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Stakeholders and their influence on supply chain sustainability: insights from the life sciences sector

A case study on the role of key stakeholders in achieving sustainable practices for commercial laboratory testing supply chains.

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Abstract

Background: Sustainability is an increasingly important topic within business administration, especially when it comes to supply chains (SCs). As members of the SC, stakeholders have the ability to influence supply chain sustainability (SCS) in various ways, regardless of industry.

Purpose: The purpose of this thesis is to explore the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies.

Method: Our research consists of a qualitative case study. Primary data was collected through six semi-structured interviews within the case company and its SC, and the secondary data was collected from online databases in accordance with their relevance to the primary data and the research purpose. The data analysis process consisted of thematic analysis.

Conclusion: The results show that stakeholders can manifest their influence through various influence mechanisms, 18 in total. Customers are found to influence SCS through mechanisms of relational dependence, communication mechanisms and indirect mechanisms. Suppliers influence SCS through their own internal practices, relational mechanisms and communication mechanisms. Regulatory stakeholders influence through evolving legislation, formal agreements, strictness, certification requirements and audit processes. Top management influence evaluation mechanisms, demand mechanisms and support mechanisms. Employees influence through communication mechanisms and other influence mechanisms, while communities influence through contextual mechanisms and other influence mechanisms. These results may provide a foundation for both the commercial laboratory testing industry and academia to further research influence mechanisms in the future.

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List of abbreviations

EU	European Union
GLP	Good Laboratory Practices
MD	Managing Director
RQ	Research Question
SC	Supply Chain
SCM	Supply Chain Management
SCS	Supply Chain Sustainability
SSCM	Sustainable Supply Chain Management

1. Introduction

This chapter provides essential information to facilitate the reader's understanding of the present thesis. It begins with the Background section that contextualizes the topic being investigated. The chapter continues with the Problem discussion section which identifies research gaps in the literature and the need for further research. Finally, the purpose of the paper is being discussed by introducing the research question and outlining our intended practical and theoretical contributions.

1.1. Background

The increasing complexity and globalization of SCs has brought unprecedented scrutiny to the environmental, social and economic impacts of business operations. This heightened awareness has propelled sustainability to the forefront of strategic decision-making across diverse industries, from manufacturing and retail to service-oriented sectors (Fahimnia & Jabbarzadeh, 2016). This shift is driven by growing concerns over resource depletion, environmental impact and the need to meet the present needs without compromising future generations' ability to meet theirs (World Commission on Environment and Development [WCED], 1987).

Challenges remain, however, such as balancing economic efficiency with sustainability goals and addressing uncertainties associated with recovery processes like remanufacturing and recycling for achieving circular economy (Bressanelli et al., 2019). Furthermore, the interdisciplinary nature of sustainability necessitates collaboration across fields (often referred to as systems thinking), which could include operations management, policy-making and social sciences, to address complex issues like resource exploitation and pollution control (Voulvoulis et al., 2022; Linton et al., 2007). As SCs evolve, sustainability practices not only contribute to environmental preservation but also increase resilience and long-term value creation, underscoring the importance of integrating sustainability into core SC strategies (Sarkis, 2021).

Within this broader context of sustainability, the life sciences sector faces unique circumstances. The need for strict regulatory compliance and quality control and assurance makes this sector more rigid than others, which could hinder the implementation of change

(Research Institutes of Sweden [RISE], n.d.). In addition, the reliance on disposable and/or non-recyclable items can prevent the transition to a circular economy with the purpose of preventing waste. The transition to green chemistry practices is another aspect that requires thorough consideration and research in order to minimize the impact of chemicals the industry relies on (Sheldon, 2016). These industry-specific challenges can intersect with the growing pressures to minimize environmental footprints, ensure ethical sourcing and promote social responsibility.

Given these challenges, stakeholders play an essential role in shaping sustainability outcomes within the life sciences sector. As defined by Freeman (1984), stakeholders are any group or individual who can affect or is affected by the achievement of an organization's objectives. In this context, regulatory bodies can influence sustainability by enforcing compliance measures (Ida et al., 2024), while suppliers impact the availability of sustainable alternatives to disposable materials. Investors and corporate leadership shape long-term strategies that balance sustainability goals with financial viability. Additionally, customers drive demand for greener practices, pushing organizations toward adopting more sustainable sourcing and operational methods (Panda et al., 2020). Employees, as key internal stakeholders, contribute by implementing and innovating sustainable laboratory practices. Given these diverse influences, the transition to sustainable SCs requires active stakeholder engagement.

The life sciences sector consists of two dimensions: the first is the scientific knowledge created to understand the effects of specific therapies on the human body, and the other is focused on the development of curative or preventive therapies to improve people's quality of life (Stremersch & Van Dyck, 2009). Stremersch & Van Dyck (2009) further identify three main components of the life sciences sector, which include the industries of pharmaceuticals, biotechnology and medical devices. Additionally, there is a growing segment focused on producing cosmetics with therapeutic properties (cosmeceuticals) and food products with health benefits (nutraceuticals). Another important segment provides services to support these industries and includes laboratories for analysis and clinical testing, diagnostic services, bioinformatics, bioelectronics labs and contract research organizations. (Pucci et al., 2020-a).

An often overlooked component of the life sciences ecosystem is the commercial laboratory testing industry, which plays a vital role in supporting quality assurance in commercial settings. Commercial laboratory testing SCs, responsible for the flow of reagents, consumables,

equipment and biological samples, are complex networks involving a multitude of stakeholders, each with potentially varying perspectives on sustainability that could provide insightful research opportunities. Stakeholders play a crucial role in ensuring the reliability, accuracy, and regulatory compliance of testing processes, as their decisions influence everything from SC transparency to the adoption of sustainable practices in laboratory operations. Therefore, understanding how these stakeholders interact and influence the sustainability performance of commercial laboratory testing SCs is the central focus of this research. This thesis will explore the diverse stakeholder landscape impacting these SCs, examining the specific mechanisms through which they exert influence and analysing the resulting implications for the environmental, social and economic dimensions of sustainability.

