firm can continue operating.

There are many difficulties that have arisen as a result of the current crisis, as discussed in 4.2.1., but the main issues can be seen as high complexity and high uncertainty. These resulted in complications due to new regulations, as well as large quantities of food being wasted. The studied firms’ responses to these difficulties were rapid, focusing predominantly on digitalisation, shorter SCs, and collaboration with key stakeholders. It is predicted that these characteristics will become the new normal in the industry, however, in the short-term there are still some new measures that will need to be implemented. Furthermore, due to the swiftly changing situation, the long-term future is uncertain, emphasising the need for resilient and sustainable SCs that can withstand upcoming crises.

5.1. Dealing with the consequences of complex supply chains

Many problems are linked to the complexity of GSCs, as a disturbance in one of the sectors can trigger a bullwhip effect, causing further problems for the rest of the key actors and therefore, exposing some groups in the SC to vulnerability (Fernandes, 2020; Sheffi, 2015). The Covid-19 crisis has shaped the current global supply chains, with new regulations in health and safety, such as social distancing, and within transport there have been logistical difficulties. However, the urgency to collaborate with all actors of their SC to ensure collective survival has been the predominant concern of the organisations to deal with the above.

To confront such difficulties, the studied organisations agreed in their responses. Regardless of their size, organisations have felt the need to improve flexibility with the reallocation of suppliers and produce. However, there was a clear distinction between smaller companies, who need to innovate and adapt to survive and ensure turnover (e.g. Interviewees B and F), and larger companies, who can continue almost as normal (e.g. Interviewees L and N). Because of their demonstrated flexibility and ability to restructure, less complex SCs have thrived and met the high demand. On the other hand, the fact that larger organisations have continued operations without substantial change could be a result of their higher “buffer capacity” (Interviewee D). Nonetheless, the significant growth that has been seen among these smaller organisations suggests that it is more advantageous to be adaptable than to rely on buffer capacity.

To counter SC complexity, an alternative to the aforementioned rerouting around damaged nodes is the shortening of SCs and the reduction in the number of intermediaries. This not only allows the organisation to have closer and stronger relationships with, and provide higher salaries for, their suppliers (Hobbs, 2020; Petetin, 2020; Interviewees C, E, G, H, I, J, K, M, P, T, and U), but also increases visibility within the chain, reducing risks and enhancing collaboration (Jüttner & Maklan, 2011). Shorter SCs heighten social sustainability with fairer pay, economic sustainability with increased resilience, and environmental sustainability with decreased transportation. The above entails one of the several congruences between SCRES and SSCM, which justifies the inclusion of resilience as part of a holistic approach to SSCM.

Although this global distribution is unlikely to fully disappear, networks and relationships between all actors of the supply chain have gained more importance, with organisations bringing their suppliers closer to them and promoting support, trust, and transparency. This is where SCRES and SSCM, conflict
the most. While resilience aims for the existence of several suppliers, to minimise risks and facilitate a bigger supply structure that enables quick reaction, SSCM demands a smaller number of suppliers with long-term contracts, stressing the importance of local production and short supply chains that encourage lower emissions. Therefore, there is a need to balance having more suppliers while also building stronger relationships with them.

In light of both shorter supply chains and the reallocation of suppliers to a more local network, innovation and new business models have emerged to solve these bullwhip effects, which will be further explained in section 5.3.

5.2. Overcoming uncertainty in a crisis

The problems of complexity within global FSCs are intensified, due to the unexpected nature of the crisis, resulting in uncertainty among all actors in the chain. Although some organisations might have had crisis management plans or strategies for potential future disruptions, few were ready for such an event (Interviewees A, C, K, M, and P). This has resulted in reactionary responses, whereby organisations must focus on the economic wellbeing of their business, and if possible, that of their network.

While there were few organisations focusing on environmentally sustainable measures, it could be posited that this is a consequence of the unexpected and uncertain nature of the current crisis. For organisations that already had sustainable measures implemented, it was possible to let these continue, however, those organisations that did not have sustainability at the forefront were not inclined to incorporate it during a crisis (Interviewee P). Even those organisations with a sustainable focus are not actively implementing new measures, however the ability to continue with their prior environmental commitments indicates the importance of incorporating these in advance of any crisis to ensure their continued contribution.

While food waste has always been a consequence of the industry, the unexpected and uncertain nature of the current crisis, together with a change in society’s consumption patterns, has increased the quantities. This drastic change in consumer behaviour, both with reference to product choice and purchasing frequency (Interviewees D, E, G, I, K, N, Q, R, and T), has caused difficulties for the food industry with some items being produced unnecessarily or in excess quantities, such as those related to animal agriculture (Interviewees D, G, I, and T). This demand fluctuation from all parties has impacted producers heavily; with the hospitality industry mostly closed, producers have needed to reallocate their goods (Petetin, 2020; Interviewees A, C, D, E, G, I, J, K, M, O, P, Q, and T), which has been difficult to achieve with premium products.

