

UNIVERSITY OF GOTHENBURG school of business, economics and law

Master Degree Project in International Business and Trade

Let Them Know You're Green:

How to Become Competitive by Being Sustainable

- a single embedded case study on the chemical industry

Graduate School

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Abstract

During the last decades, all industries have experienced increased pressure from their stakeholders towards acting more sustainable, and much research has been done to understand what can be gained from listening to those stakeholders. Yet, the chemical industry is underrepresented in business research in terms of possible advantages from sustainability positioning. The chemical industry is predicted to experience an increased demand for sustainable products and solutions, since by incorporating the right chemicals into a manufacturing process, several sustainable benefits arise. This single embedded case study, with an abductive research approach, serves to answer how a chemical firm can strengthen its position and make its supply chain more competitive by communicating its sustainability contribution in novel ways.

The empirical findings and analysis of this study conclude that sustainability actions are not considered to be a source of competitive advantage in the chemical industry but rather a hygiene factor, and a requirement for engaging in trade. For chemical firms to make both themselves and their supply chains more competitive, there are three interconnected solutions to utilize and gain from sustainability actions: collaboration, system thinking, and transparency. Engaging in sustainability collaboration, both horizontally and vertically, can solve the sustainability definition and measurement discrepancy identified in the chemical industry. Transparent communication will facilitate collaboration and system thinking, which both are sources of possible competitive advantage. In turn, these resources will lead to trust and legitimacy between the actors in the supply chain, and hence, make them more competitive by working together on sustainability.

Key words: Chemical Industry, Communication, Competitive Advantage, Green Supply Chain Management, Supply Chain, Sustainability, System Thinking.

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List of Abbreviations

B2B: Business to Business B2C: Business to Consumer GSCM: Green Supply Chain Management ICT: Information and Communication Technology ISO: International Organization for Standardization MNC: Multinational Corporation NRBV: Natural Resource Based View RBV: Resource Based View SCM: Supply Chain Management UN_SDG: United Nations Sustainable Development Goals

1. Introduction

In this chapter, we will outline the background and the problem discussion for this study, starting at the development of firms' green practice and sustainability work, the drivers and barriers for such, and in which areas there is a lack of research. At the end of the chapter, the limitations of the study are presented together with explanations to why certain delimitations have been employed.

1.1 Background

Sustainable development has become an increasingly discussed topic during the last decades. Today, there are almost as many definitions of the term as there are people on this planet. The most used one originate from the Brundtland Report, where sustainable development was defined for the first time as "... to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). Sustainability is divided into three pillars; environmental, social, and economical, and although the pillars tend to get separated, they are dependent on each other. The prosperity of the society is achieved through economic success, and the economic success depends on the environmental systems (UN, n.d.).

Over the past years, firms have experienced increased pressure from customers, employees, governments, and non-governmental organizations, among others, towards acting in a more sustainable manner, but also to take responsibility for their sustainable development (Brown et al., 2020; Grunert, 2011; Horne, 2009). Historically, there has been an environmental/economical trade-off between aiming to incorporate sustainability throughout the operations of a firm, and the costs associated with such a transition (Agarwal et al., 2017; Porter & Van der Linde, 1995b; Srivastava, 2007). These costs where not considered as being invested in a competitive way if they were to be spent on sustainability (Martin & Schouten, 2014; Porter & Van der Linde 1995a). Yet, the practice of environmental management is no longer as focused on the firm itself, but on the entire supply chain to achieve sustainable development and environmental excellence in a supply chain, there is a need for united action among its actors (Green et al., 2012; Srivastava, 2007).

Since the demand for sustainable and responsible actions, from both the public and private sector, has increased over the years, a new more sustainability-focused subfield of Supply

Chain Management (SCM) has emerged, namely Green Supply Chain Management (GSCM). GSCM is defined by Srivastava (2007) as "*integrating environmental thinking into supplychain management including product design, material sourcing, and selection, manufacturing processes, delivery of the final product to the consumer as well as end-of-life management of the product after its useful life*" (p. 54-55). The top drivers for adapting to GSCM practices are according to Susanty et al. (2019) divided into top management involvement, technology, financial, regulation, and customer pressure.

1.2 Problem Discussion

The attentiveness in researching the area of GSCM has increased during the past years since sustainability has become a topic of interest on every societal level. We know that there is extensive research on how to implement GSCM practices in the automotive, food, and apparel industries (e.g., Beske et al., 2014; Luthra et al., 2011; Zhou, 2009), but even though many firms and industries have successfully adopted new greener practices, there are still both internal and external barriers to GSCM. For example, Jayant and Azhar (2014) identified that lack of government support system was the driver of the barriers to implementing GSCM, followed by market competition, lack of sustainability certifications (ISO 14001), and high pollution of industries. Such barriers are connected to each other and if these are not delt with, they will entail that firms no longer implement greener practices into their products and processes. A similar study by Movahedipour et al. (2017) showed that the lack of customer awareness and pressure on applying GSCM, disbelief about the environmental benefits, and the unwillingness to exchange information were the driving barriers to GSCM. Customer pressure is a powerful driving force for successful implementation of GSCM (Sustany et al., 2019), however, there are researchers arguing that upstream firms in the supply chain, receive less pressure from end-consumers and thus make fewer efforts in terms of sustainability activities (Foerstl et al., 2015; Ghadge et al., 2019; Siegel, 2009). Siegel (2009) also argues that upstream suppliers tend to do the bare minimum and let brand-owning corporations downstream in the supply chain be the face for their actions and leave sustainability marketing and communication to them. This passive approach to go beyond the minimum requirements for sustainability work results in a less effective supply chain (Ghadge et al., 2019), which makes it harder to stay competitive (Porter & Van der Linde, 1995a, 1995b).

The majority of the studies on sustainability initiatives have mainly paid the attention to downstream industries. One particularly interesting upstream industry is the chemical, which have not been given much consideration in (international) business research. Chemical firms are often located upstream in the supply chain and hence, do not receive as much attention and stakeholder pressure as firms closer to the end-consumer, handling the final product. Business forecasts predict that the chemical industry will experience an increased sustainability demand from their customers in general, and products with low carbon footprints, and products that fit circular business models, in particular (Deloitte, 2021). That is because manufacturing industries are the most critical ones to transform their performance in terms of reduced need of energy and reduced resource waste (Cai et al., 2019; Qureshi et al., 2015), and by incorporating specific chemicals in a production process, they can improve the overall sustainable performance of the entire supply chain (CEFIC, 2019; Deloitte, 2021). As one of the identified key industries for the transformation, the chemical industry could function as a facilitator for sustainable development if managed strategically (European Commission, 2020; McKinsey, 2020). However, the history of fraudulent handling of chemical products has made the public suspicious and critical to the industry. The increased sustainability awareness from the society and previous scandals has given the chemical industry a bad reputation (Fagoyinbo & Dairo, 2016; Hansson & Johnsson, 2006). Given the facilitating characteristics of the chemical industry, there is a need to explore how the chemical firms can achieve their full sustainability potential but also how they can take advantage of the sustainable possibilities that the future of the industry holds.

The literature on how upstream firms in the supply chain communicate is limited when put in relation to the monetary amounts that are traded between businesses (Cortez & Johnston, 2017), and the chemical industry is not an exception to this reasoning. It is not only the literature that is limited; there is a current information asymmetry in society because of the non-transparent communication regarding sustainability activities. Often, stakeholders do not get insights into the firms' daily activities and are instead informed via generalized annual sustainability reports. Yet, firms do not tend to disclose all information anyway (Agarwal et al., 2017). However, in the competitive landscape of today, corporations that do not communicate transparently will not survive in the long run, since they will not be perceived as credible and trustworthy among stakeholders (Balluchi et al., 2020; Berrone et al., 2017). There is also a risk of being called out for greenwashing when there is a gap between what a company communicates and what it actually does, and this harms the credibility even more (Balluchi et al., 2020; Martin &

Schouten, 2014). There is also a big potential gain for those companies that go beyond stakeholder expectations, and embed sustainability within the operations (Ludema et al., 2012; Porter & Van der Linde, 1995*a*), which is another reason to why this field of research must be further explored.

Chemicals are incorporated in almost every product that is consumed in daily life and will continue to play a vital role in society for a very long time, both in terms of end-products and in supply chain performance (European Commission, 2020). It is surprising that there is, to our knowledge, a lack of business research on GSCM and how to communicate it in the chemical industry since chemicals have always been and will continue to be an important part of the everyday life. Because of this, it is important to explore how chemical firms can utilize GSCM and communicate their sustainability work competitively, but also how they can overcome the bad reputation that the chemical industry has been struggling with throughout history. There is a predicted shift towards an increased demand for sustainable chemical solutions, but since chemical suppliers are located far from the end-consumer, and hence, do not receive as much pressure as downstream actors, there is reason to explore in what ways firms can utilize their green market offering to go beyond what is expected from stakeholders and, in turn, improve the competitiveness of the entire supply chain.

1.3 Purpose and Research Question

The purpose of this study is to explore and develop a deeper understanding of how chemical firms can use communication and (green) supply chain management to benefit from their sustainable efforts and gain competitiveness for themselves but also their supply chain. Hence, we aim to answer the following research question:

How can a chemical firm strengthen its position and make its supply chain more competitive by communicating its sustainability contribution in novel ways?

1.4 Explanations and Delimitations

Because of time restrictions due to semester design, we had to make some delimitations to this study.

It is the European chemical industry that will be studied, and hence, Europe will serve as the geographical setting. We are aware that there are social and cultural differences between the member states, but the extensive common regulations for the members of the European Union allow us talk about the industry as one unit. Furthermore, the European Union engage in working towards sustainable development within the chemical industry. In 2020, a sustainable chemicals strategy was initiated as a part of the European Green Deal (European Commission, 2020), which also justifies our choice.

As previously mentioned, sustainability is divided into three pillars, and in this study, we will focus on the environmental one, which is the pillar where the chemical industry is demanded by stakeholders to make a change. The chemical industry has been critically accused throughout history of including toxic elements in its products and processes. Thus, chemical firms working with environmental sustainability have the possibility to have a positive impact on the climate.

2. Theoretical Framework

The second chapter consists of a review of existing literature within the fields of communication, supply chain management, and competitiveness, with both a general and a sustainable perspective. This is to provide a solid theoretical ground for the purpose and research question of this study. In the last section of the chapter, our conceptual framework is presented.

2.1 Communicating Sustainability in the B2B Market

2.1.1 Communication in the B2B Context

Since there is a lack of research regarding how chemical firms can and should communicate, communication in a general B2B market is going to be assessed initially. What characterizes the B2B market are few but often large purchases, done by professional buyers and sellers. The buying process often begins with the detection of an issue or a problem that the buying firm decides to solve. By translating the issue to a general problem specification, it can be used in the sales process (Kotler et al., 2013). The purchase event is a focus in both B2B and B2C markets, but the premises leading forward to the purchase decision is different. In the B2C market, the marketing activities are aiming to evoke emotions in the consumer, such as creativity or desire, and then influence the consumers to purchase their products. The purchasing decision will be taken by the individual consumer, based on feelings, personal values, and sometimes irrationality or impulsive buying (Kotler et al., 2013). In the B2B market, the prerequisites are almost the opposite, and the decisions are rational and planned, both in terms of money and time schemed to spend on research. Often, the purchase decision is not taken by an individual, but by a team. Thus, the varying premises indicates that different means of communication are required to reach the different target groups (Reklaitis & Pileliene, 2019). The demand on the B2B market often derives from the B2C market, where the endconsumer desires products that have gone through processes from several different businesses with components from several B2B companies (Kotler et al., 2013).

The strategies that a firm can adopt when aiming to sell a product are twofold according to Kotler et al. (2013); first, a firm can use a "push" strategy when marketing their products and services. A push strategy can be described as when the sender is deciding what message is to be communicated to the receiver. It can take the shape of e.g., a personal sales meeting, or an email and the strategy is mainly used by B2B firms. The other alternative is to use a "pull"

strategy, which is commonly adopted in the B2C market. A pull strategy aims to pull the customers towards the area of commerce, often by using coupons or discounts (Kotler et al., 2013).

B2B communication also distinguishes between the sender and the receiver of the message that has been communicated, but the roles alternate as the receiver at the buying firm is dispersing the information gained from the original sender, and then the receiver becomes the sender at his or her organization (Murphy & Sashi, 2018). The original sender, the seller at the supplying firm, plays an essential role in forming a strong relationship with the customers, and the training and skills of the seller are crucial, to efficiently communicate their offerings to the buyer (Koponen et al., 2019; Kotler et al., 2013). Due to the complexity of the supply chain, and the complexity of the products that the buying firms aim to source, these products have a large and sometimes overwhelming amount of product information attached, in comparison to B2C products, where the product information fits on the product label. This results in buyers sometimes not completely understanding the (un)sustainable characteristics of the products that is being sourced (Kapitan et al., 2019).

The role of the seller has evolved over the years, where they started as a guide and a static information provider regarding the products and services that were offered but are now considered to be value creators for their customers. Value creation relates to implementing highly complex solutions and being a part of strategically important decisions at the buying firm (Koponen et al., 2019). There are several factors determining which supplier that will be selected, and the most common one is related to monetary factors; price in relation to quality (Kotler et al., 2013). To successfully communicate the message of the firm, the seller is required to have both high emotional intelligence as well as intellectual abilities (Koponen et al., 2019).

2.1.2 B2B Relationships and Buyer/Seller Uncertainty

In a B2B context, relationships are crucial for organizational success (Ford et al., 2011). Firms are dependent on others because without partners they would not get access to external resources for their operations nor supplies for their production. Thus, there is a need for firms to interact with their external environment. If such interaction is handled carefully and built on commitment and trust, relationships could potentially be one of the greatest assets of the firm (Ford et al., 2011). However, it takes a lot of time and resources to successfully manage

relationships into profitable ones (Håkansson et al., 1976). Relationships and cooperation between actors are also complicated since they are enclosed by uncertainty (Eriksson & Sharma, 2003; Ford et al., 2011), that in turn is arising from distrust, lack of knowledge, or/and opportunism (Eriksson & Sharma, 2003).

An often-recurring uncertainty in the B2B context is the *need uncertainty* (Ford et al., 2011; Håkansson et al., 1976). It emerges when a customer does not know the solution for a certain problem because it cannot define or specify its actual need (Håkansson et al., 1976). If the need is perceived as important, and simultaneously the customer has difficulties determining the proper nature of the need for, e.g., materials, resources or tools, the situation gets complex (Håkansson et al., 1976). Need uncertainty makes cooperation difficult and complicates the process of addressing potential suppliers (Eriksson & Sharma, 2003; Ford et al., 2011). The perceived need uncertainty may change once interaction with a supplier has been initiated (Håkansson et al., 1976). For suppliers, this reasoning implies that developing relationships with new customers might become a long and painful process since insecure customers prefer to collaborate with already known suppliers or suppliers with a good reputation since this decreases the perceived uncertainty. However, suppliers that do not have a present relationship with a customer can tamper these perceived uncertainties and hence, get the customers' attention by either stressing the complexity of the problem or by clarifying the options for solving the problem (Ford et al., 2011).