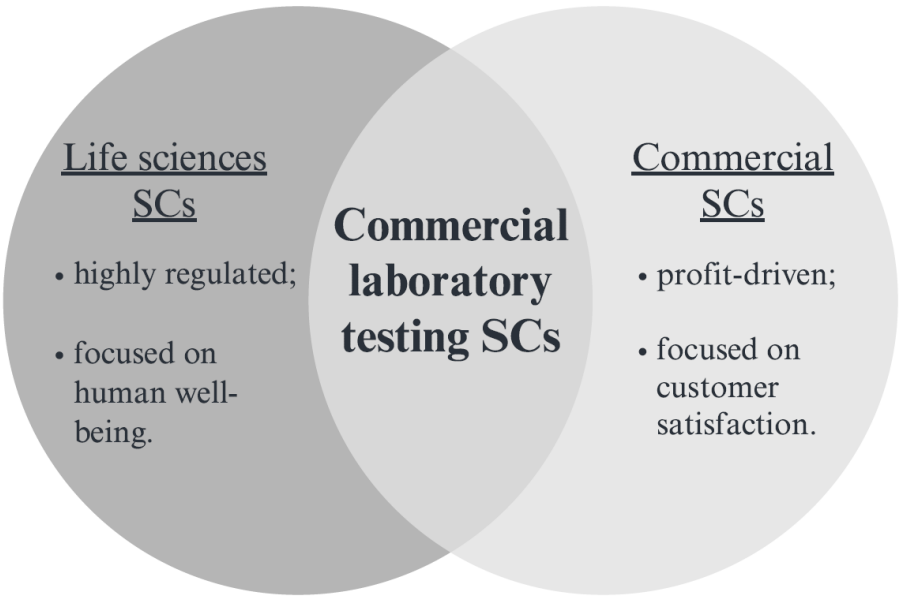
1.2. Problem discussion

Stakeholders and their influence mechanisms have been extensively researched within business, largely gaining prominence as a topic within the past 25 years (Kujala et al., 2022). The emergence of the stakeholder theory in particular has shifted the approach towards stakeholders to a more strategic perspective, acknowledging the significance of stakeholders to company operations (Mahajan et al., 2023). Stakeholders' influence over a company's sustainability has also been recognized (Hörisch et al., 2014), becoming a topic often featured in SCS research. McLoughlin et al.'s (2023) sustainable supply chain management (SSCM) process model mentions the identification, analysis and engagement with stakeholders as a critical process towards SSCM.

Despite the considerable amount of research on stakeholders and their influence mechanisms on sustainability across various industries and domains (Vidal et al., 2023; Soma et al., 2018; Viveros, 2017; Fernandez-Feijoo et al., 2014), such studies remain limited within the life sciences sector. In addition, stakeholder and sustainability research within the life sciences sector predominantly targets healthcare and pharmaceutical SCs (Donkor et al., 2021; Khosravi & Izbirak, 2019; Khan et al., 2018). Despite an extensive review of the literature, we found no studies that specifically address this topic from the perspective of commercial laboratory testing SCs, which we believe may hold unique stakeholder dynamics due to the industry's distinctive nature (see Figure 1). As Khosravi & Izbirak (2019) mentioned, "*the central focus of the healthcare supply chain are the patients*" (p. 2), therefore human welfare is a critical

component of typical life sciences SCs, whose effectiveness can save or threaten human life (Enyinda et al., 2009). While this is also applicable to commercial laboratory testing SCs, their focus also resembles commercial SCs by targeting profitability and customer satisfaction. At the same time, other life sciences characteristics remain in the form of particularities such as regulatory compliance, which could result in unique stakeholder dynamics. As such, we believe that commercial laboratory testing SCs represent an interesting middle ground that can bring insightful research findings.

Figure 1. Our view of commercial laboratory testing SCs.



Source: own figure.

In short, we determined that research on the life sciences sector is narrowly-focused on a few specific industries, and that most research on life sciences addresses scientific aspects rather than topics relating to logistics and supply chain management (SCM). To address this research gap, we have decided to focus on an underexplored aspect of the life sciences sector –that of commercial laboratory testing–, through the perspective of stakeholder influence mechanisms on SCS.

1.3. Purpose

As argued above, we believe commercial laboratory testing to be an underexplored segment of the life sciences sector in SCS and stakeholder literature, despite its unique position at the intersection of traditional life sciences industries and other commercial markets. It is therefore our purpose to explore the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies, based on stakeholder theory and institutional theory as theoretical perspectives. We aim to achieve this through the single case study method, which will allow in-depth exploration of stakeholder dynamics and mechanisms in the context of a single commercial laboratory testing company that is representative to its industry, generating insights that could be applicable to similar contexts.

Accordingly, the research question (RQ) we intend to answer is the following:

How do different stakeholders influence the SCS of commercial laboratory testing companies?

The intended practical contribution of our work is to enhance industry-specific understanding for practitioners. We believe that it is important to gain awareness regarding the various influence mechanisms that occur between stakeholders in a SC, as these can be positive or negative, and significant or insignificant (Kujala et al., 2022). By gaining such insights, practitioners of commercial laboratory testing could therefore gain competitive advantages and value creation through strategic stakeholder management (Harrison et al., 2010).

The intended theoretical contribution of our work is to expand upon already existing literature from an angle that we believe to be understudied. Our intent is to offer new insights regarding stakeholders and their influence mechanisms on SCS under the specific dynamics and circumstances that set commercial laboratory testing SCs apart from other industries.