For many organisations, the solution to this uncertainty was digitalisation and the creation of new, online business models. Flexible adaptation became the answer for many firms, who no longer had access to open sales channels (Interviewee F). This is perhaps due to the nature of the current crisis keeping many workers and consumers indoors, and therefore there has been a marked shift to digital methods (Galanakis, 2020). The use of these technologies enables control and traceability of products and all processes in the SC, ensuring that operations are optimised and that sustainable requirements are met (Karutz et al., 2018). It also increases transparency and visibility throughout the SC, fostering trust and benefitting stakeholder relationships. Furthermore, digitalisation favours the reduction of unnecessary production and the aforementioned food waste, thereby benefitting the economic, social, and environmental pillars of sustainability. Thus, digitalisation is a common practice between SSCM and SCRES.

The ability of smaller, more flexible organisations to adapt over their larger counterparts has shown the benefit of resilience and sustainable practices in the face of a crisis. The uncertainty of the future then strengthens the need to implement resilience and sustainability in order for organisations to be prepared for the unknown.
5.3. The ‘new era’ of the food industry

The leading characteristics during this crisis - digitalisation, shorter supply chains, and collaboration - will become intrinsic and will shape the future of the industry. On one hand, the tendency of companies to become more digitalised is not only going to enable new ways of approaching consumers in the short-term, but will benefit procurement in the longer-term, integrated throughout the chain to increase the value for all parties and to improve visibility and traceability. On the other hand, the need to reduce the complexity of these SCs to improve their adaptability is going to enhance the shortening of these, becoming localised where possible. These shorter supply chains, together with the implementation of digital traceability of products and processes within the SC, are also going to favour the development of stronger contingency plans for the future (Interviewee P), enabling better control of global supply chains. Moreover, as exemplified by Interviewees E, I, and J, there is a need for innovation and development of new business models.

“You have to change everything; how we produce and how we distribute, how we retail, and how we consume” (Interviewee K).

Secondly, the food industry is going to be framed by new regulations, which will delimit its future activity, and new priorities will emerge, both within consumer product choices and organisation-supplier relationships. This reconsideration of needs is going to affect companies in regard to re-evaluating the importance of different products, but also will impact priorities among the population, where premium brands and hospitality are going to feel the largest repercussions, due to economic concerns (Interviewees D, F, Q, and T). Interviewee Q expressed that “there is a necessity for innovation in regard to the product, how we connect with the consumer, the value proposal, etc because the future average consumer is going to prioritise the items in their basket.” Additionally, Interviewee G mentioned that “traditionally in recessions, people tend to be very picky with what they are buying, and in general you cut luxury purchases and focus on essentials and cheaper goods.” The repercussions of this will be wide-reaching and severe unless there is significant restructuring of the industry.

It is clear that the Covid-19 crisis is going to trigger a significant reconfiguration of global supply chains. The learnings derived from this situation suggest a need for greater control, in an attempt to create a more resilient and sustainable food industry, empowering these organisations to thrive and adapt to future disturbances (Interviewees D, P, and S). Thus, organisations must work towards the above mentioned characteristics of digitalisation, fewer intermediaries, and collaboration in all sectors.
6. Conclusion

This research aimed to uncover how organisations in the food industry in Western Europe are managing their SCs in the face of a global crisis, with reference to sustainability. The Covid-19 pandemic has exposed a number of weaknesses within global FSCs, but, while some organisations have struggled to stay afloat, others have experienced huge growth. This growth was most significant among smaller organisations with shorter SCs, due to their ability to adapt to overcome the crisis. Furthermore, those firms that implemented aspects of social sustainability, such as maintaining positive and trusting relationships with suppliers, were better able to rely on their SC. For this reason, bigger companies are trying to reduce the complexity of their chains by shifting some of their products to locally produced and implementing digitalisation and traceability to achieve better control of their networks and reduce potential disruptions. This research has exposed the need for a holistically sustainable approach to supply chain management, implementing both Supply Chain Resilience (SCRES) and Sustainable Supply Chain Management (SSCM) to focus on economic, social, and environmental sustainability, in order to exploit the opportunity for growth during a crisis.

In addition, this study has shown the importance of resilience over risk and crisis management; the former prepares an organisation for any unexpected circumstances, whereas the latter has limited use unless the event has been foreseen. Thus, SCRES can be seen as a way to increase the economic sustainability of an organisation, and thereby as a vital part of SSCM, which emphasises sustainability in all three pillars: economic, social, and environmental. While this research has shown that, in times of crisis, these pillars do not have equal importance for global supply chains in the food industry, it has demonstrated the shifting priorities of firms, abandoning environmental measures and focusing more intently on economic wellbeing. Furthermore, it has shown that building trustworthy and supportive relationships with all actors of the chain, including end consumers and producers, enables the companies’ longevity and facilitates potential growth. As opposed to the role of the crisis for resilience, this crisis has not been a driver for the implementation of sustainability within social or environmental aspects. In the pre-Covid context, organisations were less likely to introduce resilience. However, this major incident has raised its importance, incentivising the transformation of supply chains towards resilience. Contrarily, environmental concern was more significant before the start of the crisis than in the current situation. Nevertheless, the research results clarify that these measures have been postponed and not cancelled.

An organisation must properly implement SSCM, including SCRES, before a crisis in order to allow for growth of the organisation during the event. If not, the crisis response will be reactionary, and although this may still prevent the company from collapsing, it will not enable any significant improvement. The main congruences between SSCM and SCRES are those which, beyond mere survival, facilitate growth during crises. The authors would suggest that in this case, the most beneficial practices are digitalisation, shorter supply chains and reduction of intermediaries, and collaboration throughout the SC. Regardless of the reason for implementation, these actions can benefit all three pillars and therefore should be prioritised within all food SCs.