2.1.3 Communicating Legitimacy

Previous research within communication suggests that in the globalized world of today, where the competitive landscape is tougher than ever, it is of great importance to gain consumers' trust to be able to protrude in the market (Balluchi et al., 2020; Berrone et al., 2017). Legitimacy is gained through meeting the demand from stakeholders and when it comes to the environmental aspect, only authentic incentives and actions will be rewarded with credibility. The communication must be sincere, easy to understand, and transparent for the firm to be perceived as credible and to reach legitimacy among stakeholders, which is the foundation for long-term relationships (Balluchi et al., 2020). When it comes to communication and information processing, globalization and digitalization have complicated the business climate even more. The development of ICT has made sources of information accessible almost everywhere, which companies worldwide are taking advantage of, pushing their messages through the immense number of channels available. The overload of information and communication might lead to confusion among consumers in their decision-making process, making it difficult to grasp which information to absorb and trust (Marques & Batista, 2017). The problem of filtering and processing information becomes more aggravated when companies purport themselves as something they are not. If there is a perceived gap between what a company communicates that it is doing and what is actually being done in terms of sustainability, i.e., greenwashing, it is hard to reach legitimacy among stakeholders since credibility is harmed (Balluchi et al., 2020).

The concept of greenwashing is defined by Martin and Schouten (2014) as "making false or exaggerated claims to project a more sustainable image than is warranted by actual practice" (p. 4). In other words, greenwashing refers to the act of making the company look more responsible than it is to, for example, gain credibility and in turn, attract new or more customers. The use of such false communication assertions might be lethal for a firm since consumers are more well-informed than ever and know how to separate the wheat from the chaff. Hence, not walking the talk is not an option if one wants to be successful (Berrone et al., 2017; Martin & Schouten, 2014). Typically, consumers who emphasize making sustainable product and service choices are skeptical about green marketing strategies because of the increased occurrence of greenwashing, which makes it difficult for companies to gain their trust (Szabo & Webster, 2020). When greenwashing appears, the search for legit and true information is aggravated and since the world is already an information-dense place, consumption choices become even harder when firms are not honest with their actions (Martin & Schouten, 2014). Communicating sustainable attributes of a product does not automatically mean that the product is sustainable in any sense, while at the same time, products that are not explicitly communicated as sustainable are not unsustainable per definition (Kapitan et al., 2019).

Greenwashing can be intentional as well as unintentional. The latter is usually the case when an actor in the supply chain is hiding their true unsustainable intentions with a green marketing strategy (Szabo & Webster, 2020). Irrespective of the intentions, companies are hurt from greenwashing, in terms of brand perception and company reputation (Martin & Schouten, 2014). Such reasoning suggests the importance of working throughout the value chain to prevent unintended greenwashing from happening since this makes the company suffer in ways that can be avoided (Kapitan et al., 2019).

2.1.4 Communication and Labeling

Prior research states that sustainability labeling is one of the most effective means to change the pattern of unsustainable consumption and production (Bratt et al., 2011; Dendler, 2014). The usage of such labels can provide the customer with clear and sufficient information, and followingly influence the society in making more conscious purchases. End-consumers tend to rely on sustainability labels when they aim to make well-informed decisions but have a limited time or willingness to do deeper investigations regarding the environmental and social sustainable attributes of the product or service that they want to purchase (Bratt et al., 2011; De Boer, 2003). Often, the underlying cause is related to the selling firm's market position. If the performance is sharp and ambitious, one type of label is used to portrait that, and if the firm complies with bottom-line requirements, this can be portrayed as well (De Boer, 2003). This reasoning is further developed by Bratt et al. (2011), who describes that a selling company can use sustainability labels as a marketing communication means. As the number of sustainability labels have been growing, especially within the environmental field, it has become difficult for consumers to separate them. Adding the fact that the criteria for the labels are changing over time, consumers also lose their trust for the labels since they do not help them to make these well-supported decisions. Criteria for sustainability labels must be clearly determined and are usually based on the issues that are currently being discussed in the public debate, something that might hamper innovation. Since these labels have sustainability as their foundation, the term must be defined, which it has not been until today (Bratt et al., 2011).

Most of the sustainability labels are used in the marketing of consumer goods. Within the B2B context, the most frequently used certification is the ISO family of standards. In many cases, the ISO standards have become a minimum requirement for doing business and the most commonly ISO standard to demonstrate sustainability work is the ISO 14000 (Kapitan et al., 2019). Standards, such as ISO support the three pillars of sustainable development outlined by the United Nations (SIS, n.d.). Since 2015, when the 17 Sustainable Development Goals by the United Nations (UN_SDGs) was presented, it has become more common to actively visualize on webpages and in communication messages that firms support the concept of sustainable development, by following the UN_SDGs. Agenda 2030 is the agenda for how the global society will become sustainable, both in terms of environmental, social, and economic sustainability by the year 2030. The inclusion of the UN_SDGs is done via management systems and sustainability reporting, which is provided with the help of external knowledge. However, there is evidence showing that firms tend to disclose different kinds of information,

which is explained by the fact that each different industry has different levels of influence on environmental, social, and economic sustainability (Tsalis et al., 2020).

2.2 Supply Chain Management

2.2.1 SCM and Supplier Relationship

A supply chain is described in literature as actors in a network, such as suppliers and customers, which are involved in upstream and downstream cooperation. In such networks, goods and services, information, and finances flow in both directions and end up at the most suitable customer (Christopher, 1994; Verma et al., 2018). Supply chain management (SCM) is defined by Larson and Rogers (1998) as *"the coordination of activities, within and between vertically linked firms, for the purpose of serving end customers at a profit"* (p. 2).

Trends identified within the research field are the change of focus from competition to cooperation within a supply chain and an increased assessment of suppliers from their customers (Storey et al., 2006). Today, the competition is rather taking place between the different supply chains than on the individual firm level (Carter et al., 2015; Li et al., 2006; Solér et al., 2010), and the supply chain itself is required to be successful for the organizations within to become successful (Green et al., 2012; Kim et al., 2010). There are two main objectives of SCM: to make the individual firm perform better and to make the supply chain in which that firm operates perform better (Li et al., 2006).

The relationship is described as the foundation in the supply chain (Harland, 1996). Research on how firms can build strong relationships in a supply chain is done by Johanson and Vahlne (2009) in their revisited version of the Uppsala Model, in which it is concluded that trust between actors is essential for commitment. Trust is an aspect that allows actors to share information between them and is considered important in times of uncertainties. Trust can then be seen as a replacement for knowledge and confidence that the counterpart will honor that faith, e.g., trusting a supplier with a critical business issue that cannot be solved within their firm. The revisited Uppsala Model developed by Johanson and Vahlne (2009) also recognize that when building strong relationships, trust and commitment are two outcomes, together with dependency. The relationship can provide both actors with several benefits, such as efficiency and productivity, but also aspects that are not only positive. Such negative aspects are often accepted since, in the longer time perspective, they might not be definitive, but trust and commitment are not a consistent state, instead they are dynamic (Johanson & Vahlne, 2009). Trust within SCM is also crucial given that brand-owning firms, or firms closest to the endconsumer are held accountable for the environmental and social performance of their supplier. Thus, these firms must put faith in the rest of the actors in their supply chain (Seuring & Müller, 2008).

2.2.2 Green Supply Chain Management

The increased demand from stakeholders for firms to make more sustainable efforts has led to the new more sustainability-focused subfield of SCM, Green Supply Chain Management (GSCM). Within GSCM there are three approaches in which firms can incorporate sustainability throughout their supply chain: reactive, proactive, and value-seeking (Srivastava, 2007). In the reactive and proactive approaches, there is a minimal or limited commitment to environmental practices and activities only within a few functions of the firm. This is what Preuss (2005) states as an *arm's length approach* to sustainability, where actors only do what is expected of them, in terms of, for example, environmental standards. However, when firms adopt the value-seeking approach, sustainability can become a competitive advantage since environmental thinking is integrated into the business strategy and permeates the entire operations (Green et al., 2012; Srivastava, 2007).

Several researchers have pointed out that firms and their decision-makers experience that there has been a trade-off between environmental effort and the cost associated with such investment (Agarwal et al., 2017; Porter & Van der Linde, 1995*b*; Srivastava, 2007). To move away from this trade-off, to go beyond stakeholders' expectations, and to achieve sustainable development, cooperation along the supply chain is needed since GSCM practices is focused the supply chain as a whole, rather than firms on their own (Green et al., 2012; Srivastava, 2007). Miscommunication within the supply chain and different perspectives of the term sustainability are the main reasons sustainability along the supply chain has not worked in the past (Solér et al., 2010). For supply chain collaboration to work, there must be tools available that encourage and support the sharing of information between the different actors, and a green multiplier effect could be achieved (Green et al., 2012).

2.3 Competitiveness of Firms and Supply Chains

2.3.1 Competitive Advantage

Competitive advantage is an attribute of a firm that makes the firm differ from its competitors and can originate both from within a firm or from its external environment (Barney, 1991; Porter, 1985). The main assumptions of the resource-based view (RBV), presented by Barney in 1991, are that resources are not mobile and that all firms differ from each other, even the firms that operate on the same market and offer similar products. What makes firms differ are their internal resources, and those resources put together would be used as a foundation for strategy design, are what can give a firm a competitive advantage (Barney, 1991). On the contrary, Porter (1985) explains it is the external environment and the strategic position in the market that serves as the basis for competitive advantage. It is when the value that firms create for their customers surpasses the cost of producing the value a firm can generate a possible competitive advantage. There are two ways for firms to gain this leverage, either through having lower costs than their competitors or by differentiating themselves in the market (Porter, 1985).

For the unique composition of resources to be considered as a *sustained* competitive advantage, the strategy based on the resources should not be easily replicated by anyone else in the market nor should any competitor be able to use the same strategy at the same time (Barney, 1991; Porter, 1985). Barney (1991) states that not all resources can be used to achieve sustained competitive advantage, they must live up to four criteria: the resources must be valuable, rare, imperfectly imitable, and non-substitutable (the VRIN criteria). The third criteria can be based on three underlying factors; historical events, social complexity, and causal ambiguity, i.e., when the cause and effect between the resource and competitive advantage is inexplicit (Barney, 1991), which all can be derived from the tacitness of resources, especially those that are skills and people focused (Hart, 1995). Once a sustained competitive advantage has been generated, the firm needs to keep improving its resources and strategies since competitors will do whatever it takes to recreate successful strategies (Porter, 1985).

2.3.2 Competitive Advantage and the Global Supply Chain

While Barney (1991) argues that resources are internal and must be protected to gain and maintain competitive advantage, Dyer and Singh (1998) declare that sharing of resources might not be a bad idea. By encouraging, e.g., knowledge spillover between firm and their

suppliers/customers, a unique combination of resources can be achieved, which in turn could lead to competitive advantage (Dyer & Singh, 1998). Over the past decades, firms have reached the understanding that working alone is not enough if one wants to stay competitive and more recently, competitiveness along the entire supply chain has become a strategic focus for many firms (Li et al., 2006; Gligor et al., 2020). Research suggests that a holistic view on competitive advantage is needed, where adaptability, agility, and alignment among actors in the supply chain should be set in place to gain sustained competitive advantage (Gligor et al., 2020). Some of the main sources for competitive advantage are the engagement of stakeholders and the cocreation of value between the actors of the supply chain (Ludema et al., 2012; Gligor et al., 2020). Firms that understand that they can learn from each other and work together will more easily cope with the complex competitive landscape of today (Ludema et al., 2012) where the competition is no longer between firms, but between supply chains (Carter et al., 2015, Li et al., 2006; Solér et al., 2010). To gain a competitive advantage, one must look at how the supply chain can differ from other supply chains and how the supply chain can create value that firms alone cannot (Gligor et al., 2020; Li et al., 2006).

Today, SCM is a way of competing, and firms that understand how SCM practices can be used in an efficient way will become even more competitive in the global setting (Li et al., 2006). Within the global supply chain, there is a complexity arising when the actors of the supply chain are adapting locally to the national setting in their part of the supply chain without realizing the implications for the rest of the chain. Since the chain comprises multiple actors from different parts of the world, it might lead to the need for changes in other parts of the supply chain, for example, in terms of capabilities (Gligor et al., 2020). Firms working to improve cooperation within their supply chain will strengthen their own competitiveness in the market as well as the competitiveness of the entire supply chain (Thatte et al., 2013).

2.3.3 Being Green and Competitive

The competitive landscape has changed over the past decades, which has made firms rethink and redefine how they want and should create value for their stakeholders. This change has been initiated by the new, highly connected, and transparent society, scarcity of resources, and new demands and expectations from various stakeholders (Ludema et al., 2012). Historically, companies believed in the idea that incorporating green activities into their business strategy would result in higher costs and thus, would harm the firm's competitiveness. Looking at the industry level, the most competitive companies are those with the highest resource productivity throughout the entire process, that is, the lowest cost or the highest customer value (Porter & Van der Linde, 1995*a*, 1995*b*). Today, environmental sustainability awareness is considered an opportunity rather than a pure cost (Dangelico & Pontrandolfo, 2015; Ludema et al., 2012; Porter and Van der Linde, 1995*b*). The most successful firms are the ones that go beyond what is expected from stakeholders and embed sustainability within the business strategy without trading it for costs or quality of products/services (Ludema et al., 2012).

Since globalization has extended the competitive landscape by including both direct and nondirect competitors, the international marketplace can be described as dynamic rather than static, and hence, the competitive strategy should be likewise (Ludema et al., 2012; Porter & Van der Linde, 1995b). Possessing a static mindset is considered more costly than investing in green activities. Investing in green activities entails intangible assets, such as environmental knowledge, and since the environment is a public good, it also brings benefits for society, such as, cleaner air. However, environmental actions must be sincere and go beyond what is expected from stakeholders (Ludema et al., 2012; Porter & Van der Linde, 1995*a*). The possession of, e.g., an ISO standard is not enough and will not have a direct impact on the firm's image or performance (Dangelico & Pontrandolfo, 2015). It is not yet enough to just have the resources necessary for a potential competitive advantage, these must be employed strategically (Porter & Van der Linde, 1995*b*).

According to Hart (1995) and his extended version of the RBV, the natural resource-based view (NRBV), new "greener" capabilities, such as sustainable development, can generate a source to a sustained competitive advantage. Ludema et al. (2012) suggest that firms can gain competitive advantage by having the capacity to focus on sustainability and by implementing strategies that create environmental efficiency, for example, actions that decrease the quantity of waste or energy used. Cooperating with external actors could also result in a possible competitive advantage, both in terms of ecological and economical effects. Firms realizing the positive effects of developing the capabilities necessary for such collaborative partnerships will experience higher performance on the existing market(s), but it may also make new market opportunities arise. Also, the firm's brand and image will be positively affected which in turn influences the stakeholders' perception of the firm and the quality of its products and services (Dangelico & Pontrandolfo, 2015).

2.4 Conceptual Framework

To develop a deeper understanding and explore how chemical firms can use communication and SCM to gain competitiveness in a B2B sustainability context, a conceptual framework has been developed, which is presented in Figure 1. Each of the theoretical fields; communication, supply chain management and competitiveness, have been connected to answer the research question *"How can a chemical firm strengthen its position and make its supply chain more competitive by communicating its sustainability contribution in novel ways?"*. The conceptual framework is based on assumptions derived from the theoretical framework.



Figure 1. Conceptual Framework. Compiled by the authors (2021).