2. Literature review

This chapter outlines and discusses several relevant concepts from a theoretical perspective, namely: sustainability in SCM, particularities of the life sciences sector, and stakeholders. Lastly, stakeholder theory and institutional theory are introduced, and their roles as theoretical frameworks for our research is explained.

2.1. Approach to literature review

The literature review is structured as follows. Firstly, the concept of sustainability and its role in SCM is introduced, as it is closely related to the research purpose and method. In particular, the dimensions of sustainability help us conceptualize the different priorities and wishes of stakeholders in regards to sustainability. Secondly, some particularities of the life sciences sector are presented to familiarize the reader with the circumstances of the case company. Thirdly, the current literature on stakeholders is presented, as they play a central part to the thesis purpose. Lastly, stakeholder theory and institutional theory are presented, and the role they play as theoretical frameworks for our thesis is explained.

This literature review was conducted using the Web of Science database for academic articles, as recommended by university staff. Some of the selected keywords and boolean operators include: “life sciences” AND “innova*”; “supply chain sustainability”; “environmental sustainability”; “social sustainability”; “stakeholder theory”; “stakeholder theory” AND “competitive advantage”; “stakeholder influence” AND “sustainability”; “institutional theory” AND “stakeholders”; “stakeholder” AND “influence” AND “mechanism”, etc. Some of the most featured journals in this literature review include: the Journal of Business Ethics published by Springer Nature; the International Journal of Production Economics published by Elsevier; the Strategic Management Journal and the Journal of Supply Chain Management published by Wiley-Blackwell; and the Academy of Management Review published by the Academy of Management.

For quality assurance purposes, the ABS Journal Ranking 2024 list was consulted, and we have made every effort to feature articles from renowned publishers such as Elsevier. We minimally

utilized articles from journals with low scores (ranked with 1) or not featured on the list. However, we were compelled to use some of these articles due to occasional research scarcity; in such cases, we chose articles with the highest number of citations according to Web of Science, prioritizing articles labelled as "Highly Cited Papers". Some of the most instrumental resources are featured below (Table 1).

Table 1. Key resources featured in the literature review.

Author (year)	**Type**	**Journal/publisher**	**Description**	**ABS Ranking 2024**
Freeman (1984)	Book	Pitman Publishing	Provides the most widely used stakeholder definition. Introduces the stakeholder theory.	N/A
Carter & Rogers (2008)	Journal article	International Journal of Physical Distribution & Logistics Management	Proposes a SCS framework that involves focusing on the entire SC and its stakeholders rather than on individual firms.	2
Pagell & Wu (2009)	Journal article	The Journal of Supply Chain Management	Details how companies can achieve truly sustainable SCs based on multiple case studies.	4
Belussi et al. (2010)	Journal article	Research Policy	Describes stakeholder interactions between life sciences firms in the context of innovation.	4*
Touboulic & Walker (2015)	Journal article	International Journal of Physical Distribution & Logistics Management	Illustrates the dominance of stakeholder theory and institutional theory in SSCM.	2
Leisen et al. (2019)	Journal article	Journal of Cleaner Production	Describes sustainability challenges in highly regulated sectors.	1
Mahajan et al. (2023)	Journal article	Journal of Business Research	Analyzes literature on stakeholder theory since its inception.	3
Durgan et al. (2023)	Journal article	Immunology & Cell Biology	Details sustainability challenges relating to laboratories and potential mitigation strategies.	N/A

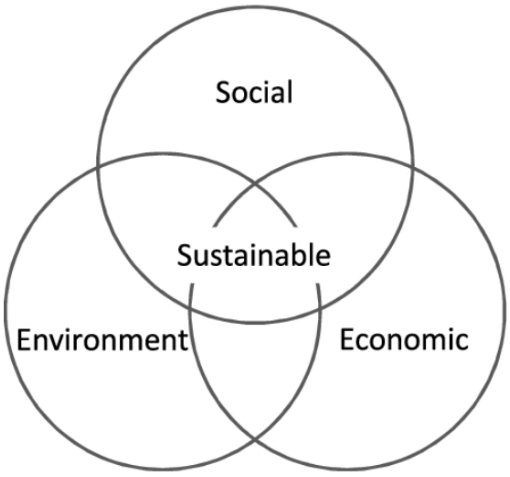
Source: own table.

2.2. Sustainability and its role in SCM

Sustainability has most commonly been referred to in literature as having three dimensions: economic, social and environmental; this theoretical concept is often referred to as a three-pillar paradigm (Purvis et al., 2019) or triple bottom line (Kannan, 2018). All three dimensions should be integrated to achieve true sustainability (Carter & Rogers, 2008)

Economic sustainability encapsulates company growth and resilience through measures such as appropriate pricing, capital regeneration (especially for natural resources) and reduced reliance on non-renewable resources to secure long-term continuity of company operations (Elliott, 2005). Social sustainability often overlaps with corporate social responsibility, referring to social issues such as human rights, quality of life, ethics, working conditions and overall societal well-being (Zorzini et al., 2015). Finally, environmental sustainability refers to the preservation of Earth and its natural resources through measures such as pollution reduction, carbon neutrality and environmental protection, and is especially relevant in logistics and transportation (Lieb & Lieb, 2010).

Figure 2. The three dimensions of sustainability.



Source: Purvis et al. (2019).

Seuring (2013) asserts that social sustainability remains largely underrepresented in sustainability research, often being oversimplified or overlooked. He argues that while environmental sustainability is well-supported by lifecycle assessment studies and economic sustainability is largely driven by cost minimization models, the social dimension lacks robust modeling approaches. His insight emphasizes the need for more extensive research to develop

accurate and effective methods for incorporating social considerations into sustainability frameworks.