Finally, this crisis has provoked drastic responses and behavioural changes from all sectors of the FSC, changing their business strategies and purchasing portfolios. The speed with which the industry has reacted, and the willingness of all parties to change their consumption habits, has indicated that radical change is possible if there is motivation for this. Therefore, the future climate crisis could be employed as the impetus for transformational change within the food industry, leading to more resilient and more sustainable supply chains.

6.1. Practical implications

This thesis has wide-reaching practical implications for the food industry and beyond. It has increased the understanding of SC management practices in the food industry during a crisis and has exposed the tendencies of organisations to ignore the environmental aspect of sustainability. This has implications
for academics in terms of future research, as discussed in 6.2. Furthermore, the profitability of those companies that were focused on all three aspects of sustainability within their SC has demonstrated the benefit of implementing resilience in the face of unknown future crises. This has implications for practitioners, since it has been demonstrated that collaboration and trust throughout the SC network can result in beneficial outcomes for the focal firm. The study demonstrates to supply chain professionals the need to focus on SSCM, integrating SCRES, ensuring a holistic integration of all three pillars of sustainability. This research has outlined the most common practices of SSCM and SCRES among the food industry in Western Europe, however the key learnings could be translated to other locations and industries, due to the global nature and wide-reaching significance of both the current crisis and the impending climate crisis.

6.2. Recommendations for further research

While this thesis examined the practices of organisations in the food industry, it was not possible to research the factors that influence decision-making of SC managers. This could be an area for further study, perhaps also considering the role of organisational culture. Furthermore, the majority of interviewees acknowledged the importance of environmental sustainability but did not act in a way to facilitate this. Thus, further research could uncover what compromises are made and the reasoning behind these, taking into account an organisation’s mission, vision, and values to understand any correlation. Moreover, this research was conducted from the perspective of brands and retailers; additional studies could consider the topic from the perspective of suppliers. In addition, while there are aspects of this research that could be applied to other geographical locations, it would be beneficial to carry out further studies in different cultural and economic contexts, as well as within other industries that have been differently affected by the current crisis.
Bibliography


Appendices

Appendix 1: Similarities and differences between Covid-19 and climate crisis.

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Represent physical shocks causing socioeconomic impacts.</strong> Can only be remedied by understanding and addressing the underlying physical causes. Current crisis provides a foretaste of simultaneous exogenous shocks to supply and demand, disruption of supply chains, and global transmissions and amplification mechanisms.</td>
<td>Covid-19 presents imminent, discrete and directly discernible dangers, which have conditioned us to respond for our survival. Risks from climate change are gradual, cumulative, and often distributed dangers that manifest over time.</td>
</tr>
<tr>
<td><strong>Systemic.</strong> Direct manifestations and knock-on effects propagate fast across an interconnected world.</td>
<td><strong>Timescales.</strong> Pandemics are often measured in weeks, months, and years. Climate is measured in years, decades, and centuries. Prove far lengthier and more disruptive.</td>
</tr>
<tr>
<td><strong>Nonstationary.</strong> Past probabilities and distributions of occurrences are rapidly shifting and proving to be inadequate or insufficient for future projections.</td>
<td>Pandemics are a case of contagion risk, while climate hazards present a case of accumulation risk.</td>
</tr>
<tr>
<td><strong>Nonlinear.</strong> Socio Economic impact grows disproportionately, and catastrophically once certain thresholds are breached.</td>
<td></td>
</tr>
<tr>
<td><strong>Risk multipliers.</strong> Highlight and exacerbate untested vulnerabilities inherent in financial systems and the real economy.</td>
<td></td>
</tr>
<tr>
<td><strong>Regressive.</strong> Can affect disproportionately most vulnerable populations and subpopulations.</td>
<td></td>
</tr>
<tr>
<td><strong>No black swans.</strong> Experts have consistently warned against both over the years.</td>
<td></td>
</tr>
<tr>
<td><strong>Require the same fundamental shift.</strong> Requires optimising short-term performance and ensure long-term resiliency.</td>
<td></td>
</tr>
<tr>
<td><strong>Need true global coordination and cooperation.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Require present action.</strong></td>
<td></td>
</tr>
</tbody>
</table>

(Pinner et al., 2020)

Appendix 2: Elements of supply-base continuity.

<table>
<thead>
<tr>
<th>Element of Continuity</th>
<th>Description</th>
<th>Number Involved (Out of Six)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decommoditization</td>
<td>Explicitly treating a supplier and/or entire chain that provides a commodity (lots of substitutes/competition mainly on price) as if it supplied a rare/strategic input. Buyers give long-term contracts and pay above market prices for items that are usually bought on a transaction-by-transaction basis for the lowest possible price.</td>
<td>6</td>
</tr>
<tr>
<td>Traditional supplier development</td>
<td>Training suppliers to be better suppliers for the focal firm. Benefits accrue to both the buyer and the supplier.</td>
<td>5</td>
</tr>
<tr>
<td>Reducing supplier risk</td>
<td>Helping suppliers to mitigate some or all of the risk associated in making supplier’s products and/or processes more sustainable.</td>
<td>4</td>
</tr>
<tr>
<td>Nontraditional supplier development</td>
<td>Training suppliers to be better suppliers to other customers. Benefits directly accrue to supplier and perhaps competitors.</td>
<td>3</td>
</tr>
<tr>
<td>Transparency</td>
<td>All chain members provide full accounting of flows of money to origins.</td>
<td>2</td>
</tr>
</tbody>
</table>

(Pagell et al., 2010)
Appendix 3: Kraljic's Model of Purchasing Portfolio Management.