The conceptual framework is designed to visualize how an actor in a *B2B sustainability context* can utilize communication and supply chain management to strengthen its *competitiveness*. The yellow arrow represents the *chemical actor*, which serves as the central connection point between the two of the main elements of the framework; *communication* and *supply chain management*, that together lead to *competitiveness*, which is the third main element. Based on the previous literature review, by communicating with focus on relationship, GSCM and legitimacy, visualized as three different inputs to the framework, potential competitive

advantage can be gained. *Relationships* are important within B2B sales, and previous literature puts emphasis on the buyer and seller relationship, and their personal characteristics (Kotler et al., 2013). *GSCM* is included since value-seeking proactivity in processes and offerings and seeing beyond pure costs are crucial in sustainable development (Green et al., 2012). *Legitimacy* is the final input, because it is important to be transparent and diminish the risk of being called out for greenwashing, since both customers, second-tier customers and end-consumer are highly knowledgeable (Martin & Schouten, 2014). Sustainability labels and certifications compose a large share of the theoretical framework, but are not visualized, per se, in Figure 1. They are included in legitimacy since they function as tools to feature the sustainable efforts made by actors. The grey arrows represent the interconnected relationship between the inputs and two of the main theoretical fields: communication and SCM.

A chemical actor that can bring all pieces of Figure 1 together will have the opportunity to compete with its sustainable contributions in the B2B context. For example, without legitimate, green, and relationship building SCM actions, the communication will be nothing but empty words, and without communication, the chemical actor will not be able to push the message out about their greener actions and in turn, these actions will not become legitimized by the stakeholders. Hence, it is the concurrence between communication and SCM that serve as a potential enabler for the chemical firm to become competitive.

3. Methodology

The methodology chapter will present the chosen method for this study, accompanied by arguments for the choices made. First, the research method is presented, followed by an explanation of the research unit and the research design. Then, the data analysis will be described, and the chapter will end with a discussion of what has been done to ensure quality of the research and proper ethics.

3.1 Qualitative Research Methodology

Within business studies, the research question is the driving force of the process and is supposed to give the research work a direction. The research question should serve as the foundation for the choice of how to arrange the collection of data but also what type of research design and approach are most suitable for the study (Bell et al., 2019; Eden et al., 2020; Eriksson & Kovalainen, 2015). As this study originates in a current challenge and is of an exploratory nature, we argue that a qualitative research methodology is appropriate to answer the research question: "How can a chemical firm strengthen its position, and make its supply chain more competitive by communicating its sustainability contribution in novel ways?" The qualitative methodology is suitable since the purpose of our study is, in accordance with Bell et al. (2019), and Eriksson and Kovalainen (2015), to explore a real social phenomenon, how the occurrence of GSCM and sustainable attributes can be utilized within communication to gain a competitive advantage. Moreover, Eriksson and Kovalainen (2015) suggest qualitative research methodology when the presumptions and the focus of the study may change along the way, which is applicable for us since we have identified a research gap regarding the chemical industry. Hence, the aim of this study is to explore explanations behind this phenomenon, which is something that Bell et al. (2019) highlight as one of the main arguments for a qualitative research method.

3.2 Abductive Research Approach

The research process of this study started off in the empirical world, exploring the challenge of communicating sustainability in a competitive way. This is according to Bell et al. (2019) particularly suitable for qualitative research. Reviewing existing literature, we realized that there was limited research conducted on how to communicate but also about specific barriers and drivers for GSCM in the chemical industry. This made us explore more general aspects that could be connected to our problem, e.g., how firms commonly communicate in a B2B

context and how GSCM practices have been employed in other B2B industries. A lot of the studies that we found regarding communication, were focused on B2C markets but these shed some light on new aspects that we could use to explore and dig deeper into our empirical problem. Also, during our primary data collection, several of our informants kept coming back to the traditional characteristics of the chemical industry, which justifies the use of older, well-known but still relevant theories and research. As the research process proceeded and new details were detected, such as the upcoming challenge of coping with the competition from the Asian countries, the theoretical framework and the empirical data collection were revised and updated to serve the purpose of this study. Since the empirical data seldom matches the theoretical framework initially, and vice versa (Dubois & Gadde, 2002; Eriksson & Kovalainen, 2015), we applied an abductive, circular approach to research, hence, systematically combining the inductive and deductive research approaches.

However, data from a case does not have to align with the existing theory in the field, rather it can create new theories and frameworks (Shepherd & Suddaby, 2017). Since there is much research conducted on other B2B industries, as mentioned in the introduction chapter, we have identified a gap within research field the chemical industry, and we were compelled to find new ways of approaching our empirical problem to find explanations that have not yet been discovered. By applying an abductive approach to our study, we have been able to move between the empirical data, theories in adjacent subjects but also the case itself to answer the research question, in accordance with Dubois and Gadde (2002).

3.3 Case Studies

According to Yin (2018), there is not one single definition of what a case study is, but in general he states that it is a research method that is used to "*investigate a contemporary phenomenon* ("the case") in depth and within its real-world context" (p. 45). In this study, the case refers to sustainability work in relation to communication, SCM, and competitiveness, and the real-world context is the chemical industry. The most applicable form of case study for this is the embedded case study since we cover several units of analysis (see Figure 2) to capture a holistic view of the chemical industry and its supply chains. These units must be within, or part of the case (Yin, 2018) and we have chosen to include sustainability specialists, communication specialists, industry organizations and selling/buying firms within the case context. It was

important to us that all informants are connected to either the chemical industry per se or the field of sustainability and/or communication.



Figure 2. *Our Embedded Single Case Study.* Based on Yin (2018), compiled by the authors (2021).

Case studies can be descriptive, explanatory, or exploratory (Yin, 2018), where this study has been conducted accordingly with the latter. The exploratory approach is conducted when there is no pre-established set of results and outcomes, and when the aim of the study is to describe a phenomenon comprehensively (Yin, 2018). We had very little experience of the chemical industry and, we found that there is a lack of research when it comes to sustainability and communication in the chemical industry from a business perspective, which made it difficult for us to come up with hypotheses of a potential result beforehand. Also, we wanted to explore the sustainability communication problem in-depth, which goes well in line with Yin's (2018) reasoning about exploratory case studies and the fact that case study research questions often include the word "how". The research question: "How can a chemical firm strengthen its position and make its supply chain more competitive by communicating its sustainability contribution in novel ways?" is narrowly formulated for us to be able to answer it, but our

broad purpose helped us to explore this context in greater detail and to keep our minds open for possible explanations and solutions. We had in mind that case studies have not always been recognized as an appropriate research design because of their limited generalizability (Dubois & Gadde, 2002). However, our aim never was to find a general solution that is applicable for all firms, in all industries. We wanted to investigate an industry where there is a clear problem in how to communicate sustainability in a competitive way, try to understand why this issue has arisen, and try to contribute with some implications for both theory and practice.

3.4 Research Unit and Design

3.4.1 Selection of Case Study Unit

Our case study unit is sustainability work in relation to communication, SCM, and competitiveness. The context of our case study unit is the chemical industry, which was identified in the introduction as underrepresented in business research and given its upstream location in the value chain, not assumed to be pressured by end-consumers to work with sustainability. Hence, it is important to explore the chemical industry because of the impact that firms and their supply chains can have on the sustainable development. Also, the business context in which chemical actors and supply chains are operating is usually spanning over country borders, which adds an international aspect to this study.

3.4.2 Selection of Embedded Units of Analysis

To completely understand the case study unit and receive a comprehensive and substantial view of it, we decided to use several embedded units of analysis (see Figure 2), in accordance with our exploratory purpose of this study. All the units were studied by conducting interviews as a primary source of information. A more detailed description of the data collection will be introduced in sections 3.4.3 and 3.4.4.

Since the informants were selected to give a holistic view of the chemical supply chain, we wanted as many actors as possible to be heard. *A chemical industry organization* and *an industry organization of a typical customer* were interviewed since these could provide us with a less subjective view on the industries, than if we had only talked to specific firms. Informants from *a chemical firm* and a *typical customer* were studied to get both the sending and receiving views of communication, but also to get more frames of reference in SCM. The reason for using more than two informants, as done in other units of analysis, from the supplying and

buying side (six informants), was to develop a deeper understanding of their more direct perspective on the industry through a rigorous data collection. It also to enabled us to triangulate the answers, to get both cohesiveness and dissention. *External specialists,* with no direct connection to the industries, but closely related to the topic(s) of sustainability and/or communication were interviewed to get an understanding of the practicalities and challenges of dealing with sustainability in B2B markets. And last, *miscellaneous actors* within the chemical industry, who have extensive experience from working with sustainable chemicals, were interviewed to gain insights into green chemistry and how it can be communicated. In total, an extensive data collection was done, with 16 interviews conducted (see Table 1) to give a substantial and robust foundation for the analysis, to get various and a deeper perspective of a chemical supply chain, and to enable us to respond to our research question in a solid way.

Embedded research unit	Area of expertise	Reference in text	Interview type	Date	Duration
External specialist	Sustainability	Specialist 1	Zoom	March 25th 2021	40 min
External specialist	Sustainability	Specialist 2	Zoom	March 31st 2021	50 min
External specialist	Communication	Specialist 3	Zoom	April 1st 2021	40 min
External specialist	Communication	Specialist 4	Teams	March 22nd 2021	60 min
Chemical industry organization	Sustainability	Chemical IO 1	Zoom	March 30th 2021	45 min
Chemical industry organization	Communication	Chemical IO 2	Zoom	March 23rd 2021	45 min
Chemical supplying firm	Sales	Firm Representative 1	Zoom	March 30th 2021	35 min
Chemical supplying firm	Sales	Firm Representative 2	Telephone	February 8th 2021	30 min
Chemical supplying firm	Sustainability	Firm Representative 3	Teams	February 8th 2021	45 min
Chemical supplying firm	Communication	Firm Representative 4	Zoom	February 9th 2021	45 min
Customer industry organization	Energy	Customer IO 1	Zoom	March 24th 2021	35 min
Customer industry organization	Sustainability	Customer IO 2	Zoom	March 26nd 2021	60 min
Customer to chemical firm	Strategic procurement	Customer 1	Zoom	April 8th 2021	40 min
Customer to chemical firm	Sustainable procurement	Customer 2	Zoom	April 8th 2021	40 min
Miscellaneous actor	Sustainable chemicals	Chemical Engineer 1	Zoom	April 6th 2021	45 min
Miscellaneous actor	Sustainable chemicals	Chemical Engineer 2	Zoom	April 6th 2021	55 min

Table 1. Interview Sessions. Compiled by the authors (2021).

3.4.3 Primary Data Collection

Interviewing is the most used method in qualitative research, and the benefits of using interviews in qualitative research are multiple (Bell et al., 2019), which are favorable in our research as well. Semi-structured interviews were considered the most suitable since more attention can be paid to the opinions and thoughts of the informant, but also to have the support of an interview guide. The informants, as well as the researchers, are allowed to drift away to some extent from the interview guide (Bell et al., 2019), which was developed prior to the first interviews (see Appendix 1) with the research question in mind. The topics and questions

included in the interview guide were based on the findings from the literature review but also from the insights we got from the empirical problem. Hence, they were based on communication, SCM, and competitiveness. The questions were designed in different ways, to give us the most comprehensive understanding, including both open-ended questions, scenarios and either/or-questions to enable the informants to discuss the topics in all possible aspects. To make sure that the questions were understandable and unfavorably formulated, a test interview was done on an external consultant that was not a part of the embedded research units.

The interviews were conducted via remote video calls, by using Zoom or Microsoft Teams. There are several benefits of doing such digital video interviews according to Bell et al. (2019), such as increased flexibility, where time adjustments could be done on short notice, and it also facilitated interviews to be conducted when the informants were located elsewhere. Both of those benefits were experienced when doing our data collection, where the current pandemic, Covid-19, and the risk of spreading and getting an infection of the virus was reduced when doing remote video calls. The ability to do remote video calls also enabled us to do several interviews with geographically dispersed informants, something that would be very constraining if done face-to-face. The interview with Firm Representative 2 was conducted via telephone, and with only one more exception (requested by the informant), the rest of the interviews were held with the camera switched on, which also gave us the chance to read body languages and mimics. Most of the interviews were held in Swedish, where we took turns in leading the interviews, and then transcribed each other's interviews based on audio recordings. Firm Representative 1 asked us to not record the interview, which led to one of us taking notes while the other one led the interview and asked questions. Quotes from the informants have been included in chapter 4. Since the majority of the interviews were held in Swedish, the quotes were translated by both of us separately, and then compared to ensure correctness and conformity.

3.4.4 Secondary Data Collection

The secondary data that was collected mainly came from the web pages of the embedded units, but also from supranational institutions to strengthen the answers from the informants. According to Yin (2018), this is the main usage of secondary data together with the fact that it makes the empirical findings more convincing. Occasionally, we had to complete the answers from the informants with secondary data to avoid the risk of reveling their identity or to enable

the reader to connect the informant to a specific firm or title. At some points, secondary data was used to explain terms, statements, and results expressed by the informants.

3.5 Data Analysis

After the data collection was finished, and all the interviews were transcribed and translated, we divided the answers from the informants into three broad categories based on the main elements in the conceptual framework: communication, SCM, and competitiveness. Merriam (2009) emphasizes the importance of organizing the data in a manageable way, some advice we followed. In a separate document, all answers were included to make sure that nothing was missed out in the data collection. The three main elements in the conceptual framework were used as main headlines in chapter 4 and the subheadings were derived from the informants' answers, mainly categorized based on the questions asked during the interview sessions (see Appendix 1). All answers could not be divided into one of the three categories, and hence, some were excluded since they were not as connected to the research question as we first though, and some were included in a separate category which later became section *4.1 An Introduction the Chemical Industry Context*. This enabled us to see the wholeness, which is emphasized by Bell et al. (2019) when analyzing the collected data.

The analysis follows the conceptual framework presented in section 2.4. Considering the choice of conducting an abductive case study throughout the research process, it enabled us to move between the empirical findings and the theory and add to the theory when the initial findings from the literature review did not properly explain some phenomena that were discovered in the empirical findings. When analyzing the results of the study, our aim was to use an inductive approach, since the initial literature review resulted lack of applicable research to our case study unit. This made us use the empirical findings to steer the discussion and explain the previous research. Given the broad spectrum of literature, ranging from general communication strategies to competitive advantage at large, the empirical data from the informants was used to narrow and specify the broad research to our research context. When choosing the main headlines and subheadings in the analysis, our aim was to use the elements of the conceptual framework to the greatest extent possible, to make it simple for the reader to follow our reasoning in the analysis outline.

3.6 Quality of Research

To confirm and secure the quality of this study, four measures have been used: credibility, transferability, dependability, and confirmability as emphasized by Bell et al., (2019).

3.6.1 Credibility

Credibility refers to the plausibility of the findings to the reality that is studied. To ensure credibility, two methods have been used: informant validation and triangulation (Bell et al., 2019). *Informant validation* was done when the interviews were transcribed and translated into English and then sent out to the informants, since most of them were held in Swedish, as described in section 3.4.3. This led to validation of the results, an assurance that the translation was successful and that the informants were not misunderstood. In the cases where the answers from the informant had been incorrectly translated or interpreted by us, it was noted by the informant and changes were made accordingly. *Triangulation* is recommended to use to make sure that the researcher made a trustworthy interpretation of what the informant has answered and to find coherence (Patel & Davidson, 2011). We used triangulation to compare the answers between the informants, but also between the primary and secondary data collection.