Addressing the economic trade-offs of sustainability, Mota et al., (2015) proposed a model that balances environmental, economic, and social sustainability. Their findings suggested that cost reductions and environmental benefits could be simultaneously achieved by optimizing production and transportation strategies. They also demonstrated that moderate compromises in economic performance could lead to enhanced social contributions, implying that government incentives could play a crucial role in achieving an optimal balance between profitability and sustainability.

A foundational framework for SSCM was developed by Carter & Rogers (2008), extending the traditional concept of sustainability beyond individual firms to the entire SC. Their work highlights the need for integrated sustainability practices that balance environmental, social, and economic considerations. Particularly relevant to highly regulated industries, their framework emphasizes how businesses must navigate external dependencies, regulatory requirements and resource constraints when implementing sustainability initiatives.

For effective sustainability integration, Pagell & Wu (2009) consider that a proactive and committed managerial approach is required. This includes redefining SC memberships, ensuring supplier continuity and seeking novel partnerships to increase innovation and create unique value, thereby enhancing overall SC resilience and financial stability. The authors also emphasize that sustainable SCs must also be economically viable, supporting the notion that a triple bottom line approach is inherently tied to financial performance.

The need for broader engagement is also discussed by Koberg & Longoni (2019), who highlight the crucial role of SSCM configurations as enablers, arguing that the structural arrangement of actors within the global SC is a key determinant of sustainability outcomes. Uddin et al. (2023) contributed to this discussion by examining how dynamic organizational capabilities interact with sustainability practices to improve competitiveness. Their study emphasized the importance of technological advancements and managerial competencies in fostering sustainability. By integrating social sustainability initiatives with environmental and economic considerations, organizations can achieve long-term competitive advantages while maintaining their commitment to sustainable business practices.

Zhu & Sarkis (2007) examined the influence of market, regulatory and competitive pressures on environmental sustainability practices. Regulatory pressures were identified as key drivers for the implementation of green purchasing and recovery of surplus and obsolete materials, though they also found negative economic consequences in some cases. In contrast, competitive pressures, such as trade associations and benchmarking activities, were linked to improved economic benefits without adverse environmental effects, suggesting that industry collaboration could be a viable strategy for sustainable economic and environmental improvements.

The role of learning and adaptation in achieving environmental sustainability was further explored by Silvestre (2015). He argued that SCs in emerging economies gradually learn how to integrate environmental considerations through improved collaboration, alignment with partner expectations and the development of technological and business model innovations. Additionally, he highlighted that these SCs face greater barriers to sustainability due to institutional problems such as weak infrastructure, corruption and social instability, conditions that shape their sustainability trajectories and require adaptive, stakeholder-oriented responses. As such, stakeholders shape sustainability by influencing firm adaptation learning processes, and innovation under uncertainty.

2.3. The life sciences sector

Many industries are characterized by specific contexts and sustainability challenges. In the case of the life sciences sector, some of these circumstances are elaborated upon below.

2.3.1. Particularities

Quality standards are a highly important part of the life sciences sector. To ensure the quality and integrity of laboratory work within life sciences, good laboratory practices (GLPs) were established as a set of guiding principles (Brander et al., 2009). In the European Union (EU), Directive 2004/10/EC sets out guidelines to ensure that testing and research activities meet rigorous standards, ensuring that laboratories follow GLPs. Such regulatory standards help ensure that life science research and laboratory testing produce dependable data more effectively (Sheikh-Hosseini et al., 2020; Becker et al., 2009). For instance, the initiatives of Guindo et al. (2012) to promote clinical GLPs in West Africa have proven valuable even in

challenging settings, leading to, among other benefits, improved workflows and cost effectiveness in cold-chain shipping.

The life sciences sector is also highly regulated, with several regulations specifically relevant to commercial laboratory testing. For instance, regulation (EC) No 178/2002 establishes the framework for food safety, laying down general principles and requirements for food law, including product traceability. Regulation (EC) No 1907/2006 addresses the production and use of chemical substances and their potential impact on human health and the environment. Laboratories that handle chemical substances must register substances and comply with safety data sheet requirements. Similarly, Regulation (EC) No 1107/2009 governs the approval of plant protection products, ensuring their safety and effectiveness through extensive testing. Additionally, standards from the International Dairy Federation offer guidelines for laboratory testing within the dairy industry, focusing on product safety and quality assurance.

Innovation is another key characteristic of the life sciences sector, as it drives advancements in biotechnology, drug development and functional food production. As innovation demands both local and global collaboration, the life sciences sector must navigate complex knowledge-sharing networks of stakeholders to accelerate progress and meet evolving market needs. Belussi et al. (2010) found that life sciences innovation is increasingly following an open and systemic approach, crossing organizational boundaries and involving diverse external sources of knowledge. Life science firms are seeking stakeholder knowledge not only from clients and customers but also from semi-public and institutional sources. In particular, information from the public sector plays an important role in life sciences innovation (Sternitzke, 2010). As such, Belussi et al. (2010)'s findings emphasize the effectiveness of stakeholders in innovation within life sciences, where research collaborations complement internal research and development efforts.

2.3.2. Sustainability challenges

Although laboratory testing offers significant contributions to society, it often comes with significant environmental impacts that need to be acknowledged and carefully considered to facilitate the transition to a more sustainable approach.

Laboratories are responsible for a substantial portion of institutional energy use, primarily due to processes such as heating, cooling and ventilation, but also due to the operation of energy-

intensive equipment like fume hoods, fridges and freezers (Winter et al., 2023; Durgan et al., 2023). In addition, laboratory activities produce considerable waste, including millions of tons of single-use plastic and hazardous chemicals, which contribute to global pollution. These issues are further compounded by the extensive water usage in laboratories for processes such as cooling and washing (Freese et al., 2024).