(Kraljic, 1983)

Appendix 4: Sustainable Purchasing Portfolio Matrix.

(Pagell et al., 2010)
Appendix 5: Interview guide

Research questions:
Main RQ: How are organisations in the food industry in Western Europe managing their supply chains in response to global crises?

RQ 1: What are the key characteristics of global food supply chains and what are the main difficulties for these chains during a crisis?
RQ 2: Which aspects of SSCM and SCRES are organisations implementing to overcome the difficulties in their food supply chains?
RQ 3: How do professionals working with food industry supply chains perceive the future of these chains, both in the short and long-term in relation to sustainable development?

Interview questions:
The interviews were carried out according to the following guide. This was primarily created for consultants and then adjusted for organisations. Hence, there are some questions that were phrased differently, which can be seen in parentheses.

1. What is your role - how are you involved in the food industry Supply Chain?
2. How is Coronavirus affecting your role and your daily tasks?
3. Regarding organisations in the food industry that you’re familiar with: can you please tell me about any commonalities or discrepancies between the management of their SCs that you’ve noticed since the breakout of the Coronavirus. (Are there commonalities or discrepancies between how your organisation is acting and the strategies demonstrated by other organisations?)
4. From the actions you have seen, what are the priorities of organisations? (What are your priorities during this crisis?)
   [The interviewees here wanted to know whether companies were focused on short- or long-term, which stakeholders had more power and whether they were focused on sustainability]
5. From what you have seen, does sustainability impact the actions taken in response to the crisis, and the consequent outcomes? (Does sustainability impact your reactions taken?)
6. How important is sustainability in the current situation?
7. Which sectors of the SC are most vulnerable?
8. What are the biggest difficulties for food industry SCs currently with Covid-19?
9. Tell me about the relationships between suppliers and the buyers. (What is your relationship with your suppliers?)
   [Here the interviewees were aiming to get information regarding the communication and collaboration among these, if they were still purchasing global or they were becoming more local, how were they auditing, new regulations, etc.]
10. Are organisations still relying on their established networks? (Are you maintaining relationships with your established networks?)
11. Have you seen any innovative responses in terms of the management of these SCs, or is there a reliance on traditional methods (highest bidder etc.)? (This was not asked to organisations).
12. How are the current reactions different from the crisis management methods employed in response to the 2008 economic crisis? (This was asked when the interviewee had been in the company or industry for that long).
13. How is the current situation different to the 2008 crisis and how is this impacting SCs?
14. How do you foresee the future of food industry SCs? (This was asked when the interviewee had been in the company or industry for that long).
   [The aim with this question was to understand how the future scenario of the entire industry and of the global supply chains in general would look like in the eyes of the professionals.]
Appendix 6: Interview Sample

Interviewee G: Consultant with food companies and foodservice brands on plant-based, cultivated, and fermented foods.

Interviewee G 19:26
I guess in general, I feel like having competition amongst your suppliers is what most businesses would want. In terms of pricing, obviously like this, you know, suppliers that share your values and are closely aligned with your business are pretty normal. You do want obviously your suppliers to think of you as a partner and you want to be significant to each other's businesses and in a good relationship. So I think there's there's a few tensions there because most businesses want to commoditize their inputs. And most suppliers don't want to differentiate their inputs so that they're not they can't be commoditized most of the time are, at least how the alternative protein industry seems to work right now, is that the majority of companies are relying on I would say, non-commoditized inputs. Even though a lot of the plant proteins they use are themselves commodity. There's often a lot of variability between suppliers and so once you've adapted your production process for the particular parameters of a like a pea protein or soy protein that you get from a particular supplier... It's often really tricky to switch to a different supplier because that means you have to then change your production process. Maybe you change how much time or heat is applied in your extruder or how much downstream or upstream processing you have to do before things are going through your manufacturing. So, in general, that's the stage where most of the time suppliers are highly differentiated. And there's quite a bit of locking effect and low portability. So in this situation, like, when you're subject to those kinds of concern, you absolutely want to be very closely tied with your partners and that can serve as an insulating effect if you are a major buyer for a particular protein or ingredient supplier. Maybe you get preferred status, and hopefully there's no interruption. But over time, I do expect that there will evolve to be more fungible inputs to alternative proteins, and there'll be more portability between suppliers. And that competition will reduce prices and also create a little bit of redundancy in most companies supply chains. Because it's also it's a risky place to be if you just have one supplier. For those, there's not a lot of backups. Not only did that, obviously increase your cost risk, but in the event of like the crisis we're in, if there's a major supply chain interruption, you could be really left high and dry.

Interviewer 22:15
Okay. And as you've mentioned before, would you say then that the most vulnerable part of the supply chains right now in this crisis are inventories? Or is there any other part of the supply chain that might be more vulnerable?

Interviewee G 22:32
Yeah. Are you asking specifically in the alternative protein supply chain or food supply chain or?

Interviewer 22:38
The industry in general, I would say.