3.6.2 Transferability

Transferability can be achieved when the findings from the study can be applicable in other settings (Bell et al., 2019). To allow for transferability to be tested, we have provided a thick description of the circumstances when doing the data collection, together with the interview guide presented in Appendix 1. When adding enough details and specific information regarding the data collection, together with the limitations of the study, outlined in *1.4 Definitions and Delimitations* we enable the readers to conclude whether the findings from this study can be applicable to other cases as well.

3.6.3 Dependability

To ensure dependability, efforts to enable the study to be replicated by others must be done (Bell et al., 2019; Yin, 2018). Extensive documentation of the process, and publishing the specific dates for the interviews, transcribing them, and providing detailed information on when digital information was retrieved from the internet, where efforts that we did to ensure dependability. These are guidelines that we followed from Yin (2018).

3.6.4 Confirmability

Conformability can be described as the objectivity of the researchers (Yin, 2018), which is needed to ensure that the researchers are not biased when conducting their study (Bell et al., 2019). Since triangulation was used in the data collection, most of the material collection was found to be coherent. The material that was not found to be coherent, was still handled with objectivity. An important aspect to our unbiasedness, is that we had little prior experience of the research unit and no personal connections to the informants.

3.7 Ethical Considerations

Outlined by Eriksson and Kovalainen (2015), there are ethical facets that need to be considered when conducting this type of qualitative research.

Voluntary participation (Eriksson & Kovalainen, 2015) was crucial for us, and the informants had the option to withdraw from participating in the interviews, even after they had accepted our initial invitation via email. This was clearly stated in both the email and the attached preparation letter which the informants received before the interviews. They were also given some of the questions in advance, to make sure that they felt qualified to answer. Informed consent (Eriksson & Kovalainen, 2015) can be translated into giving the participants information on how the study would be conducted, which procedure we would follow, and the reason why the informants were selected to participate. This was given both in the first email, when the informants were asked to participate in the study, then more extensively explained in both the preparation letter and during the interview. Also, the informants were asked prior to the interview if recording was allowed, and it was after giving consent that the recording in those cases began. Anonymity (Eriksson & Kovalainen, 2015) was emphasized, and all the informants are held completely anonymous. The primary data collection, i.e., the answers given during the interviews, are useful without disclosing the names, the gender, or the exact working role of the participants. After the empirical data collection was completed, the informants had the opportunity to read the material to make sure that any misinterpretation was made, or that any sensitive ethical information was revealed, that induced how they would be presented and described in the study. If the informants had any objections or additions to their answers, these were handled accordingly.

4. Empirical Findings

This chapter consists of the empirical findings of the study, from our interview sessions and secondary data. The outline follows the conceptual framework presented in section 2.4. Initially, the research context is presented, followed by the communication, supply chain management, and competitiveness in relation to the chemical industry.

4.1 An Introduction to the Chemical Industry Context

The chemical industry is described as very broad, where both pharmaceuticals, fuel, and cosmetics are included. The perceptual developments within the industry concerning sustainability have gone from initially being described as defensive, to becoming more aware of its importance (Chemical Engineer 1, 2021; Chemical IO 2, 2021). Within Europe, the public opinion regarding the chemical industry is varying. For example, Swedish firms perceive that they get critically reviewed when claiming to do something sustainable, so instead they might not use sustainability arguments in a sales meeting to avoid follow-up questions and distrust (Chemical Engineer 2, 2021). This could depend on the well-noted historic chemical scandal in Teckomatorp, Sweden, but also the low media coverage on the sustainable innovations from the industry. Since the chemical industry is located upstream, the chemical firms rarely, or never, sell directly to the end-consumer. When a new sustainable innovation is developed by the industry, it is often actors closer to the end-consumer that get the credits for it (Chemical IO 2, 2021).

An upcoming challenge within the global chemical industry relate to sustainability and competitiveness between continents. It is predicted that within the next ten years, Asia, and specifically China, will supply half of the global chemical market (UNEP, 2019). The chemical industry in China, produces large volumes of bulk chemicals while the European chemical market is more focused on niche products (Chemical IO 1, 2021). In Europe, the major focus is on environmental sustainability (Firm Representative 1, 2021) and the sustainability issues in Europe are often related to the current public debate. Historically, society was concerned with questions regarding, freons and acidification, (Chemical IO 1, 2021; Chemical IO 2, 2021; Customer IO 1, 2021) and today, the challenge is related to meeting the increased demand for

non-toxic and safe ingredients, recyclability, renewability, climate neutrality, electrification (Chemical Engineer 2, 2021), and circularity (Customer IO 1, 2021). In general, Europe is moving from soft regulations, recommendations, and guidelines towards more hard laws and restrictions, something that might push a lot of firms to do more than what is currently done in sustainability terms (Specialist 3, 2021)

4.2 Communication in the Chemical Industry

4.2.1 The Difficulty in Defining Sustainability within a Supply Chain

The definition of the term sustainability has been evolving over time (Chemical IO 1, 2021; Customer IO 2, 2021; Specialist 3, 2021). Historically, sustainability has been limited to householding with resources (Customer IO 2, 2021) and equated to environmental aspects, but there are much more to the term that shall not be forgotten, especially the social aspect (Customer IO 1, 2021; Specialist 2, 2021; Specialist 3, 2021). For a long time, it has been established that sustainability has three dimensions, environmental, social, and economical. However, lately, this definition is no longer enough. The term "sustainable sustainability" and "sustainable wellbeing" has entered the stage, which make many actors question themselves and whether sustainability is no longer considered valuable (Customer IO 2, 2021).

Some of the informants argue that there is a consensus regarding how to define sustainability within the supply chain these days (Customer 1, 2021; Specialist 2, 2021). This reasoning is mainly driven by the fact that ISO certifications and sustainability standards shape basic requirements for businesses, especially when it comes to environmental sustainability. For example, the possession of the ISO 14000 standard determines a certain level of a firm's environmental performance, but it also shows that the firm is working to continuously improve its operations with regards to sustainability (Specialist 2, 2021). However, most of the informants are pointing out aspects that show the difficulties in finding a general definition of the term but also to agree upon its importance (Chemical Engineer 2, 2021; Customer IO 2, 2021; Firm Representative 1, 2021; Specialist 4, 2021). One of the issues being raised is the complexity of operating in long supply chains where a lot of actors are involved. Usually, there are many intermediaries between the chemical supplier and the end-consumer, and product-specific information might be lost along the way. Intermediaries tend to choose the supplier that is the best possible for them, e.g., the one that gives them the highest profit margin or that does not entail the need to change its internal processes, which means that sustainability aspects

might not be prioritized (Chemical Engineer 2, 2021). It gets even more complicated when the actors are located in various countries since the importance of sustainability differs across the globe (Specialist 4, 2021) but also because the political landscape and national regulations might be contrastive (Customer IO 2, 2021).

Another problem that is discussed among the informants is that different actors are not interpreting sustainability terms in the same way (Customer IO 1, 2021; Firm Representative 1, 2021). In the sales process, words such as renewable and compostable are frequently used, however, these are sometimes being mixed up by customers who do not seem to understand the difference between the words. There is no consensus on what can be regarded as compostable or renewable. In some countries, a product that is, e.g., 80% compostable is considered compostable, whereas in other countries this percentage might be lower or higher. There is a current discussion regarding what is more sustainable, but also what factors are more important for a European customer; a product that is 100% renewable but produced in China or a product that is 80% renewable that is produced in a neighboring country (Firm Representative 1, 2021).

Firm Representative 4 (2021) believes that the firm where the informant is employed, has actively been working with sustainability for a long time, but has not been using the sustainability terminology for their actions. Chemical Engineer 1 (2021) thinks that sometimes the terminology is troublesome, such as within cosmetics; recycled chemicals ingredients are not as appealing for the end-consumer as recycled chemicals in plastic bags. The terminology issue is further discussed by Customer IO 1 (2021):

"A term such as, "to save energy", is considered a good thing among chemical suppliers, but for a typical customer, this is not always the case, because sometimes there is a need to use more energy in one part of the supply chain to decrease the net effect of the supply chain's sustainability efforts" (Customer IO 1, 2021).

For example, the electrification of industrial processes is supposed to decrease the emissions of carbon dioxide. For the electric transition to work, there is a need for available green electricity, and to produce more green electricity, more high-voltage cables are needed. These are usually made of plastic, which is not regarded sustainable (Chemical Engineer 1, 2021). Or, if a wind turbine is to be produced, which is considered a sustainable source of energy,
chemicals with less sustainable and more durable properties must be used to make the turbine blades cope with extreme weather to not dissolve or break (Chemical IO 1, 2021). It is important to remember that saving energy and saving the climate is not to be equated (Customer IO 1, 2021). One must look at the entire value chain when talking about the sustainability of chemicals (Chemical IO 1, 2021). Within the industry of the typical customer, the concept of "system thinking" is often referred to as being very successful. That is, to not limit the conversation to a particular actor and its carbon footprint, but to see the full picture. If, for example, more energy is used by a supplier to make a product stronger or more durable, the end-consumer might be able to use less material for the final product or the product might become reusable. Hence, the net climate effect is lowered (Customer IO 1, 2021; Customer IO 2, 2021).

4.2.2 The Difficulty in Measuring Sustainability

The chemical industry has no general and comparable measures or tools of evaluation concerning sustainability. The industry is very broad, and it is up to each firm to find the most appropriate measures and usually, these depend on what the firm is producing (Chemical IO 1, 2021; Specialist 1, 2021). In many cases, firms measure the simple factors and postpone the complex aspects of sustainability. A common and straightforward measure that many firms use is the amount of carbon dioxide emissions (Specialist 1, 2021), but there is no standardized way to measure it which leads to every actor doing it in their way. Some actors only measure their own emissions, while others also include emissions from the transport of raw materials to their factory (Customer 2, 2021). The chemical industry has developed the global Responsible Care Program, a self-assessment tool aiming to make firms improve their environmental sustainability processes, but also improve work-related health and safety issues. However, since the program is self-assessing, the criteria that are being measured differ around the world and hence, cannot be compared between firms. Another issue with the Responsible Care Program is that not everything is being reported, making it hard to assess the performance of the firm (Chemical IO 1, 2021; Chemical IO 2, 2021).

In the industry of a typical customer, Customer IO 2 (2021) describes that firms report environmental aspects to a portal where they can be compared to each other. Also, those firms are not seeing themselves as competitors when it comes to sustainability, instead they are cooperating, trying to find common solutions for such issues. If there is a mutual environmental problem arising in the industry, forces and resources are being bundled together to solve the problem. In other words, the actors within the industry solve industry-specific problems together, often through common research projects, since they agree that sustainable development must be shared to have an impact. This reasoning is considered as quite unique and is not being seen in many other industries (Customer IO 2, 2021).

4.2.3 The Chemical Sales Process

In general, there are two types of chemical suppliers. Either, the suppliers are delivering tailored niche products, or bulk chemicals. The bulk chemicals are often traded at low costs, where the price is the decisive factor (Firm Representative 2, 2021). The niche products are sold via traditional sales meetings, where either the seller reaches out to a potential customer to offer their solutions, or the potential customer contacts to the suppliers to ask for a solution to an issue within their production process. In such sales process, it is functionality that is decisive (Firm Representative 4, 2021). The sales process is characterized by the importance of the relationship between buyer and seller, but the importance has decreased during the years. Instead, security and sustainability are important additional factors (Firm Representative 2, 2021).

The seller is a very important part of the sales process, and his/her greatest responsibility is to turn the information into something understandable for the buyer (Firm Representative 4, 2021). The sales process within the chemical industry is complex, where a lot of different actors from the buying firm are involved. The seller must adapt the communication to the different actors at the buying firm, e.g., communicate price to the purchasing department, functionality to the production department, and sustainability requirements to the sustainability department, if there is one (Firm Representative 1, 2021). A successful seller is someone who scans his/her audience and quickly tailors his/her level of communication to the receiver's ditto, otherwise, the sales meeting will probably fail (Specialist 3, 2021). Some informants argue that the buyer, is highly knowledgeable and thus, that the communication does not have to be stupefying (Specialist 4, 2021) while others believe that it is important to go back to basics, highlighting what is really engaging people (Specialist 3, 2021), which is easier when the firm is located closer to the end-consumer (Chemical IO 1, 2021). For example, a large chemical firm that produced oil, lubricating the wheels of a skateboard, made a press release about the oil, not the enhanced functionality of the skateboard and failed to reach out to the consumer (Chemical IO 2, 2021).

Another aspect of the complexity of the sales process in the chemical industry is that sometimes the buyer makes demands without really knowing why they are asking for it. The top management might set the requirements for the products, but the responsible buyer might not have all the knowledge of why the requirements are set in the first place. The seller is responsible to provide the appropriate solution, but if the buyer cannot specify what it needs or why, things get complicated (Firm Representative 1, 2021). The technical aspects of the product and its functionality are still the determining factors for many buyers, at the expense of an additive such as sustainability. Some buyers are genuinely interested in sustainability and consider it crucial in the buying process, while others are unconcerned, mainly focusing on functionality (Firm Representative 3, 2021; Firm Representative 4, 2021). This is an issue for the selling side as well, especially in smaller companies where working roles might be split. Then, the seller might not have the power, or time, to push the sustainability issue forward and improve the sustainability sales pitch, since they are not backed by a large sustainability department (Firm Representative 4, 2021). A challenge for the chemical industry when it comes to selling sustainability is that when firms do not sell directly to the end-consumer, rather to other industries, it is difficult to get credit for sustainable chemicals. Also, it is hard to make chemicals interesting and easy to understand, and thus, it is hard to communicate their attributes to the end-consumer (Chemical IO 1, 2021).

4.2.4 The Usage of Sustainability Labels and Certifications

Looking at sustainability labels within a B2C context, e.g., the Nordic Swan and Fairtrade; these are used to simplify the buying process for the consumer. However, it is not that simple to use them in a B2B context since such labels are not always translatable or appropriate for a more complex setting (Customer IO 2, 2021). Labels are a work in progress; when too many firms reach the criteria of e.g., the Nordic Swan, these are developed to be harder to reach. Labels are not something that all firms can be striving for because it will be very expensive to possess and to adjust processes to reach the continuously harder criteria (Chemical IO 2, 2021). According to Chemical IO 1 (2021), labels and certifications might not be suitable for all:

"Standardization is not always a good thing, it might lock firms into old structures and prevent innovation" (Chemical IO 1, 2021).

This is also supported by Specialist 3 (2021), who states that it is important to make sure that the firms are using certifications and standards in a way that is appropriate for the particular kind and size of business to get the desired outcome.

In the chemical industry, many firms highlight that they are ISO-certified and that they are working towards Agenda 2030 in their external communication (Customer 2, 2021; Firm Representative 3, 2021). Several informants argue that ISO certifications are a hygiene factor these days (Chemical IO 1, 2021; Firm Representative 1, 2021; Specialist 2, 2021; Specialist 3, 2021; Specialist 4, 2021). For many companies, it is a requirement that current and potential business partners have certain ISO certifications before a business relationship is being initiated (Specialist 1, 2021; Specialist 3, 2021). ISO certifications have existed for a long time, but they have not changed much since they were introduced, and they have not led to more sustainable companies (Specialist 1, 2021).