The construction and operation of laboratory buildings also impose significant demands, particularly due to the energy-intensive requirements of supporting heavy equipment and vibration minimization (Durgan et al., 2023). Laboratory buildings require more energy for ventilation and running complex instruments, which add to their carbon footprint. Moreover, the life-cycle impacts of laboratory furniture and materials, such as the embodied carbon in laboratory equipment, packaging and transportation, should also be considered, specifically in relation to inventory and lifecycle assessments (Freese et al., 2024).

Lyons et al. (2024) state that regulatory changes are considered a challenge by life science practitioners. Accordingly, regulatory frameworks in highly regulated industries can play a crucial role in shaping SSCM adoption, similar to the energy sector, where regulations have led to new business models which facilitate sustainability transitions (Leisen et al., 2019). However, a key challenge is ensuring that regulatory support does not create long-term dependencies that block market competition. As seen in energy markets, niche protections, such as those shielding new renewable energy business models, must eventually give way to open competition (Leisen et al., 2019). For the life sciences sector, this could mean designing regulations that support green chemistry initiatives, circular economy models, or ethical sourcing in SCs while ensuring that businesses can sustain these practices without continued regulatory incentives. Policymakers must balance between encouraging innovation and ensuring that sustainability-driven SC transformations remain viable, reducing dependency on regulatory interventions while maintaining compliance with industry standards.

Finally, the complex SC within laboratory testing, involving the procurement of chemicals, equipment and consumables, further contributes to the environmental footprint. Like in any other industry, the sourcing and transportation of inventory (such as raw materials and testing samples) is a significant component of the sustainability of laboratory testing (Abbasi & Nilsson, 2016). The distance these materials travel, along with the logistics behind their shipping, can significantly impact the carbon footprint of the SC. Despite the development of

alternative fuels, logistics operations still rely on fossil fuels and non-renewable resources across a variety of industries, leading to pollution, health and safety risks and environmental degradation (McKinnon, 2024).

2.4. Stakeholders

One of the earliest definitions of stakeholders comes from the Stanford Research Institute in 1963 (Jongloed et al., 2008), which defined stakeholders as "*those groups without whose support the organization would cease to exist*". Today, the most commonly used definition comes from 1984 and defines stakeholders as "*any group or individual who can affect or is affected by the achievement of the organization's objectives*" (Miles, 2012; Freeman, 1984).

Throughout the years, many other authors in stakeholder research have attempted to coin their own definitions. In an attempt to organize and classify the various definitions of stakeholders, Miles (2015) determined no less than 15 classes of stakeholder definitions. Accordingly, Miles (2012) earlier determined the concept of stakeholders to be essentially contested in the literature due to reasons such as its internal complexity and open character. As such, the author argues that stakeholders are a dynamic concept that differs according to societal changes, and its definition is invariably based on contextual factors such as specific needs. Accordingly, Freeman et al. (2010) also acknowledge the existing variations in definition that have formed over the years. In response to this, the authors propose that such variations should not always be seen as a problem to be addressed, but rather as separate definitions that are meant to serve different purposes of their own.

2.4.1. Typologies

Regardless of context and definition, there are some universal stakeholders that are always considered. According to Donaldson & Preston (1995)'s stakeholder model, a firm can have mutually beneficial relationships with the following generalized stakeholders: governments, investors, suppliers, employees, communities, customers, trade associations and political groups. Freeman's (1984) original stakeholder model includes similar actors, however Freeman later actualized his model to only include five broader groups: financiers, customers, suppliers, employees and communities (Fassin, 2009).

Throughout the years, several stakeholder taxonomies have emerged in the literature to help companies map and understand their stakeholders. One of the earliest and most influential contributions is Mitchell et al.'s (1997) stakeholder typology, which classifies stakeholders based on the level of power, urgency and legitimacy that they hold over the focal company. Based on which of those three attributes they hold, stakeholders can either be dormant, dominant, dangerous, definitive, discretionary, dependent or demanding. The more attributes it holds, the more critical a stakeholder becomes, requiring a larger degree of priority.

Buysse & Verbeke (2003) identify stakeholders as: regulatory (such as governments), primary stakeholders (internal, such as employees and shareholders; and external, such as customers and suppliers) and secondary stakeholders (such as competitors and non-governmental organizations). Delmas & Toffel (2008) split stakeholders into two groups: market stakeholders, which are encountered in the market environment (such as customers and suppliers) and non-market stakeholders, which are mainly interested in non-economic issues (such as governments and regulators). Later, Fassin (2009) proposed a refined stakeholder model which includes classic stakeholders, stakewatchers and stakekeepers. In this model, classic stakeholders are identified as those SC actors with a stake and interest in the focal firm, such as employees, which is similar to Harrison et al.'s (2010) primary stakeholders. The stakewatchers are those who do not have a stake but have an interest in the focal firm, such as work unions and consumer associations. Finally, the stakekeepers are those who do not have a stake but have control over the focal firm, such as governments and regulatory bodies.

2.4.2. Stakeholder influence mechanisms in SCS

Considering that the importance of stakeholders has been well-established in literature, researchers have attempted to study the ways in which stakeholders influence companies and operations. There is no universally agreed upon set of stakeholder influence mechanisms, however several have been identified in a variety of contexts and industries (see Table 2). To date, we have not been able to find research on stakeholder influence mechanisms in the life sciences context, which further reinforces our identified research gap (see Problem discussion section).

Table 2. Stakeholder influence mechanisms as identified in past research.