Interviewee G 22:41
Okay. Yeah, I think in general, the most vulnerable part of the supply chain right now is, you know, any company that's dealing with a complete interruption to its customer base, so restaurants and food service being the prime example of that and recognizing that's not only just something that's happening right now in the short term, but food service and restaurants generally have very low margins, a lot of them are small. They have, you know, high costs and they're, there's a real sense a lot of places are going to go bankrupt or there's going to be quite a bit of consolidation. And food service spending tends to bounce back slowly in recessions, after recession. So, some sectors will back bounce back faster than others. But it takes them a long while because it's one of the first things that consumers cut in their spending. So I think that's one of the most vulnerable pieces right now. Anybody that services a restaurant, to any service providers to restaurants or product providers that are heavily dependent on that channel, are very vulnerable right now. So big distributors that are in food service, the broad line and other types of distributors are in a tough spot on certain product categories and certain cuts of different products like
steaks often go to restaurants so that the steak business is going to suffer a little bit, although there's other uses for the need there. But I think seafoods are a very cogent example, about two, three quarters, two thirds between two thirds and three quarters of all seafood consumed in the United States is consumed via out of home channels, like restaurants, and food service settings. So that is going to be a major hit to that industry. I do not know the relevant numbers for other parts of the world, but I have to imagine it's similar in a lot of different markets. And so that is going to be a challenge. And any company that was reliant on a transportation or supply chain link that is now being in high demand from other sectors of the economy, is going to really be challenged. So like if you're a culture media supplier, and you can supply biomedical or food, there might be more much more advanced demand now for biomedical applications for that could really hurt somebody who's relying on a key supplier who then moves over into the biomedicale space. The same thing goes for like transportation. If you are heavily reliant on cold chain, like storage or trucking or trains or refrigerated containers for shipping. You're probably in a tough place right now because a lot of that movement has been reduced. And consequently, prices for transportation have gone up. If a key ingredient you need comes from a place that requires a lot of shipping, that is probably really increased your costs. You're very vulnerable. And yeah, I get and then I guess the final thing I'll point out is farmers are going to be really vulnerable just because if they're growing animals, they're in a tight spot. If their processing facilities close, if they are growing certain types of produce that are perishable, they're in a tight spot because perishable supplies are really running short. I would say like the probably the farmers that are growing grains and pulses and like things that can be processed into more shelf stable, like seeds or ingredients that might be in a better spot. But there is, there's going to be ripple effects that are hard to perceive. But in general, farmers and producers like that tend to be commoditized. And because of that, they're gonna have the harshest treatment. So, in general, I do not see most of the ingredient companies or most of the processors doing poorly, I think they'll survive, some of them might stumble, some of them might have to consolidate. But I think a lot of them are kind of come out of this actually in a fairly good position.

Interviewer 26:42
Do you think also that...? I've talked to several people, and they all mentioned that there's a lot of companies that are cutting their intermediaries, so then the supply chains are becoming way shorter because of cost efficiency and obviously the problems of Covid-19. Is that something that is happening in the companies that you know? Are they becoming more local or how are they going to tackle that?

Interviewee G 27:12
Yes, I mean, that's going to be more of a focus for sure. As transportation costs go up, the value of having a shorter supply chain also goes up way. And so some companies can, I think, make that switch easier than others. A lot of the world's crop processing capacity is in China. And so, a lot of things that are grown in North America are shipped to China, processed, and then shipped back to North America. So, there is going to be a very high premium, which is obviously a huge sustainability challenge, in addition to being, you know, kind of a business challenge. So, one of the things we're trying to encourage for both sustainability and business reasons is, obviously the development of much more processing capacity, closer to where it's needed. And that is, I would imagine also a big consideration for a lot of European companies that I imagine have similar economics. So, what as you see shipping prices go up, that's going to place a lot of premium on more localized processing. Because in general, you know, you can grow a lot of ingredients for the food products that we're interested in, you can grow those ingredients all over the world, it's then the processing that has tended to be, you know, become very geographically clustered, because it often has very high capital costs and is very subject to labour cost exposure. But with the advent of maybe shipping that's interrupted, we could just see a major shift to more localized processing of crops that are known and that in turn could lead to much shorter supply chain because if you're able to source from within a region or a country the crops that are then processed and new ingredients that then you can then use in your products that could end up cutting thousands of miles out of supply chains like could be one of the sustainability benefits of this crisis is that it just forces companies from a cost standpoint to shorten their supply chain. But that reorientation can't happen overnight, you know, it takes hundreds of millions of dollars to open up a lot of these processing facilities, so the infrastructure required is going to require a significant amount of lead time to develop. But it's, there's now a lot more of a financial reason to develop that infrastructure on the part of both of
the providers and the buyers than there was six months ago. So, I do expect that will happen. It's just that, even though everyone sees the need for it right now, it can't happen overnight. It does require a lot of money, specialized expertise, and just takes time to build that and reorder and, you know, the whole, like set of storage and transportation infrastructure that's needed to service those processing facilities.

**Interviewee K: Sustainability professional in agri-foods projects**

**Interviewer 13:35**

Then with flexibility you mean it not like having more suppliers, but flexibility in the sense of cutting out intermediaries and like bringing directly from producers to consumers?