Regarding Agenda 2030, most informants agree that it has become a hygiene factor as well (Firm Representative 1, 2021; Specialist 2, 2021; Specialist 4, 2021). However, Specialist 4 (2021) believes that Agenda 2030 might not be translatable to all businesses and does not think that creating a universal way to reach its targets is appropriate. Specialist 3 (2021) points out that, initially, it was aimed to be a political tool at a state level but is something that has been adopted by firms in their communication lately. The UN SDGs are useful in external communication channels since it is one of those tools that can make complex issues understandable and concrete for stakeholders, but they also show things that the organization can have an impact on (Specialist 3, 2021). However, many firms feel that these supranational goals are unreachable and that they do not have a chance to influence them (Specialist 2, 2021). Firms might also be questioned why they are working against some goals but not others and commonly, firms are usually working with the goals that are easy to measure whilst the more complex ones are being handed over to someone else (Specialist 1, 2021). Simultaneously, many firms work with the UN_SDGs although they may not realize it (Customer IO 2, 2021; Specialist 2, 2021). This is because firms do not understand the underlying message of the goals and have not invested enough time and resources to get to the bottom with what the UN SDGs mean for the particular firm. The fact that firms do not realize they are working on Agenda 2030 does not have to be negative, rather, the opposite. It should be, and in some firms, it is natural to work with, that the employees and management do not even realize it (Customer IO 2, 2021).

4.2.5 The Potential Need for a Sustainability Label in the Chemical Industry

Almost none of the informants had reflected about the need for a sustainability label within a B2B context. It has not been discussed in the different forums on the industry organization level (Chemical IO 2, 2021; Customer IO 2, 2021), and is not something buyers have been lacking hitherto (Customer 1, 2021; Customer 2, 2021). One of the most common explanations for this is that all actors within the chemical industry know what they are looking for (Chemical IO 1; Specialist 2, 2021; Specialist 4, 2021). Chemical IO 1 (2021) argues that there is a risk to simplify something quite complicated too much. Customer 1 (2021) states that it is not clear how much of a value such a label would bring to their decision process, whilst Customer 2 (2021) believes it would make decisions easier.

All actors have different aims for their sustainability work, depending on their position within a firm or within a supply chain (Chemical IO 1; Firm Representative 1, 2021). Some think that recycling products and processes are the most important, while others think renewable solutions are what should be emphasized (Chemical Engineer 1, 2021). A label will only work if the actors agree upon what sustainability is and which criteria that should be considered as most important; for example, should minimization of carbon dioxide emissions in the firm's own production process be prioritized over the possible life extension of a customer's processes (Chemical IO 1, 2021). Also, aligning sustainability measurements is a precondition for a label to become successful (Customer 2, 2021; Specialist 2, 2021). If you do not count the same way, you cannot put a tag on your products or processes and thus, it might become a challenge to implement a label in the industry (Customer 2, 2021). Specialist 2 (2021) has worked in another B2B context before, where a sustainability label/certification was introduced and developed successfully. When implementing such a label it is important to have a clear agreement between the customer and the supplier and to agree upon what sustainability means, in that particular context. If the idea behind the label stands on solid grounds, there is certainly a need for it, and it would work well (Specialist 2, 2021). Although the need is non-existing today, it is always possible to create a need for something, no matter what that it might be (Specialist 4, 2021).

4.2.6 Communicating within a B2B Sustainability Context

When it comes to communication in general, whether it is within a B2B or a B2C context, the most important thing is to know the audience and tailor the message to the particular receiver (Specialist 2, 2021). To be perceived as credible, it is crucial to be transparent and authentic

and to not deceive or stupefy the receiver (Specialist 2, 2021; Specialist 4, 2021). On the one hand, highlighting the positive aspects of the business is key in communicating sustainability, but on the other hand, being open with the negative facets does not have to be as harmful as it may sound (Specialist 4, 2021). By daring to show vulnerability and reveal the problems that the firm is facing, but also by disclosing how to move forward in solving these issues, there is much for firms to gain (Specialist 1, 2021; Specialist 4, 2021). To nuance the picture and to be as honest as possible, also strengthens the firm's reputation and empowers the people internally (Specialist 4, 2021).

Several informants agree that chemical firms have not been successful when it comes to communicating sustainability historically (Chemical Engineer 1, 2021; Chemical IO 1, 2021; Firm Representative 4, 2021). Within B2B communication, the receiver of the communication is well-informed but also very skilled when it comes to filtering information. Such receivers will see right through an inauthentic message, no matter how hard the efforts are, which tend to cause detrimental consequences for the firm (Specialist 2, 2021). The concept of greenwashing is not as present today as earlier, but there are still some actors that do not walk their sustainability talk (Specialist 1, 2021; Specialist 2, 2021; Specialist 4, 2021). Some of these attempts are harmless, with no intention to greenwash but firms end up in old habits (Specialist 1, 2021) and some still do not care about sustainability issues, continuing to deceive their stakeholders (Specialist 2, 2021).

"If you have a vulnerable business, you are often quite far ahead with your sustainability work" (Specialist 4, 2021).

Whether the firm is engaging in sustainability work because of the above reasoning or if it actually wants to do good is not always obvious (Specialist 4, 2021). For example, many firms produce sustainability reports, yet these are more marketing material than a real report (Specialist 1, 2021). However, it is harder to get away with greenwashing today since there are so many expert organizations, knowledgeable consumers, and industry media that examine initiatives (Specialist 4, 2021). In the long run, firms will not become successful if they just communicate what they think that customers want to hear. To meet customer demand, firms need to figure out and communicate how they can contribute to sustainable development appropriately and credibly, and why they are taking certain sustainability actions (Specialist 2, 2021). Some of the informants acknowledge that one of the main challenges when it comes to

acting sustainably is the lack of knowledge. Firms do not know what is considered sustainable or what is expected from them in terms of sustainability (Specialist 2, 2021; Specialist 4, 2021).

In heavy and criticized industries, Specialist 3 (2021) highlights it is even more important to be open and upfront about the challenges. If firms are dishonest about their negative impacts, the media or some other stakeholder will address the issue, making the firms look bad since they were not communicating the negative facets themselves. Firms must be open about the challenges to become legitimate, e.g., regarding what they are trying to do to mitigate negative environmental effects but also how to diminish their negative corporate impact. At the same time, it is of utmost importance for chemical firms to highlight that chemicals are a crucial part of society and the positive things they do for society, e.g., driving innovation, or making our lives much more comfortable. But the potential and real negative consequences for the planet and the people working in these industries, must also be addressed (Specialist 3, 2021).

4.2.7 Section Summary: Communication

The most relevant findings from section 4.2 are summarized and outlined below:

- There is no common definition of sustainability.
- There are no common sustainability measurement(s).
- Sellers/buyers in the chemical industry are highly knowledgeable.
- The chemical industry is not ready for a sustainability label (yet).
- Authenticity is important to get legitimacy.

4.3 Supply Chain Management

4.3.1 Customer Pressure Shaping the Sustainable Supply Chain

Regarding the influence of customer pressure on sustainable attributes, the informants agree that they perceive more pressure than before (e.g., Customer 1, 2021; Customer 2, 2021). In general, the large traditional bulk chemical firms would not change their offerings without proven demand from their customers. But often, smaller, more innovative firms even offer sustainable solutions as their business models are built on these aspects (Chemical Engineer 2, 2021). Specialist 2 (2021) points out that when the initial customer pressure arises, things can get uncomfortable through increased costs, or that the firm must use external consultants to acquire specific knowledge. Nowadays, it is common for firms to push each other in sustainable development work. If a customer makes a demand on the supplier's business, then both the

supplier and the customer will benefit from it, since they develop and push each other forward (Specialist 2, 2021).

"Most sustainability actions are based on customer pressure, but looking at the positive effects, one can also see that improved customer relationships may be a result of the firm's sustainability work. It becomes a win-win situation" (Specialist 2, 2021).

There is a lot of pressure in the entire supply chain, and the minimum levels of pressure have become higher than ever before (Customer 2, 2021). The pressure from the second-tier customers has increased recently, which leads the first-tier customers to put pressure on their chemical suppliers. Customer 1 (2021) states that, to keep the firm's position and still be competitive, there must be pressure from actors further down the supply chain. At the workplace(s) where Customers 1 and 2 are employed, there are annual evaluations of the suppliers' sustainability performance. The evaluation has had a positive impact on the suppliers, since it put pressure on the suppliers and their internal organization, thus, this evaluation can give them an understanding of how to improve themselves (Customer 1, 2021).

It gets more complicated the more upstream in the supply chain the firm is located, and it takes longer before the pressure reaches the chemical industry, but there is still pressure (Chemical IO 1, 2021). End-consumers can easily change one product for another, but upstream in the supply chain, such a swap might not be as simple. There are often several parameters to account for: the functionality in the process at the producer and the functionality at the downstream actors. The process to get a new product approved is extensive, since the product must be confirmed by an internal approval process to ensure legal compliance, technical requirements, and sometimes the next actor in the supply chain must approve that those product changes are made in the process (Customer 1, 2021). Even if there is sustainability pressure within the supply chain, it is not always appreciated by downstream customers if an actor begins to experiment with new solutions, since it often requires them to do changes as well (Customer 2, 2021).

4.3.2 The Trade-off Between Sustainability and Costs

Most of the informants agree that a trade-off between sustainability and costs still exists but to different extents. It is almost always more expensive, from a supplier perspective, to make

investments in sustainable production and source sustainable raw material, which means that sustainability is related to increased costs (Chemical Engineer 1, 2021; Customer 1, 2021). The business case must add up, and a firm will not make the investments if it cannot see an economical gain in a reasonable future (Chemical Engineer 1, 2021). However, companies have begun to realize that sustainability can be a competitive advantage and that in many cases costs can be reduced (Specialist 2, 2021).

Since sustainable products usually are more expensive, Customer 1 (2021) has experienced that the discussion regarding who is to pay for this premium attribute has arisen more frequently. Firms want to keep their market position; it is about their survival and ultimately also the survival of their business partners (Customer 1, 2021). It is difficult to charge a higher price for a product if the firm cannot actively show and communicate in what ways it is better or more sustainable (Chemical Engineer 2, 2021; Firm Representative 1, 2021). However, there are market shares that will be lost if the emphasis is not put on sustainability (Specialist 4, 2021). It is difficult for an industry upstream in the supply chain, to influence what endconsumers or downstream buyers are willing to pay. Customer IO 1 (2021) and Specialist 2 (2021) argue that, in general, the price acceptance to pay for sustainability has increased in society. Yet, there are still great challenges in areas such as recycled plastics, where it sometimes can be much cheaper to manufacture virgin plastic, than to manufacture recycled plastics (Customer IO 1, 2021). It is connected with the market, but where the market cannot contribute, legislation and political instruments can affect the willingness to pay (Chemical IO 1, 2021). If there is strong customer demand and a willingness to pay, the barrier to make sustainable investments will be lowered. Some customers have a willingness to pay, and others have not, it depends on the pressure from the end-consumer (Chemical Engineer 1, 2021).

4.3.3 Responsibility within the Supply Chain

If a firm has the possibility to make a large impact when it comes to sustainability, the firm also has the responsibility take the lead in the discussion on sustainable development. Often, this ends up on the larger actors (Specialist 1, 2021; Specialist 3, 2021). By taking the leadership role, they can bring the smaller firms along, and a synergistic effect can arise. Since the larger corporations are expected to communicate to their customers how the entire supply chain performs in terms of sustainability, the smaller firms also must show their sustainable performance (Specialist 2, 2021). Smaller firms are important in the supply chain since they

account for a very large share of the total numbers of firms, and if the larger corporations put higher demand on them, a real change within the industry can happen (Specialist 1, 2021).

According to Chemical IO 2 (2021), the responsibility is shared, and everyone must help to develop a sustainable supply chain. The larger corporations place high demands on their suppliers, who must contribute to the sustainable agenda for the large corporation to be able to communicate to their customers that their materials, for example, do not have any hazardous chemicals in their products. Firms closer to the end-consumer receive most of the pressure and, in turn, direct it towards their supply chain, but consequently, they also receive the most credit for the entire value chain's sustainability work (Chemical IO 2, 2021).

4.3.4 Supply Chain Collaboration

A hypothetical horizontal collaboration, with regards to sustainability actions, within the chemical industry can function as a catalyst, and firms who have not come far enough within their sustainability work can find new ideas and get inspiration from those who have gotten further. By discussing such things, a move forward in sustainable development is initiated, bringing companies closer together (Chemical IO 1, 2021). Specialist 2 (2021) is certain that there are business advantages to be gained from more vertical collaboration in the sustainability field, which is supported by Specialist 3 (2021):

"Instead of everyone trying to reinvent the wheel in their part of the supply chain, firms could be asking how they can leverage on the activities that have already been undertaken by others in the supply chain" (Specialist 3, 2021).

There are benefits to be gained in the long run, e.g., increased profit that can be made by strengthening that kind of cooperation. It can also spur innovation since it forces firms to look at the same problem from different perspectives. Another important aspect for a collaboration to be successful is the diversity of thoughts and people, which is a problem since firms tend to recruit the same kinds of people, from the same background, with the same profile (Specialist 3, 2021). But what is needed for such a collaboration to be successful is difficult, since it requires openness and transparency, which are two things that firms often skeptical about. Thus, trust is needed within and between different actors of the supply chain (Specialist 3, 2021). The various perspectives on what sustainability is differ depending on which part of the

world the value chain is located, but it can also differ regarding what kinds of information that firms are willing to share (Specialist 4, 2021).

Vertical collaborations are rare (Specialist 3, 2021), because within the chemical industry, firms are in general very individual and tend to hold on tightly to their supply chain and their customers (Chemical Engineer 2, 2021). Nonetheless, there is a willingness to collaborate in the chemical industry, if there is a common position (Chemical IO 1, 2021). For the collaboration to work, all actors must see that the sustainability effort is a profitable adaptation, but they also need to be interested in helping each other out. If all actors are aware of the ongoing societal debate, there is a big likelihood for the collaboration to be successful (Specialist 2, 2021). Given the broad spectrum of firms within the industry, the diversity of firms make collaboration more difficult. Pharmaceutical corporations have different needs than bulk and basic chemical manufacturers. It is hard to find a common issue, since all of these have different sustainability challenges (Chemical IO 1, 2021). The different interfaces of sustainability make one of the main counterarguments for collaboration, and even if there would be a non-disclosure agreement set in place, it can be difficult to find collaboration opportunities (Customer 1, 2021).

Chemical Engineer 1 (2021) has a positive view on a combination of vertical and horizontal collaboration by own experience. One of the outcomes of that collaboration were that being a united force enabled the actors to drive issues further than they could have done without the collaboration. To some extent, the firms in the collaboration had an overlap in their areas of interest, and were competitors to a certain degree, but sensitive information regarding innovations and such was not shared with the collaboration actors before they were publicly announced, and the firm representatives were acting highly professional (Chemical Engineer 1, 2021).

4.3.5 System Thinking

In section 4.2.1, the concept of system thinking, or a system perspective on operations and sustainability, was touched upon. Usually, when a supplier has a new product suggestion that might require more resources in production, but the firm closest to the end-consumer can, for example, use less material for the end-product, the suggestion is abandoned. Since the supplier is measured specifically on what is happening in its factory, and is ending up having increased resource usage, this sends out negative signals if one does not look at the whole picture,

something that is rarely done (Customer IO 1, 2021). The total cost is often reviewed when cost-saving activities are conducted, but the overall picture of the supply chain is important to understand. It is not enough to only look at the product or substance itself (Customer 1, 2021). The process-related chemicals can positively affect the production process at the buying firm since they can optimize the entire system and provide added value elsewhere to the customer (Firm Representative 1, 2021).