Author (year)	**Research focus**	**Industry**	**Identified mechanisms**
Frooman (1999)	Stakeholder influence strategies.	No specific industry	Direct withholding, direct usage, indirect withholding, indirect usage.
O'Connell et al. (2005)	An organizational field approach to corporate rationality: the role of stakeholder activism.	No specific industry	Normative pressure via internal subunits; legislated stakeholder participation; legislated access to information; direct stakeholder activism.
Viveros (2017)	Unpacking stakeholder mechanisms to influence corporate social responsibility in the mining sector.	Mining	Demands, communication, counselling, control and engagement.
Barnett et al. (2020)	The rise and stall of stakeholder influence: how the digital age limits social control.	No specific industry	Filtering, framing, sensemaking, sensegiving, slacktivism, synchronicity.
Pucci et al. (2020-b)	The virtuous cycle of stakeholder engagement in developing a sustainability culture: Salcheto winery.	Winery	Adoption and development; co-creation and diffusion; exploitation and contamination.
Nguyen et al. (2020)	Stakeholder influence strategies in construction projects.	Construction	Inputs withholding, inputs compromising, communication, direct action, coalition building, conflict escalation, credibility building.

Source: own table.

Although past research has mostly identified general stakeholder influence mechanisms, we aim to go one step further by identifying the specific ways in which different stakeholder groups affect SCS. Given the different nature of stakeholders and their typologies (as identified in section 2.4.1.), each stakeholder group is characterized by unique circumstances that could determine their influence mechanisms.

Customers are carefully considered in SSCM decisions. As Leonidou et al. (2013) argued, companies which use sustainability in marketing can benefit from improved financial performance due to customer expectation appeasement, as customers are increasingly interested in sustainability in their buying decisions (Panda et al., 2020; Kotler, 2011). Considering that one of the most important goals a company has is to ensure profitability, the importance of acting in accordance with customer expectations is justified. As customers can

choose whether to buy the company's products or those of a competitor, this kind of influence could fall under O'Connell et al.'s (2005) direct stakeholder activism mechanism or Frooman's (1999) direct usage mechanism. This behaviour is similar to potential employees: research has found that job-seekers are considering the corporate social performance of a company when determining its attractiveness as an employer, due to reasons such as positive association (Jones et al., 2013). A survey conducted by the IBM Institute for Business Value corroborates this point, showing that nearly half of the respondents would prefer working for a sustainable employer despite a lower salary, therefore influencing workforce availability.

Investors and potential investors can also pressure companies to become more sustainable through their investment decisions. Harzmark & Sussman (2019) have studied investors in the United States mutual fund market and determined that investors value sustainability, which is seen as a positive characteristic that indicates better overall financial performance in a company. van Duuren et al. (2016) and Amel-Zadeh & Serafeim (2018) also found out that investors are increasingly using Environmental, Social and Governance information for risk management in their investment decisions. Therefore, the decision-making process of investors is more likely to be predisposed towards companies that are sustainable, which can determine companies willing to attract investors to adopt more SSCM practices. As these stakeholders possess resources that the focal firm may be dependent upon, this kind of influence could fall under Frooman's (1999) direct withholding mechanism.

Regulatory stakeholders such as governments and regulatory bodies can significantly influence companies in a variety of ways, as shown in Tanzania (Nilsson, 2022), India (Panwar et al., 2022), China (Zeng et al., 2023), Japan (Ida et al., 2024; Arimura et al., 2019) and many other national contexts. The aforementioned studies show that this influence is mainly due to mandatory regulations that can restrict, inhibit or promote certain behaviours to protect the environment and the surrounding communities. In doing so, companies under the jurisdiction of these organizations are forced to adapt their operations in order to ensure legal compliance and avoid penalties. Because regulatory stakeholders hold authority over companies' practices, this kind of influence could fall under Viveros' (2017) control mechanism. Another way in which regulatory stakeholders can influence companies is through what Panwar et al. (2022) call "soft regulations", which have a voluntary character and do not punish non-compliance. As such, this type of stakeholder influence could fall under Viveros' (2017) counselling mechanism due to its advisory nature.

Suppliers also hold considerable influence on a company's SSCM. For instance, socially unsustainable suppliers can increase risks in the focal company's SC (Klassen & Vereecke, 2012). Hartmann & Moeller (2014) have shown that unsustainable supplier behaviour can lead to the chain liability effect, in which other members of the SC, especially the focal firm, are also considered unsustainable by association. Therefore, the focal company may lose business opportunities and profitability if they are known to use unsustainable suppliers, making suppliers highly influential as a result. On the other hand, Paulraj (2011) proves that sourcing from sustainable suppliers can significantly elevate a company's SCS. This is similar to Mani et al.'s (2018) findings, who claim that aiding sustainable supplier development can increase the focal firm's SC performance. Therefore, this kind of influence could fall under Pucci et al.'s (2020-b) co-creation and diffusion mechanism.

In conclusion, stakeholder influence mechanisms can take many forms, which we aim to explore from the perspective of the SCS of commercial laboratory testing companies.

2.5. Theoretical frameworks

Within the field of SSCM, stakeholder theory and institutional theory remain some of the most dominant theoretical concepts (Touboulic & Walker, 2015) which highlight "*the emergence of SSCM as a result of the influence of parties impacted by business activities*" (p. 33). This stakeholder influence often acts as a driver or enabler of SCS, through specific influence mechanisms based on pressure, requirements, engagement, perceptions or expectations (as explored in section 2.4.2.).

We therefore believe stakeholder theory and institutional theory to be highly relevant to our SSCM research, and have subsequently incorporated them as a theoretical perspective within our methodology. In particular, we believe that stakeholder theory is valuable to our stakeholder identification process, determining key actors that may hold influence over the case company's SC, and therefore the respondents to our interviews. Institutional theory complements this by explaining the very existence of stakeholder influence mechanisms, which is a critical point for our research.

2.5.1. Stakeholder theory

Robert Edward Freeman is credited for the creation of stakeholder theory in 1984, in his highly influential book entitled "*Strategic management: A stakeholder approach*" (Mahajan et al., 2023). In it, Freeman describes the growing complexity of the business environment and emphasizes the need for companies to focus more on value creation for stakeholders, and to consider their demands and needs. This is due to stakeholders' growing influence on the focal company's financial performance and therefore its very survival on the market. Stakeholder theory encourages organizations to be more conscious of their stakeholders and to understand their needs and demands, empowering them to improve their value creation, to take more strategic action and to ensure their success and survival in the increasingly competitive market environment (Mahajan et al., 2023).