**Interviewee K 13:49**

Yes, yes, yes. Because Oh, and I see I can give you another example that is maybe more close to you because he's in Sweden, which is , and also , they are already changing. Because they were already changing the supply chain strategy, but not even though they were strategic and they were going forward they have to, they were dealing with the same problem as the rest of the stakeholders from the sector. How you can connect the, the final food consumer with with the food with the restaurant and beverage services, there was not capacity and there was no conditions for that. And from now, that is going to be a conditional -How to say - a conditional requirement in terms of how to connect with the with the final producer because sorry with the final consumer, so they are already doing it and there there are going to be other actors from the supply chain that they have they need to do it. For example, I can give you an example. At the beginning of April, Wuhan and that Area Regional of China they were already having the they already lifted the lockdown situation and why don't they have what what they were witnessing is most of the restaurants, coffees, even though they were applying all day sanitary norms and all the capacity of the capacity that now they have to, to follow in terms of the social distancing, they are having issues to bring new to bring new or and usual customers, because now you are dealing with this, this this radical change of human behaviour, because we are taking a lot of a sanitarian and health measures to avoid to have contact with others. So, maybe you can lift the norms and the rules that are related to social distances but then you have to it's hard I mean, you have to work also with the strategy from the from the company but also the strategy with the supply chain, how to guarantee to the final consumer that they are not exposed, exposed again to the, to the this virus or other virus, and it's going to change the whole way that we behave, but also the way we consume And also the way that we produce. So, it has to be more practical, more adaptable, more flexible, but also take into account the new situation related how we how we interact with the food sector.

**Interviewer 17:17**

Okay. Yeah. Nice. Ah, what are like from these organisations that you have experience with? Their management, let's say what are the priorities? Are they more focused on short or long term, on the stakeholders? What is the pattern?

**Interviewee K 17:48**

I think that could be a tricky question because most of their long term plans and now they are they have no...they don't have a baseline, they have to change in terms of what the expectations of the of the measures our government can bring in terms of social distancing and how they every sector, every business sector can be on lockdown in our progressive, the only information that has been released is, for example, the tourism sector and all sub sectors related with tourism and one of them. One of them here in Barcelona is obviously food services. They will not be fully open until the end of the year. And I'm sure that these measures will be similar in Italy because they have a similar or worse situation than in Spain. Maybe those countries that were taking previous measures they can. They can - the food industry stakeholders - can also take those decisions in advance but take into account what is happening now. I think most of the companies are working on the short and medium term plan, how to change and adapt the way they offer their products or services, but also take into account what the government is going to rule, the way and the conditions and norms that for the, for the reopening of those or of those businesses.
Interviewer 19:49
So do you think they're taking into consideration the impending climate crisis that we're going to have? Are they also taking into consideration sustainability or are they just trying to fix their situation right now and not really taking?

Interviewee K 20:11
I think that it is all connected because we are thinking okay now, we the Covid situation you have to change the way you manage, the way you sell, the way you will have to connect with others and other ways to retail your product or service. But at the same time, you are if you're in the first line of the supply of the food supply chain what it means farmers, organisations, and cooperatives and other similar institutions. You are seeing that your product is not having the - or your production is not having the capacity to be sold, or 100% of the of the production yield has not a capacity to be positioned or to be sold in the diverse types of retail that are available in your food supply industry because that changes from one country to another. But what I suggest or what I see that is that is happening, and I'm lost. I lost the word. Can we take the question?

Interviewer 21:41
If they're taking into consideration sustainability and the climate crisis?

Interviewee K 21:51
Yes and No, it depends. It depends on the context. It depends on the government context it depends on the country context and on awareness of how the consumers are aware for example, if people are aware of the impact that all the food waste is having, that has been lost then you can see. I mean that is a very tricky question. I'm trying to think about what can be because it depends, it depends on the context. I cannot tell you that they have a unique or a similar position because now we have in that we are in a state of emergency. So, there are other priorities. But when it comes to the situation about sustainability and climate change, maybe it is not a priority, but you can connect that priority in another way. For example, you can talk about food security and healthy food, reducing food waste, and strategies to sell because nowadays we are not only seeing a health or health or sanitary emergency, we are dealing with a economic crisis. So how a household economy is changing, and you have to prioritise. Are you going to pay the rent or are you going to eat better to protect yourself and your family from the Covid virus or to boost your immune system? So, in terms of talking about lifespan related with food consumption. So is the way how you reconnect those problems in another way regarding what are the priorities in their final consumers and, and household economy, which is reduced food waste, have better or at least more access to health, food products and having access to healthy and nutritional food in better price conditions. That's why for example in Barcelona there are some platforms where they are taking the opportunity of this crisis to bring farmers and organisations to connect with direct paying consumers and when we are talking that we are talking about final consumers, those households. So, I don't know if I answered your question that the focus is changing you have to change Otherwise, you will be in the middle of in the middle of an underline that you cannot be able to implement new strategies in terms of or new strategies or new opportunity actions in terms of the crisis that we are dealing

Interviewer 25:57
And what are, like in these supply chains. What are the biggest, where is the most vulnerable sector like part of the supply chain where there are more difficulties?