4.3.6 Section Summary: Supply Chain Management

The most relevant findings from section 4.3 are summarized and outlined below:

- Pressure from customers is essential for sustainable development.
- Sustainable products are costlier than traditional products.
- Brand-owning firms are held responsible for the supply chain actions.
- Brand-owning firms are given credit for the supply chain efforts.
- Collaboration and system-thinking are potential competitive factors.

4.4 Competing with Sustainability in the Chemical Industry

4.4.1 Prioritizing Sustainability

Almost every firm has a will to work with sustainability, but it is not always prioritized. There are always more important and critical issues on the agenda, and sustainability is one of the issues firms tend to duck for. Complying with all new sustainability regulations has sometimes become a burden and most firms want to improve operations to maximize profits in the easiest way possible, something that has not been equated with sustainability actions (Specialist 1, 2021). However, the prioritizing of sustainability is still very varying in the chemical industry. It has to do with where the firm is located in the supply chain, and who its customers are (Chemical Engineer 2, 2021).

Today, Specialist 4 (2021) perceives that there are far more people who take sustainability seriously and have realized that it is an important factor to work with it, and when it is done properly, money can be made.

"When firms' top management realized that there was money to be made by positioning themselves as sustainable, it became an incredibly rapid shift and sustainability issues became much more important" (Specialist 4, 2021).

Specialist 2 (2021) believes that the focus when engaging in sustainability activities is often on strengthening competitiveness. In the chemical industry, customer pressure and regulations are two important reasons for prioritizing sustainability, but also the need to feel that one is doing good (Specialist 2, 2021). Another explanation for engaging in sustainability activities is community involvement, that firms and decision-makers work with these issues because people want to be able to face themselves in the mirror and be proud of their jobs (Chemical IO 1, 2021). The internal drive has grown, in almost every firm, and some decision-makers want to do good since they recognize the importance of doing the right thing for future generations. But money is still talking. Making a business case is one of the biggest drivers for sustainability and if stakeholders start to ask for sustainability, it sends a strong message to the top management (Specialist 3, 2021).

There is a big difference between realizing that a firm needs to work with sustainability and the firm actually taking the step to work sustainably. Decision-makers often associate sustainability with increased costs and investments, but that is what is required for firms to reduce their impact on the environment. There is a need to shift the discussion towards that these investments will be earned in time, and that they will pay off in the long run (Specialist 2, 2021). It is only when the conditions in a long-term perspective are favorable that a firm can feel confident to make changes and investments within sustainability (Chemical Engineer 1, 2021). It becomes clear that when there is a higher customer demand, it becomes highly prioritized in firms, but there must be commitment among the employees, otherwise, laziness and carelessness could lead to mistakes and miscommunication (Customer IO 2, 2021).

4.4.2 Resources and Facilitators

The informants agree to a great extent that the best way for a sustainability strategy to be successful and permeate the entire organization is that the top management is committed (Specialist 1, 2021; Specialist 2, 2021; Specialist 3, 2021). It should come from the top and consequently, infuse to all parts of the firm. Larger corporations have their own sustainability departments, but smaller firms do not have the resources for that, which makes it important that the top management communicate the importance of sustainable actions to the rest of the organization (Specialist 1, 2021).

The need for commitment from the top management could sometimes be a problem. Specialist 3 (2021) believes that often there is a person within the organization that have a big interest in sustainability, who wants to involve sustainability in the operations, but is usually facing resistance; the legal department implies that it is not possible for legal reasons, the finance department is afraid that it is going to cost money, and the communication department does not think that the firm should focus on such a difficult issue. But both the engagement from the top management and "regular employees" within the organization to drive the change internally are important. The top management needs to make sure that the responsible employees have the mandate to drive such changes. If only the top management is involved, there is a risk of greenwashing the issue (Specialist 3, 2021) and if the sustainability commitment from the top management does not feel sincere or credible, both customers and employees will see right through it (Specialist 4, 2021).

The top management also must get better to communicate to the employees what effect the sustainability work has on all people within the organization. Some employees might not see the benefit(s), but if they get an explanation about the gains from working with sustainability and doing the changes required, employees will feel meaningfulness in their daily work. It is also often the employees who work in the operations/manufacturing/production that can find better solutions since they know their facilities inside and out (Customer IO 2, 2021). If the employees are not being involved in sustainability work, it is hard for them to make decisions that help the firm to get on the right sustainability track (Specialist 2, 2021).

"Clear leadership in the initial phase of the sustainability process, get everyone involved in the beginning, and let all employees be a part of the whole journey of development, are the most important things to be able to succeed" (Specialist 2, 2021).

There is also an interplay between the firm and the rest of the society. The next generation of blue and white-collar workers have grown up with sustainability. When they look for jobs, they will bring their values with them, and they will not apply for a job at a firm that does not work with nor take sustainability seriously. Firms cannot ignore this, it is a central business prerequisite for their survival (Customer IO 2, 2021).

4.4.3 The Possibility to Compete with Sustainability

On the question whether chemical firms can compete with sustainability and gain competitive advantage(s) from it, or, if it has become a hygiene factor that is taken for granted, the answers from the informants vary.

Firms that work with sustainability consider it a competitive advantage, and the firms that started to work with sustainability a few years ago have benefited from it when looking back (Specialist 2, 2021). Chemical Engineer 1 (2021), Chemical Engineer 2 (2021), and Firm Representative 1 (2021) argue that, if managed properly, sustainability work within the chemical industry can be profitable but also that such efforts is necessary to be competitive. An example that visualizes this business success, is the ChemScore report, that looks at the global chemical manufacturers in terms of sustainable and safe chemicals. In 2020, the stock price of the firms who were ranked as the top three had increased 10 percent, and for the three worst, the stock price had decreased between 30 to 40 percent (ChemSec, 2021).

Looking a few years back in time, it might have gone bad for firms that did not work with sustainability (Specialist 1, 2021). The firms that were early and actively worked with sustainability could use it as a competitive advantage, then, but by now it is a hygiene factor. If the minimum requirement within sustainability is not fulfilled, the firm cannot participate in procurements. Today, it is more integrated into the business, and more mainstream (Specialist 3, 2021). However, sustainability per se has become more of a hygiene factor in the sales process. At the same time, the sustainability agenda keeps evolving and there is always the next generation of topics that can be used as a potential competitive advantage (Specialist 2, 2021). The boundaries between competitive advantage and hygiene factors are floating. It is a challenge for the chemical industry since it is located upstream in the supply chain which means that the customers' customers might not perceive the sustainability efforts as noteworthy (Chemical IO 1, 2021).

4.4.4 Section Summary: Competitiveness

The most relevant findings from section 4.4 are summarized and outlined below:

- There is a varying degree of prioritizing sustainability in the industry.
- Customer pressure, regulations, and the willingness to do good affect the priority.
- Top management commitment is crucial for successful sustainability efforts.

- Sustainability has become a hygiene factor in business.
- Losing money from not engaging in sustainability work is considered as more likely than earning money from investing in it.

4.5 Summary of the Empirical Findings

The most relevant findings from each element of the conceptual framework; communication, SCM and competitiveness, have been summarized in sections 4.2.7, 4.3.6, and 4.4.4. In Figure 3, these are put together to clearly visualize the results of this study.



Figure 3. Summary of Empirical Findings. Compiled by the authors (2021).

5. Analysis

In this chapter, the empirical findings will be analyzed with the help of the conceptual framework, to fulfill the purpose of this study and to answer the research question. The structure of the analysis will follow the elements and inputs of the conceptual framework, presented in section 2.4, starting with the research context. The current communication and SCM contributions in the chemical industry will be examined to be able to understand in what ways competitive advantages can be gained.

5.1 The B2B Sustainability Context

5.1.1 Sustainability Discrepancy and Developments in the Global Context

The chemical industry is very complex, and it is important to get an understanding of its characteristics and context to be able to understand what communication and SCM strategies that should be employed to become competitive.

A current development within the global chemical industry is a textbook example of Porter's (1985) cost leadership versus differentiation. In China, the focus is on large quantities offered at a low price, and in Europe, the focus is on niche products. The upcoming challenge for the European chemical industry is to keep their market shares, their competitiveness, and at the same time afford investments in complying with the new, tougher regulations without losing the innovativeness. A way to be more competitive towards the Asian challenge could be, in accordance with Dyer and Singh (1998) to share knowledge and resources among suppliers and customers. By engaging in a European industry collaboration on sustainability, the firms could learn from each other, communicate as unit, and work together on both innovativeness and lobbying for reasonable regulations. The collaboration (hereinafter, collaboration will always refer to collaborations with regards to sustainability) that Chemical Engineer 1 is involved in actually had a positive effect on the national government implementation of regulations, which is a great benefit of the collaboration. Customer IO 2 argues that Europe has reached a stage where sustainability is incorporated into the firms, but that the Asian firms have not reached that stage yet (Specialist 4, 2021; Customer IO 2, 2021). A crucial aspect in the discussion on keeping the European firms' competitiveness, is that there is a big challenge since actors in larger supply chains adapt to the national setting in their part of the supply chain (Gligor et al., 2020). If large MNCs do not see the benefits of keeping their production in Europe due to tough regulations, and hence locate to Asia in general and China in particular, and adapt to the lower sustainability requirements, it will affect the entire supply chain, which is in line with Gligor et al. (2020) above. This goes against the benefits of system thinking, since the net effect of that supply chain will likely result in increased short-term profit for the MNCs but decreased sustainability performance.

5.1.2. Supplier and Customer Trade-off

An important finding from the data collection is that firms are starting to move away from the assumption established in the literature; that there is a trade-off where the transition towards more sustainable operations is related to increased costs (Agarwal et al., 2017; Porter & Van der Linde, 1995*b*; Srivastava 2007).

From a customer perspective, Specialist 2, and Customer IO 1, with an indirect connection to the chemical industry, argue that the discussion today has moved past that trade-off, but also state that it is because society is more willing to pay extra for sustainable products. Informants, with a direct connection with the chemical industry (e.g., Chemical Engineer 1; Firm Representative 1), agree that sustainable products are costlier and that the products will likely stay more expensive in the foreseeable future, but they disagree with the statement that there is a willingness to pay a price premium for a more sustainable product. Rather, the chemical suppliers must be able to communicate why the products are more expensive and explain the sustainable benefits of the products, which often are expected to be superior to the traditional products by their customers. Since the market is very competitive, and price together with functionality are the two driving factors for success, it would still be a complex decision for a customer to purchase a more expensive, but sustainable product, and then risk being deselected for being too expensive from its customers. Without the ability to show that sustainable products are exceptional in other areas as well, such as increased total efficiency for the whole process, the products will not be sold. An additional complexity to the this is what Håkansson et al. (1976) describe as need uncertainty. This is common in the chemical sales process as well, where Firm Representative 1 states that, at times, the buyer does not know what or why they are asking for it or has a production/process problem that is hard to formulate. Selling a sustainable product at a price premium to a buyer with need uncertainty or that has a reactive or a proactive approach to sustainability, described by Srivastava (2007) gets complicated when the selling firm is trying to adopt a more value-seeking approach, going beyond what is expected from stakeholders. This latter approach described by Green et al., (2012) and Srivastava (2007) is on the other hand something that firms can use to gain competitiveness when environmental processes are integrated into the business offerings.

From a supplier perspective, there is still an economic trade-off according to the informants (e.g., Chemical Engineer 1; Firm Representative 1); there will be a cost in making investments to make the production more effective, sustainable raw material is more costly than traditional and if firms cannot see the economic gain from it, and a clear demand from their customers, it will be hard to motivate those decisions. The pressure on the industry to become more sustainable is more evident than earlier, and the pressure keeps increasing, according to most informants. Yet, the process is becoming more complex upstream in the supply chain, which is an explanation to why it takes longer for the pressure to arise; it gets more difficult and costly to change products and suppliers the more upstream in the supply chain one is located. But the maintenance of a static mindset and keeping the status quo is also related to costs, that are higher than those related to sustainability investments. The sustainability investments do not necessarily have to be tangible, such as machines and tools, which the informants often refer to. Instead, the investments can be in environmental knowledge received from consultants (Ludema et al., 2012; Porter & Van der Linde, 1995a). This environmental knowledge may also come from within the company, which is important to acknowledge. Customer IO 2 and Specialist 3 add to the discussion that firms also must look at who they want to employ in the future. The next generation of blue and white-collar workers will not settle for a job at a workplace that does not value or engage in sustainability activities. The successful attraction of future employees and the retaining of current employees is something that is derived from successful communication that could make the firm competitive in the labor market. This is as crucial as being competitive in the regular market.

5.2 SCM in the B2B Sustainability Context

5.2.1 Relationships in the Supply Chain

Customer 1 and Customer 2 argue that they receive pressure from their customers to act more sustainably, and to take responsibility for the actions of their suppliers upstream in the supply chain. This is done via annual sustainability evaluations, to ensure compliance with their values and objectives, and according to Storey et al. (2006), assessing suppliers have become a frequently occurring event. Yet, as discussed by Ford et al. (2011), relationships between firms

are crucial for organizational success. Firm Representative 2, with long experience from the chemical industry, testified that relationships today are important, but of less importance than at the beginning of the informant's career. The consequence of the decreased importance of relationships in the industry is that suppliers get disqualified to supply the customer if it does not live up to the purchasing firm's sustainability requirements. However, according to Johansson and Vahlne (2009), trust and commitment between a customer and its supplier is not a consistent state, rather it is dynamic and ever-changing.

Since the customers to the chemical industry, and the end-consumers, are more aware than ever regarding sustainability, it is very important to not be associated with greenwashing, which might be an explanation to the somewhat harsh treatment of the chemical suppliers. Even if it is unintentional, the reputation of a firm is severely hurt for being accused of it (Martin & Schouten, 2014; Szabo & Webster, 2020). A justification to the tough supplier treatment comes from Seuring and Müller (2008) who assert that firms closest to the end-consumer, or brandowning firms, are held accountable for the environmental performance of their entire supply chain, which goes in line with the reasoning of Chemical IO 2. Larger MNCs are often far ahead in the industry when it comes to sustainability work, since those firms are critically reviewed and questioned if they do not live up to the expectations of society. Specialist 2 agree that it is the larger corporations that have the biggest responsibility in terms of sustainability activities and push their suppliers to act more sustainably. However, brand-owning firms also get the credit when their suppliers act following the expectations of society, and when they exceed those expectations as well. Such outcomes can lead to demotivation at the suppliers. This phenomenon is described by Preuss (2005) as an arm's length approach to sustainability, where actors only do what is expected of them and nothing beyond the minimum requirements which will not make them competitive. On the other hand, the ChemScore report function as evidence that those chemical firms that work with sustainable chemicals are performing much better than their competitors that does not engage to the same extent in sustainable development, which is supported by Ludema et al. (2012) who states that the most competitive firms are the ones that go beyond stakeholder expectations in terms of sustainability.

5.2.2 Collaboration(s) in the Supply Chain

Specialist 2 states that the relationship between the customer and the supplier will improve by co-developing and collaborating on sustainability issues. At the beginning of such a collaboration, it could be uncomfortable, and costs are likely to increase, but if handled

correctly it can lead to competitive advantages, which is supported by the thoughts of Ford et al. (2011) and Ludema et al. (2012). Ludema et al. (2012) also argue that this possible competitive advantage can result in both ecological and economical effects since developing the capabilities necessary for such collaborative partnerships lead to higher performance on the existing market(s), but it may also facilitate new market opportunities. It can also lead to a positive influence on the brand image and stakeholder opinions. All these factors are successful outcomes in the vertical and horizontal collaboration that Chemical Engineer 1 is engaging in, which shows the strengths in collaborations, both for the individual firm but also for the supply chain as a whole.