This perspective, however, has been criticized as being self-serving in nature (Walsh, 2005) due to its focus on stakeholders deemed "useful" or "impactful". Similarly, Stieb (2008) calls Freeman's contribution "*business as usual, not a revolutionarily new stakeholder theory*" (p. 405), hinting at the theory's basis in traditional business practices, rather than revolutionary concepts. Regardless of its critiques, stakeholder theory has been thoroughly debated, expanded upon and critiqued in the literature (Kujala et al., 2022). This theory has been so prevalent in literature, that its very nature as a theory has been put into question. Parmar et al. (2010) rather identify stakeholder theory as a framework from which other theories can be developed, "*a genre of management theory*" (p. 406) which encapsulates the resulting rich body of research around this subject.

Donaldson & Preston (1995) further developed stakeholder theory by formulating three important dimensions: its descriptive character, which describes the corporation and its particularities in the context of stakeholder relations; its instrumental character, which highlights the theory's managerial usefulness for stakeholder management; and its normative character, which acts as a guideline for companies. In this thesis, the focus is on the descriptive aspect of stakeholder theory, as it provides insight into the current state of stakeholder relations within the case study.

The practical application of stakeholder theory in business settings could lead to several competitive advantages. For instance, Jones et al. (2018) claim that the application of instrumental stakeholder theory can facilitate the achievement of close relationship capabilities

with strategic stakeholders, which they argue to be rare and difficult to achieve. This resulting capability can subsequently generate a series of mutual benefits such as improved coordination, cooperation and knowledge sharing. Harrison et al. (2010) also argue that consistent positive treatment of stakeholders not only leads to value creation, but also to a positive reputation as a competitive advantage for the focal firm. This increased reputation among stakeholders can result in more business transactions, which could translate to profit maximization.

2.5.2. Institutional theory

Another theory that addresses stakeholder influence is institutional theory, which studies how social and cultural aspects such as expectations, norms and beliefs shape the behaviour of individuals and organizations (Ashworth et al., 2009); in other words, how one conforms to the environment and society they are a part of. Glynn & D'Aunno (2023) trace the origins of institutional theory back to the early 1900s, with its roots within the field of sociology. However, since its inception, institutional theory has undergone a profound evolution, expanding into various fields. As such, unlike stakeholder theory, institutional theory is not explicitly business-oriented; it is used to study social conformity in a wide variety of contexts, such as healthcare (Mekonnen & Sahay, 2008), public sectors (Berman et al., 2024; Fuenfschilling & Truffer, 2014) and manufacturing (Dubey et al., 2019).

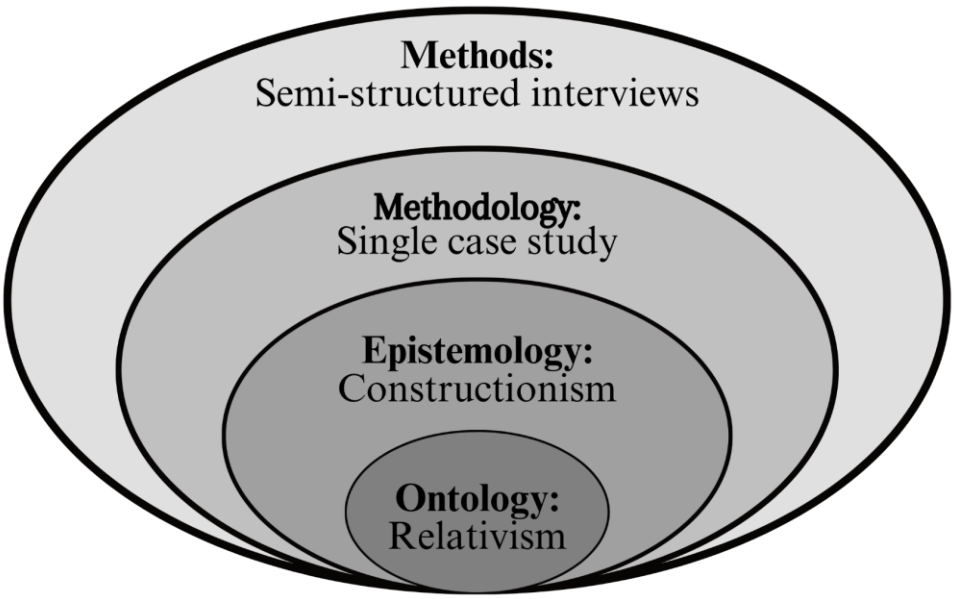
The concept of legitimacy is used in institutional theory to explain why organizations choose to conform to their institutional environment. Suchman (1995) provides one of the most widely used definitions of legitimacy, defining it as "*a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions*" (p. 574). In business, companies seek legitimacy from stakeholders, especially when it comes to sustainability, as it could be crucial for survival. As such, institutional theory is widely used in literature regarding corporate social responsibility (Frynas & Yamahaki, 2016) and SSCM (Touboulic & Walker, 2015). For example, Campbell (2007) argues that companies are more likely to be socially responsible if they belong to an environment with solid and well-enforced state regulations, and if there exist organizations such as the press which monitor their behaviour.

3. Methodology

This chapter describes the methodology behind the thesis. It details our approach and showcases the justifications behind our research philosophy, the adopted method, the data-gathering process, the data analysis method and other relevant methodological aspects. The aim of this chapter is to ensure transparency and a clear understanding of the process that led to the subsequent results.

Our research approach is fundamentally shaped by our research philosophy, which is characterized by ontological relativism and epistemological constructionism. Accordingly, we have chosen to conduct qualitative research under the form of a single case study, for which semi-structured interviewing was chosen as a qualitative data gathering method. This approach is pictured in Figure 3. Further on, thematic analysis is used to interpret the collected data.