Interviewee K 26:10
I think there is, is I think there are two vulnerable, vulnerable sectors. First farmers because before this crisis most of the farming sector or the small or medium farmers and businesses they were not being paid the right price in several products. You will see that all these subsidiary systems that have been working across Europe for the last 50 years, are not sustainable. Because we are not paying the final price for our food. And is happening the same in some South Asian and Latin American countries and so this was happening before and now it's happening the same but now you have to deal with the surplus
of food that you are not able to sell because those intermediaries or those final industry consumers from restaurants and similar they are not going to buy. So, what are you going to do with a surplus? I suggest you to go and look for the news in the UK this week or in the US this week or last week. How many tonnes? Of milk and dairy products and even though you are pro vegan or plant-based diet it’s amazing. All of all the inputs and outputs in terms of energy and materials and resources that have been part of that production is all waste.

Interviewer 28:13
Do you think because of this, uh, the food industry is going to become more local like that the global supply chain is going to just bring them to like work nationally maybe?

Interviewee K 28:26
Yes, absolutely. I was in a webinar like two weeks ago and they were doing these analyses from the UK Food sector. And these like every country has to not only in terms of government decisions, but also the food industry sector or if there is a committee or for sure there are committees or boards for different sections of the supply chain they have to analyse okay how we can retail and maintain a food industry supply chain that is not sustainable and you know, is not affordable in this situation. For example, if a country 40% of the, to be conservative about the percentage, 40% of their food and fresh fruits and vegetables are imported. How you can sustain that in these conditions. So, then you have to see okay if that is going to change, there is a part of the population that is used to or are used to consuming bananas from Latin America or avocados from Mexico, because it is what you have established as a diet, then you change. You have to change everything how we produce and how we distribute how we retail, and how we consume. And that starts with their core responsibility of the food supply chains to see okay, this is not affordable, it's not immediate, it cannot be from one day to another, but let's change our portfolio of worries, our food products, what are our priorities in terms of food production? What are the food products that I can be introducing as a company or as a farming company in terms of cycle, in terms of nutrients, in terms of the climate conditions that I have? That is not the same if you are in the Equator or if you are in Ireland or Sweden or in the Northern Hemisphere. Now consider all these factors you have to rethink and not only rethink, but also being adaptable and being like, for instance, for that part of the of the supply chain, you have to plan because you have to plan. I mean, you have to plan in advance because it's part of the farming sequence.

Interviewee N: Senior Buying Manager at a multinational supermarket chain

Interviewer 23:28
Yep, that’s interesting. Thank you. Um, so what... can I ask what your priorities are when you're kind of making these decisions? Are you thinking about long term? I mean I know you said, even just then with the suppliers that you can't pay them more because then you'd go under. So that in itself is long term consideration. Are you seeing a lot of that among your colleagues as well, or is there more focus on short term: we have to get this product…

Interviewee N 23:52
I would say so at the moment. I think a lot of it is crisis management. And so, there's long term thinking naturally, like I said, you don't want a supplier to go under, because ultimately in two years time, you might need them for something, but that's not really how people in the food industry think because it's such a fast moving... it's an FMCG isn't it, so it's really hard to plan for long-term, actually. You don't know what's going to be trending, you don't know whether for instance, do you remember like gluten free, how huge that was two years ago. And like now, nobody really, you know, you might have the odd person who's gluten intolerant or whatever, and like, vegan two years ago everybody thought you were absolutely crazy. And now, you know, there are a lot more vegans so yeah, it's really hard to plan for long-term. The long term for the food industry is really like eight months. I could not tell you what will be trending next year and I wouldn't be planning for it. Because I think that you have to allow even for the like social media and stuff, new social media influencers and how you know they have their avocado on toast, so avocados are huge now, so we have to kind of keep our eye on, on trends like that really the
same as everybody else does, and we keep it up at the same time to be honest. So long term, there isn't a lot of planning. We do think, we don't want the supplier to be long term damaged, but I would say really that's, that's the extent of it. Which is why the food industry as a supplier in particular is bloody hard. I wouldn't want to do it, because customers are so volatile and so fickle. And, you know, there are so many like gluten free factories now that have lost so much money because it's set up, you can imagine the investment, like machinery and everything. Then the factory can't be used for like normal pasta because then it's not gluten free, so they literally bought all this machinery, all this space, all these workers and within two years, like it's, you know, the value, market value, of gluten free has dropped by like 100 million or something. So then, you know, it’s really risky. It's a really risky industry unless you go for something that you know people will always eat like, you know, tomatoes, or something like that. Or chocolate. But even with chocolate, you know, that varies all the time you've got ... people can start using dark chocolate more now, or chocolate with caramel in it, so I think that you're very brave if you are a person who goes into food production. Yeah, I do I do, I think it's really, because with clothes you have seasons naturally. And you have fashion but ultimately, most factories can produce a dress or they can produce a coat and they can change it according to the season and the style, whereas food you can't do that because there are legal requirements. You can't you can't put a salad bag, through, you know, the same factory as some crisps, because salad bags much more high care and crisps are much more low care, so you know you need different factories and different spaces so you have to be totally committed to that thing that you're going to be supplying. And like I said because things change so frequently, and they're not as adaptable as other industries so supply chain for food is much more complex than clothes, because with clothes you don't have shelf life do you, you know. Yeah, it's not going to go off and customers are not going to get salmonella from eating it or wearing it, you know. And, yeah, it's an interesting one to be honest, and I don't, I don't know how sustainable food supply chains are. You know, I really don't. I have a lot of suppliers who we've worked with for a really long time, so like one of my biggest suppliers we've worked with for like 20 years. I'd say that's one of the longest standing relationships we have. But the majority of suppliers, you will work with for a few years, I guess, like three or four years and then maybe you have a fall out, or something better comes along, or they go under or something like that. So it's quite a, I would say like three to five year turnover; then you obviously have the long term supply slot which is great. But generally, you know, I've seen so many businesses, so many suppliers go under. Because a lot of them will try to be too ambitious maybe, employing 20 people and they haven't got the business expected. It’s very rare, and I think this is a really common misconception, and certainly one I had before I kind of got involved in the food industry. A lot of people think that suppliers go under because of the prices you pay them. And really I don't think that's the case at all. I think it's, from all the personal cases that I know it's because they have... demand has just decreased their product. They've invested so much money in doing it and then their overheads are just bigger than what they're making, you know. So that's kind of my stance on it which I don't think is recognised, you know, the general public think that oh you know farmers aren't getting paid enough and stuff but it's, it's not really the case.