Collaboration and cooperation are two occurrences that are rare in the chemical industry supply chain. Instead, it is found that the firms are rather individualistic, not willing to collaborate either horizontally or vertically. The foundation for Chemical Engineer 1's collaboration is that there are common issues to solve, and trust between actors. That is essential to be able to share the firm-specific challenges to find out if there are any common ones. Johansson and Vahlne (2009) agree with that reasoning, arguing about the importance of trust to build a strong relationship. Without trust, firms will not share information between them. In Chemical Engineer 1's collaboration, the involved actors were acting professional, something that Koponen et al. (2019) corresponds with, saying that successful information sharing is requiring the participants to have high emotional intelligence and intellectual abilities. Trust and commitment can lead to benefits such as increased efficiency and productivity, which was the case for the collaboration, mentioned above, in the supply chain, where a united voice had a great(er) impact on its surroundings. If chemical firms are to collaborate, there must be intellectual alignment. If there were tools for information-sharing available, supply chain collaboration would become more successful since a green multiplier effect could be achieved (Green et al., 2012). Adding the reasoning from Customer 1 and Customer 2, regarding that if they get pressured by their customer, they must pressure their supplier, who must pressure their suppliers, etc., but someone must start to get the ball rolling. This is a way of collaborating and helping each other and in the end, it is a win-win-win situation, both actors are winning, but most importantly, the environment wins.

Another important facilitator for the inclusion of sustainability activities and collaborations in a firm, i.e., GSCM, brought up by several informants, (e.g., Specialist 1, Specialist 4), that in the long run enables supply chain collaboration, is top management involvement. Susanty et al. (2019) argue that without support from the management team, the initiatives taken by sustainability enthusiasts will likely lead nowhere. Hence, there must be an interplay throughout the organization for GSCM actions to have a real impact. This is further complicated by the sales process, where a lot of actors, such as strategic buyers, technicians, management, and the seller, are involved, usually having different interests in mind. It is crucial that top management makes sure that there are sufficient resources available but first and foremost, that everyone is aligned regarding the importance of sustainability. In general, when the firm's top management realizes that there are potential profits to be made in sustainability positioning, the sustainable development at firms accelerates fast (Specialist 4). Porter and Van der Linde (1995*b*), and Dangelico and Pontrandolfo (2015), among others, state that sustainability awareness today is to be more like an opportunity with benefits to be gained, rather than a pure cost.

5.3 Communicating in the B2B Sustainability Context

5.3.1 Definition and Measurement Discrepancy

Before exploring how chemical firms should communicate their sustainability contribution, there is a need to understand the underlying challenges that have impeded the firms to reach their stakeholders up until now. One of the main issues within the chemical industry when it comes to communication is that there is no general definition of the term sustainability. Miscommunication is described by Solér et al. (2010) as the principal cause of why working with GSCM has not been very successful historically. Even though this is something described as being in the past, it is clearly still a major problem in the chemical industry.

Most informants agree that the lack of a common sustainability definition is a problem, but some believe that the ISO 14000 certification works as a general definition, in a certain sense, since it sets some common grounds. However, according to Chemical IO 1, the ISO certifications have not changed much since they were introduced (they have just multiplied in numbers) although the world and the public debate are not the same as they were back in the days, something that Ludema et al. (2012) argue changes the competitive landscape for firms. On top of that, Specialist 1 states that firms have not become more sustainable because of these kinds of certifications. This indicates that ISO certifications per se are not enough if a firm wants to be perceived as sustainable, which is also argued by Kapitan et al. (2019), and Dangelico and Pontrandolfo (2015) who both states that ISO certifications have become a

minimum requirement for doing business. Most informants describe ISO certifications as a hygiene factor in a business relationship; it is expected from potential partners. Only using the arm's length approach, is not enough if a firm wants to be successful in its sustainability work (Green et al., 2012; Srivastava, 2007). It should also be noted that ISO certifications do not reveal anything about the actual sustainability actions and contribution. They just indicate that the firm is reaching certain quality standards and help the firm to set up an environmental agenda. Hence, ISO certifications cannot work as a common definition for sustainability, especially since sustainability is more than just protecting the environment.

The lack of communication between actors within a chemical supply chain is also evident in the absence of common measurement tools and criteria. It must be repeated that the chemical industry is very broad, ranging from oil refineries to pharmaceutical producers, thus making it difficult to use the same kind of metrics. Yet, the industry cannot consent to measure something as simple as carbon dioxide emissions, which is a problem. Some actors are including all emissions in the supply chain, while others only count what their particular operations emit. There has been an attempt for a common way of measuring through the Responsible Care Program that Chemical IO 2 describes as a good strategy in theory, but in practice it has not really united the industry in measuring sustainability. It is up to each firm to decide what is to be measured and as of now, it is not possible to compare firms in different countries since they measure different aspects. Martin and Schouten (2014) describe the world as a very information-dense place, which makes sustainable consumption choices hard. The usage of different metrics makes it difficult to compare firms and products and thus, aggravates these choices. When firms are acting in global supply chains, the discrepancy discussion gets even more complicated since the different aspects of sustainability are of varying importance in different parts of the world.

Aligning measurement tools, but also definitions of sustainability terms is the first step towards potential competitiveness and in turn, sustainable development. If firms can compare themselves to other actors, there is an indirect pressure to (hopefully) improve, but for this to work, there must be some unified tools to measure sustainable actions. Specialist 1 finds that firms are measuring what is easy to measure and leave the harder parts to someone else. If all actors are operating this way, there will not be sustainable development in the industry, which is supported by Green et al. (2012) and Srivastava (2007), both stating that united action among supply chain actors is needed for sustainable excellence.

5.3.2 Ways to Communicate with Legitimacy

In B2C markets, sustainability labels have been a very successful tool to prove the legitimacy of the firm's sustainability actions and hence, become competitive. However, almost none of the informants had spare sustainability labels a thought, within the chemical industry. Labels are used to simplify consumption decisions (Bratt et al., 2011; De Boer, 2003), which is not applicable in the chemical industry since it must be based on common grounds. If the actors within a supply chain cannot agree upon a definition of the term sustainability nor how to measure it, how are they supposed to decide upon the foundations of a label? Also, the argument for the non-need for a sustainability label is partly based on the reasoning of Specialist 4, who declares the importance of not stupefying the buyer. Within B2B markets, the seller and the buyer are well prepared and knowledgeable (Koponen et al., 2019; Kotler et al., 2013), especially in markets such as the chemical industry, and labels would according to Customer IO 2 simplify the complexity of the products too much.

Labels are supposed to be a benchmark, but if there are no common grounds for defining sustainability nor how to measure sustainable actions, there is nothing that can be compared between firms. In the industry where Specialist 2 previously has been operating, firms understood the importance of working together on certain sustainability issues, since these are affecting all actors within the industry. A sustainability label was initiated, covering both the environmental and social aspects of the term. It is still very successful in that industry, but only because all actors agreed upon the definition of sustainability and the underlying criteria. Together, these examples imply that it is possible for actors within an industry to consent when it comes to measurements and definitions and in the long run, it can also be very successful. Previous research, e.g., Carter et al., (2015), Li et al. (2006), and Solér et al. (2010), support this reasoning and adding their argument regarding competition taking place between supply chains rather than between individual firms, chemical firms must start merging their forces. If the chemical industry could agree upon some measures and definitions when it comes to sustainability, the foundations for a potential label would be there.

It is important to have in mind that a sustainability label per se is not the answer to all problems. Labels will not change the world or save the planet as Bratt et al. (2011) state, neither will an individual company. Once again, there is a need for collaboration within the supply chain if sustainable development is to be realized since collaboration within supply chains is a means to gain competitive advantage (Dangelico & Pontrandolfo, 2015; Ludema et al., 2012). Chemical Engineer 1 argues that collaboration might work as a catalyst because when actors work together, they have a better chance to make a change, irrespective of it is a political change or a perceptional change among customers. Working united as one is something more actors should do in the chemical industry because sustainability issues are not firm-specific, they affect all actors (and not just in the chemical industry). In the industry of the typical customer, firms are not competing against each other, when it comes to sustainability, instead they are supporting each other, trying to find common solutions to such problems. This reasoning is according to Customer IO 2 rather unique for this industry, but it is something that we believe that the chemical industry should be inspired by. However, Chemical IO 1 and Firm Representative 1 stress that, when push comes to shove, the different actors within the chemical supply chain will have different aims and purposes of their sustainability actions because of their different roles in the supply chain. Thus, things will become more complicated.

The lack of cohesiveness when it comes to the definition of sustainability is a deeply rooted problem in the chemical industry, and the main reason why sustainability labels will not be very successful in such a context. Obviously, the difficulty in defining sustainability is a part of the reason, but in the broad chemical industry, it is a complex process to align and agree upon a definition that works for all actors. The bigger, and more easily solved, problem that both the supplying and buying side address is that the actors do not agree upon what simple sustainability terms or actions mean, their interpretations, or their implications. For example, the responding suppliers highlight the confusion and misunderstanding among customers regarding terms such as renewable and compostable. Customers, on the other hand, feel that there must be alignment in what, e.g., the term "saving energy" means. Suppliers perceive energy-saving actions as something desirable while, for example, the informants from the customer industry organization declare that this does not necessarily have to be true. When basic terms and actions are not unified, it will be difficult to define sustainability in common terms. Bratt et al. (2011) state that for a label to work, there must be clearly defined criteria, something that seems to be hard to achieve in the chemical industry since actors are neither communicating nor trying to listen to each other. Communication is the key for trust and relationship-building, but if supply chain actors are not able to communicate with each other regarding the basics, such as a common definition of sustainability, they cannot collaborate and decide upon what the label should stand for. Even though Specialist 4 declares that it is always possible to create a need for something, there are several problems in this case with regards to

(mis)communication that must be addressed before such demand can be generated. Hence, we argue that a label is not the right way to communicate sustainability to gain competitiveness as of now.

5.3.3 Transparency Facilitating Legitimate Communication and Collaborations

It is evident from both the empirical findings and previous research (e.g., Balluchi et al., 2020; Marques & Batista, 2017) that transparency and openness are key factors when it comes to communicating sustainability, to gain legitimacy and competitiveness in the long run. Sincere communication efforts are highlighted by Balluchi et al. (2020), as the foundation for credibility and in the longer run, it is also what makes relationships successful. Being authentic will be rewarded with legitimacy, no matter if it is concerning the positive or negative effects of the firm. Firms that acknowledge and accept their shortcomings, but also dare to disclose their flaws to stakeholders will be able to steer the discussion in a way that is favorable for the firm. This is also the key to move past the traditional suspiciousness that is pointed towards the chemical industry. Instead of letting the media decide what is to be discussed, firms must stand up for themselves and disclose what they are not doing good and how the work to improve it. Specialist 4 argues that if such a message is sent from the firm, it will not be seen as a "villain", as if the negative aspects would have been revealed by someone else. This is what Kotler et al. (2013) refer to as the push strategy. Although messages are already pushed out to the stakeholders, it is important to be the owner of the push and not let anyone else push the messages, because then it is hard to control what is being said (Specialist 4). Another relevant aspect to this is that customer pressure, i.e., information, fades the higher in the supply chain it proceeds, something that Chemical IO 1 and Ghadge et al. (2019) agree upon. Since information languishes upstream in the supply chain, one can assume that the same reasoning goes in the opposite direction. The next actor in the supply chain chooses what message to pass forward, and so does the next, thus, it becomes like the Chinese whispers. If one actor decides to add something that might not be completely true, a snowball effect is initiated, and hence, the control over the situation is lost.

It is crucial, especially in heavily criticized industries, such as the chemical one, to stand up for oneself and be honest to all stakeholders. As an example, Specialist 3 states that if an actor in the chemical industry realizes that for the final product to have a lower ecological footprint, then the actor must be the one to communicate that the net effects of the supply chain are to be better, even though the particular firm might disclose a "worse" sustainability result. In other

words, having a "system thinking mindset" and communicate this to stakeholders, is how firms should use their communication channels. Being truthful is what builds relationships and is sometimes considered a substitute for knowledge (Johanson & Vahlne, 2009). However, actors within the chemical industry are still operating individually, only trying to maximize their profits by acting in a way that is solely beneficial to their firm. As long as this individualistic mindset is omnipresent within the industry, relationships and potential collaborations are going to suffer.

Several informants present examples of successful sustainability collaborations, ranging from labels to projects, which implies that it is possible to cooperate with fellow supply chain actors. If chemical firms would consent and collaborate, strong relationships could be built. This is something that has always been crucial within B2B contexts as stated by Ford et al (2011) and this is argued by Firm Representative 2 to be a key part of the communication strategy at the informant's workplace. If there is trust in a relationship, there can also be commitment (Johanson & Vahlne, 2009). It is such a collaboration that could serve as the basis for how to communicate sustainability to become competitive. Chemical Engineer 1's collaboration has been using united forces to make a difference, which has been very successful. When the actors were working alone, it was almost impossible to change the chemical industry because each actor had too little power. It is the collaboration itself that has helped these firms to communicate sustainable goals, sustainable development, and sustainable attributes of the firms because united they stand stronger than on their own. Moreover, several informants point out that firms have difficulties in understanding how they can fit the bigger sustainability picture and how they can make an impact on the global level, for example, by working towards the UN SDGs. Sustainability issues are, as previously mentioned, not tied to a specific firm, rather they apply to all firms, in all industries, and all actors must support each other to overcome the problems. If firms were to collaborate along the supply chain by exchanging knowledge, merging resources, and sharing information, like in the collaboration of Chemical Engineer 1, it might become easier for firms to see their impact in the bigger picture, but also for the society to see all the good that can come out of it. For a collaboration to work, it seems to be crucial to explain to the actors what the holistic utility is, how each firm can contribute to it, but also what the individual firms can gain. In this way, it is possible to circumvent the individualistic mindset of the chemical industry and simultaneously, reduce the environmental impact from the industry. The united voice is stronger than one might think, and this is a way

of communicating that firms in the chemical industry shall try to utilize because together they can become competitive and make a real difference.

5.4 Competing in the B2B Sustainability Context

5.4.1 Sustainability, per se, - a Hygiene Factor or a Competitive Advantage?

The informants state that whether working with sustainability is a hygiene factor or a competitive advantage is not obvious, yet Hart (1995) points out that sustainable development can become a source of competitiveness. Porter (1985) explains that when firms perform better than their competitors, a competitive advantage can be gained, but on the other hand, since there is a lack of cohesiveness regarding what sustainability is and how to measure it, performance becomes subjective. This subjectiveness becomes evident in the empirical findings because the firms that work with sustainability consider it a competitive advantage, while the customers consider it to be a hygiene factor.

Theoretically, for something to be considered a competitive advantage, it must live up to Barney's (1991) VRIN criteria. According to the empirical findings of this study, sustainability, as an isolated concept, is something that almost all actors are including in their business strategy and thus, cannot be considered rare nor inimitable. Although some sustainability contributions, for example, sustainable innovation, might give firms a competitive advantage temporarily, the concept of sustainability is dynamic and changes over time. Chemical Engineer 1 and Chemical IO 2, among others, have experienced that what is considered sustainable has transformed and developed throughout their careers, mostly following the public debate, which makes it difficult for firms to gain sustained competitive advantage. A few decades ago, sustainability was very much equated with saving the environment, and today, the public debate points towards "sustainable sustainability", i.e., it is not enough just to be sustainable. This reasoning complicates the discussion about sustainability as a potential competitive advantage. On the one hand, dynamic concepts, such as sustainability, are beneficial for firms since flexible ones can get a temporary competitive advantage and thus, a head start versus competitors. On the other hand, the dynamic nature of the term sustainability will make it hard to keep the competitive advantage sustained. It is important to have in mind that although sustained competitive advantage may have been reached, Porter (1985) argues that firms need to keep improving their strategies and efforts to make it difficult for competitors to keep up. As the increased focus on sustainability is primarily caused by customer demand, there is a need to keep improving. Today the (global) competitive landscape is more dynamic than ever (Ludema et al., 2012; Porter & Van der Linde, 1995*b*), which supports the fact that it will be hard to continuously match the VRIN criteria, especially the valuable and inimitable one. Adding the reasoning that firms within the chemical industry struggle to find a common definition of the term sustainability, it is hard to decide what is incorporated in the concept of sustainability and hence, what criteria firms compete on. To extract value and to try to keep competitors from imitating something that is constantly changing, complicates the process of making sustainability a key part of a competitive strategy. Because of this reasoning and the fact that sustainability does not even fulfill two of VRIN criteria, we argue that sustainability, per se, is not a source of sustained competitive advantage.

5.4.2 If Sustainability Is Not a Source of Competitive Advantage, What Is?

The research question of this study is based on how to communicate the sustainability contribution competitively. From the discussion above, sustainability is a dynamic concept that is constantly changing and not clearly defined within the industry, and hence, it is hard to consider it an obvious source of competitive advantage. However, a "resource" that the informants often recurred to is the potential benefit from collaborating on sustainability. Gligor et al. (2020) and Ludema et al. (2012) declare stakeholder engagement and the co-creation of value between supply chain actors as sources that can end up in competitive advantage. Collaborating with actors within the supply chain means that the internal resources of the firms included are bundled together into a new resource set-up. Dyer and Singh (1998), and Thatte et al. (2013) encourage firms to share resources and exchange knowledge since the new shared set of resources may become unique and hence, could become a source of competitive advantage. This somewhat contradicts the trade-off that has been evident in the chemical industry historically since working with sustainability does not necessarily mean higher costs, but rather, competitiveness. To decide whether collaboration within the supply chain can serve as a competitive advantage, we must examine whether it fulfills Barney's (1991) VRIN criteria. One of the assumptions of the RBV is that resources are immobile (Barney, 1991). However, since the theory was developed 30 years ago, we believe that collaboration (i.e., resources are mobile, not firm-specific) between firms is a resource after all, because the world is more mobile than ever, and firms would not be able to survive if resources would be immobile.

Chemical Engineer 1 and Specialist 2 are certain that there is a business advantage to gain from collaborating within a supply chain. By helping each other and not trying to reinvent the wheel repeatedly, they believe that firms can increase profits or decrease costs, but it can also

stimulate innovation since new perspectives on current problems arise. Thatte et al. (2013) extend this discussion by stating that if firms cooperate within their supply chain, the supply chain gets more competitive, but firms will also become more competitive themselves. This is the most important outcome of the collaboration that Chemical Engineer 1 is a part of. Through the collaboration, the included firms could achieve aims and objectives they could not have been able to do alone, and they were also able to make changes on a national scale that were unimaginable if they were still in their individualistic mindset, something that is supported by, e.g., Gligor et al.'s (2020) reasoning that supply chain actors together can create value that firms could not have been created on their own. In other words, collaboration is adding value to firms, but it is also hard to substitute for other strategies since the whole is evidently greater than the sum of its parts. This implies that both the valuable and non-substitutable criteria are fulfilled. Within the chemical industry, there is a willingness to cooperate, but as of today, collaborations are not very common. A reason for this is, according to Chemical Engineer 2 and Specialist 2, that firms within the industry are still very individualistic and do not want to share their customers, resources, or ideas. The fact that collaborations are rare is an enigma since the social complexity of mixing people with different backgrounds, experiences, and knowledge makes collaborations hard to imitate. Collaborations per se could be copied, but the relationships and networks between people are tacit which makes them inimitable. Specialist 3 states the diversity of people and the power of their relationships as success factors for collaborations, but exactly how this stipulate competitive advantage might be hard to pinpoint. This casual ambiguity is another argument for the inimitability of collaborations.

Another strategy that has worked very well in the industry of the typical customer is "system thinking", i.e., to see the full picture and not just what one particular company does (not) do to become more sustainable. System thinking is closely linked to collaborations because, following Ford et al. (2011), firms are dependent on external actors if they want access to resources that are not possessed in-house. Consequently, some collaboration is needed for firms to survive. Customer IO 1 and Customer IO 2 both believe that helping and inspiring each other adds value to each of the firms involved because there are a lot of things that can be learned from one another but there are also opportunities to enhance each other to reach bigger purposes. However, it is apparent that this way of thinking is rare in the chemical industry, mostly because of the individualistic mindset that is still widespread. Having a holistic view on sustainability along the supply chain has been proven successful in other industries, and what is evident is that none of the informants could give concrete examples of how they use

system thinking in their everyday operations. This is another example of causal ambiguity, the difficulty in explaining exactly how the resource in question is contributing to the competitiveness of the firm/supply chain, which supports the argument for inimitability of system thinking. Finally, following how Chemical Engineer 1, Customer IO 1, and Customer IO 2 describe the success in how working together takes sustainability work to another level because united forces are stronger than individual ones, it is evident that there is nothing that can be used as a substitute for system thinking and collaborations today.

In conclusion, it is arguable that collaborations and system thinking can serve as a competitive advantage, at least temporarily since they fulfill the VRIN criteria. But, for both resources to be fully applicable, the chemical industry must brush off its individualistic mindset and discover the benefits of working together. One of the strongest arguments for starting to collaborate more when it comes to sustainability, except for the fact that the environment becomes a winner, is that the scarcity of current collaborations opens possibilities for firstmover advantages. Obviously, collaborating regarding sustainability is hard, especially when there is no common definition of sustainability. Since competition has shifted from being between firms to between supply chains (e.g., Carter et al., 2015), there is nothing to be gained from working towards sustainable development on your own. The heterogeneity of resources, which is the other main assumption of the RBV (Barney, 1991) is an enabler of collaboration and this diversity of resources is something that Specialist 3 believes is the most important factor for successful collaborations. The unique combination of resources that emerge when firms share their knowledge in different ways is hard for competitive supply chains to copy and hence, there is value that can be co-created in a way that could not have been possible if the actors were working alone. It is crucial to keep developing and improving the relationship between the different actors for the collaboration to work, but also to keep competitors from imitating the potential success stories. Managing relationships, and hence collaborations, is hard and requires a lot of resources (Håkansson et al., 1976), but if this is done properly, sustained competitive advantage can be achieved (Porter, 1985). Srivastava (2007) discusses the importance of going beyond the arm's length approach and integrating sustainability in the business strategy. When collaborating with others and having a holistic perspective on sustainability, firms within supply chains can together achieve the unexpected, become competitive, and make a real change.

5.5 Summary of Analysis

The most important results from the analysis are summarized and visualized in Figure 4, based on the main elements of the conceptual framework.



Figure 4. Summary of Analysis. Compiled by the Authors (2021).

6. Conclusions

In the final chapter of this study, the research question will be answered and presented based on the conclusions that are drawn from the empirical findings and analysis. Lastly, theoretical, and managerial implications, and limitations of the study will be outlined together with recommendations for future research.

From the introduction chapter, it is evident that the chemical industry has not been researched enough when it comes to how to be green and competitive, which is why this study has served to explore in what ways chemical firms can use communication and (green) supply chain management to benefit from their sustainable contribution and gain competitiveness. Through a single embedded case study and an abductive research approach, internal and external actors in the chemical industry were interviewed to enable us to answer our research question:

How can a chemical firm strengthen its position, and make its supply chain more competitive by communicating its sustainability contribution in novel ways?

The empirical findings and analysis conclude that sustainability actions are not, per se, a source of competitive advantage. It is rather considered a hygiene factor and will not lead to more competitive firms. Instead, for a chemical firm to strengthen its position, go beyond what is expected from stakeholders, and make the supply chain more competitive there are three interconnected solutions to utilize and gain from the sustainability actions: collaboration, system thinking, and transparency. Engaging in sustainability collaboration(s) both horizontally and vertically enables actors to develop unified measurements and a definition of sustainability. The foundation for committing to collaborations and GSCM is involvement from the top management and relationships built on trust, social skills, and common grounds. It allows the supply chain to take a systematic view on sustainability, zooming out from the current individual assessment on firms' sustainability performances, and focus on what is important: the reduction of the supply chain's net climate effect. Since the sustainable products will continue to be more expensive than traditional ones, it is of utmost importance to communicate the reasons for this, but also the benefits, which should be the net climate effect of the entire supply chain. System thinking and collaboration can both be sources of competitive advantage, and will be facilitated by transparent communication, which leads to legitimacy and trust between the actors in the supply chain, and hence, make them more

competitive. As long as the chemical industry moves past the individualistic mindset and agrees upon what sustainability is, the united voice of a collaboration can become a powerful way of communicating and can also put pressure on the surroundings and initiate a snowball effect. All actors are gaining from collaborating and having a systematic view on sustainability, but most importantly the environment is the big winner.

6.1 Theoretical Implications

This case study has been aiming to shed light on a specific social phenomenon, how to communicate sustainability in a competitive way. It is difficult to generalize the results of a case study, but our study still has implications for theoretical contribution. The empirical findings and analysis conclude that sustainability per se is not a competitive advantage since it does not fulfil the VRIN criteria, which goes against established theories. Alternately, this study discovers two other resources that can serve as a competitive advantage in the chemical industry: engaging in collaboration and introducing the concept of system thinking, both with regards to sustainability. For existing theory, this implies that there are new, more tacit resources that must be considered when firms are striving for competitiveness. In our research context, GSCM, legitimacy and relationships are three theoretical subfields, included in the conceptual framework, that have been proven to have a facilitating ability to form collaborations and system thinking.

Regarding in what ways to communicate, the empirical findings and analysis together to some extent confirm existing theories, but also adds to them. It is established in the literature that greenwashing and false claims are very hurtful for firm reputation, and that sincere communication, both internally and externally, are fundamental. It is found in this study as well, but our results also highlight the importance of communicating both what is good, and what is not. By being transparent in the communication, firms can prevent backlashes from customers and the historical public questioning their operations, but also attract new opportunities by a gaining competitiveness.

6.2 Managerial Implications

From the empirical findings and analysis, it is evident that top management must be involved in sustainability work for firms to be able to drive sustainable development. Although there might be sustainability enthusiasts employed in a firm, these will have no power unless management realizes the importance of intra-organizational permeation of the sustainability mindset, giving the employees the power to make a change. For firm survival, it is essential to make this conviction permeate the entire firm and to reach all employees. To enable this, managers must improve their communication skills and inform employees why it is important to work with sustainability and how GSCM actions affect the employees' work. However, sustainability efforts from the top must be sincere, otherwise, employees and other stakeholders will see right through it. It is not worth the risk of being called out for greenwashing in a society that is more woke and aware than ever. Managers who understand the power of communication, dare to be honest, and strive to push the sustainability messages themselves, will make their firms, and in turn, their supply chains, more competitive than those who do not.

6.3 Limitations and Recommendations for Future Research

This study contributes to both theory and practice by developing a deeper understanding of the opportunities that the chemical industry has and will have in the future, in terms of communication and (G)SCM. However, there are some limitations to this study that has been addressed earlier in section *1.4 Explanations and Delimitations*, which also can serve as the basis for possible future research.

The European chemical industry was used as geographical setting for this study, due to the common regulations set by the European Union. Simultaneously, chemicals are not only produced in Europe and Asia, and therefore it would be interesting to see whether the results from studying another region, using a similar method as we did, are consistent. It would also be meaningful to explore what role national governments and supranational organizations, such as the EU, can have to enable system thinking and facilitate supply chain collaborations. A study like this could also be used to explore how and if collaborations could be formed to keep the market shares and stay competitive towards other regions, such as Asia.

Finally, from the empirical findings in this study, it is evident that there is reason for the chemical industry actors to have an open mindset and investigate other industries to get inspired when it comes to communicating and managing sustainable contributions. For example, the typical customer of the chemical industry introduced the system thinking to this study and there is probably much that can be learned from other industries as well. Therefore, we believe that it would be valuable for future researchers to benchmark other industries and examine what the chemical industry can learn, assimilate, and incorporate to its operations.

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Appendix 1

General Interview Guide

Interview with N.N, 2021-0X-0X, time: XX.XX

Conducted by Sofia Emanuelsson and Hanna Idmark via Zoom/Microsoft Teams/Telephone

The purpose of our study is to explore the opportunities and challenges that exist in relation to how companies communicate environmental sustainability in the chemical industry. Therefore, we will interview people with different kinds of experience and perspectives on the subject. If you feel that there is a question that you cannot answer directly, or are outside your area, we are happy to see that you ask a colleague or suggest someone else to answer.

Participation in the survey is voluntary, and as a participant, you have the right to cancel your participation at any time. The interview will advantageously be recorded if there are no objections to it. What is said in the interview will be treated confidentially, and with great care so that specific individuals cannot be identified. The answers to the interview questions will only be used for the purpose of answering the research question in the study. The study will be published on the university's database during the year. There will be an opportunity for the informant to proof-read before publication, to ensure that no ethically sensitive information is included, or that any misinterpretations occur.

Introductory Questions

• How has the sustainability work changed since you started working? Has the importance of sustainability changed? Are there any differences in different countries?

Communication

- What characterizes companies that are good at communicating sustainability?
- As far as we know, a big problem when it comes to sustainability work is the lack of communication within the supply chain and the fact that different actors are defining sustainability in different ways, but also consider sustainability as not equally important. Is this something you have experienced and if yes, what do you think is the reason for this problem?
- What can serve as good sustainability criteria for chemical companies?

- Within B2C, sustainability labels such as FairTrade and the Nordic Swan are common, and if one looks at research conducted, they are also an important part of consumption choices. Do you think that there is a need for sustainability labels in B2B markets to prove how the product can contribute to a more sustainable supply chain?
- Previous research argues that ISO certification and Agenda 2030 are hygiene factors when it comes to sustainability work and something that is taken for granted in a business relationship. What are your thoughts regarding such reasoning?

Supply Chain Management

- Which organizational factors are the most important in an organization to successfully implement a sustainable strategy?
- Are there internal challenges and divergence regarding the importance of sustainability work?
- What are the most important aspects when choosing a chemical actor as a partner?
- Is there any value to gain from cooperating when it comes to sustainability actions? What is the foundation to make such a collaboration work?
- What are the opportunities and challenges when collaborating with other actors?

Competitiveness

- Do you believe that firms can compete with sustainability?
- To reach a more sustainable supply chain and a more responsible society, all actors need to engage in the work. But do you think that some actors carry a bigger responsibility than others?
- We have got the impression that historically there has been a trade-off between a product that has a low price and a product that is sustainable, as it often comes with a price premium. Is this something that still exists?