Interviewer 29:51
Interesting, interesting. And so, when you are making decisions with suppliers and things at the moment, how... are you thinking about sustainability and not just yourself but also, you know, other colleagues, are you thinking about sustainability - economic, social, and environmental in all three...

Interviewee N 30:16
What do you mean by sustainability as such?

Interviewer 30:17
So, I mean looking at all three. The three pillars. So considering the economic sustainability of which you have already mentioned about the financial aspect of it. But you can't pay the suppliers too much. But then also need them to survive. But then also the social aspect of it in terms of with those suppliers the relationships you have with them. And then environmental considerations. So for example, more transport or those kind of concerns.

Interviewee N 30:52
Yeah, good question. And it's actually quite easy to answer so if I was kind of ranking them the number one would be the economic sustainability, two would be social, and three would be the environment. The economic is obviously what I've mentioned before, you have to think; you make each decision individually, there's no right or wrong, there's no set formula. You look at how it could economically impact the supplier and economically impact you. If I can help a supplier without causing too much damage economically I probably would. However that's rarely the case. Socially it's, at the end of the day you're dealing, you're dealing with people. So you have relationships with the person at the end of the phone, you know, and you visit the factories, you know, as part of your job every now and then and then I see the workers and how hard they work and they come over from a lot of the time Eastern Europe. And yeah they work really hard and it's really horrible to think about them losing their jobs and maybe having to go back home and things, so that is definitely massively on my mind when I'm kind of looking at how much I can help somebody, because I recognise that that people's lives and their livelihood at the end of the day. And so I've done a lot of work in the past few weeks, trying to work with my merchandising team to create extra space on the shelves essentially to restructure things. So I have more space so I can ring some of my suppliers and say right I'll increase your volume. I do it to stop them furloughing some of their workers. So that's kind of how I would go about that with the supply chain in terms of social sustainability. Environmental sustainability, I have to say, is not a huge priority for us. Well, I'd probably get told off by my CSR team for saying that, but we have, and it's quite a new team but we have a new CSR team at Lidl, and that's kind of their responsibility. So what they do for us is they will help us like develop things, and it's not it's not really anything to do with transport, but it would be more like about the packaging of a product, so like the recyclability of something. Transport is rarely mentioned, because it's all in lorries. And the CSR team will help us develop things like packaging but they, I wouldn't consult them with my decisions. You know they’re there as kind of like a support aid for the buyer. And so when I, for instance like did this salad to go with a fork and they were like, get a wooden fork in there instead of a plastic one, you know, and that's where they come in and that's where I would think about it but it wouldn't be in terms of a supply chain as such, environmental. I can't say sadly I really incorporate that into my role at all. But I think that social responsibility is probably underplayed a lot. You know, and it depends on the type of relationship you have with the supplier as well, like if you speak to the guys with ambient, because they are dealing with, you know, suppliers in Germany that they haven't met before, and that you know employ like thousands and thousands of people, whereas my suppliers probably just, you know, employ 100 or so. They're not going to feel naturally personally tied to, they're not gonna know the faces that are losing their jobs like I might, yeah so they might approach that slightly differently. And a lot of that, again, it's just the buyer's discretion, there's no real manual for it. It's kind of who you are as an individual and how you kind of interpret your role and stuff. But I think... you know most of us are nice people. We don't want...we want to help where we can. But yeah, I'd say that it is always economic. Because the food industry, whether you're a supplier or retailer, you're working such tight margins. So, every last penny counts, because there's such tight margins, but also the volumes are so huge. So if you make a small difference with one product, the impact will be huge, because you're selling so much of that product. And I think that's, again, something that I didn't realise and, and one of my friends said like, recently, how much... he said something weird like how much do you think like a chicken costs, like a whole - I mean I'm vegetarian so I hate talking about this - but like how much a whole chicken costs from a farmer. And I don't buy meat at all and I don't eat it. I don't know how much it retails for because I don't buy it in that sense either. And, and they said something like, oh sells it at two pounds so maybe like, it costs the farm 50p. And I was like, you have to be kidding?! Like if sell it for £2, we probably pay the supplier £1.85, you know? Like that's like a 300% margin, are you kidding me? And that just reminded me of how people don't necessarily realise, you know we'll have a lot of products in our store that we don't make money on. That we pay the supplier more than we charge the customer for it, but we do it to get customers into the store. So, economic sustainability for us is the most important, because it's something that we're also not guaranteed. So yeah, it's a tricky one to navigate.