Figure 3. Our research approach according to Easterby-Smith et al.'s (2021) tree trunk metaphor.



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3.1. Research philosophy

Our research philosophy is built upon the careful consideration of ontology and epistemology, which directly shape our study's design, including data collection, analysis, methodology and techniques.

3.1.1. Ontology

Ontology, the study of the nature of reality, guides our approach to inquiry. One key ontological perspective is relativism, which challenges the notion of a single, objective reality and instead emphasizes the role of interpretation and context (Easterby-Smith et al., 2021). Unlike realism, which assumes a single discoverable truth, relativism allows us to explore how different individuals and groups construct and negotiate meaning. As such, the relativist view acknowledges that reality is not singular and objective, but rather a product of circumstantial interactions, beliefs and experiences.

Our research leans towards relativism because it focuses on phenomena that are shaped by individual and collective perceptions. Our research purpose therefore aligns with relativism, as we aim to explore the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies. We recognize that different stakeholders such as suppliers, employees, customers or regulators may construct and negotiate the meaning of sustainability in diverse ways, depending on their priorities and viewpoints. In a similar manner, the case company may perceive the influence from its stakeholders in different ways. This approach therefore enables us to highlight the diversity of experiences and perspectives, with respect to the multiplicity of viewpoints.

3.1.2. Epistemology

Epistemologically speaking, our research philosophy is aligned with constructionism. Our constructionist stance coincides with the aforementioned relativist ontological position, acknowledging that multiple realities exist, each shaped by historical, cultural and linguistic contexts (Denzin & Lincoln, 2017). Rather than seeking universal laws or objective truths, we intend to uncover the different ways in which actors make sense of their social worlds (Silverman, 2024) and enact their influence within the corporate context. By acknowledging the reflexivity of the research process, we also recognize that our own understanding is part of the knowledge construction process, reinforcing the importance of critically examining the

power dynamics and contextual influences that shape stakeholder engagement in sustainability efforts.

In our study, we aimed to develop a framework that seeks to explore the ways in which stakeholders construct their influence on SCS from the perspective of the case company. Guided by a constructionist approach, our research emphasizes the interpretive nature of knowledge, recognizing that reality is not an external, objective entity but rather a product of shared understanding and discursive practices. This perspective has shaped our methodological choices, leading us to prioritize qualitative research methods that allow for an in-depth exploration of subjective experiences and meanings.

3.2. Research approach

In general, research can be either quantitative, qualitative or mixed. While the ultimate goal of all three research methods is the same, namely to enhance our understanding of the world through knowledge creation, their methodologies differ (Aspers & Corte, 2019). The approach of quantitative research is numerical in nature, reaching its findings by gathering and analyzing measurable data. In contrast, qualitative research gathers data that is difficult or impossible to quantify and measure. Finally, mixed research combines both quantitative and qualitative research for thoroughness purposes.

Based on our relativist and constructionist research philosophy, our study is best suited for qualitative research. As Easterby-Smith et al. (2021) note, relativism emphasizes that knowledge is constructed through interactions and interpretations rather than being an external reality to be easily measurable and quantifiable. This leads us to prioritize qualitative research and its respective interviewing data collection methods, as they allow us to capture the complexity of perspectives on sustainability and the subjective meanings people attach to their actions and experiences (Myers, 1997), in accordance with our research philosophy. Accordingly, Reinecke et al. (2016) encourage the use of qualitative research methods in corporate responsibility and sustainability research due to their ability to "*understand and explain complex and messy [...] phenomena*" (p. xiii) that would otherwise be difficult to research numerically.

Researchers can employ deductive or inductive reasoning depending on the usage of theory in relation to their research (Saunders et al., 2019). Deduction is a form of reasoning that involves hypotheses created from existing theory, which are then proven or disproven against the collected data. In contrast, induction is a form of reasoning that involves the development of general theories and ideas from the collected data. Our research approach aligns with the latter, as we are using inductive reasoning to find out how different stakeholders influence the SCS of commercial laboratory testing companies based on the data we have gathered. In doing so, we are aiming to address the identified research gap by providing new general insights and ideas.

3.3. Research design

3.3.1. Single case study

The case study is a research design employed in the investigation of an organization or individual (single case study), or a small number of organizations or individuals (multiple case study) (Eisenhardt, 1989). Generally speaking, multiple case studies are considered to hold higher academic value than single case studies, especially if the number of case studies featured is higher (Gibbert et al., 2008; Siggelkow, 2007; Dyer & Wilkins, 1991). Proponents of this belief argue that multiple case studies offer the ability to compare insights across case studies and therefore improve the external validity (or generalizability) of the findings.

Advocates of single case studies, however, argue that multiple case studies often lack the depth of single case studies, as Dyer & Wilkins (1991) put it: "*the most critical trade-off [...] is between the deep understanding of a particular social setting and the benefits of comparative insights*" (p. 614). As such, the authors argue that the theory resulting from single case study research is more likely to be accurate due to the focus that is placed on the particularities of a specific context, which would otherwise be missed in a multiple case study. Addressing concerns regarding generalization, Thomas & Myers (2015) state that "*generalization is not always needed from inquiry*" (p. 15), emphasizing that painting a rich picture is more important for case studies. In addition, perhaps more relevant to this thesis, multiple case studies are considered to be more resource intensive than single case studies due to the need to involve

multiple organizations and/or individuals, the increased complexity that comes with multiple cases and contexts, and the longer time frame needed to collect and analyze the resulting data.

We have chosen a single case study as our research design because it allows for an in-depth exploration of stakeholder influence mechanisms within a specific SC. We justify this choice by reaffirming the complexity of sustainability challenges that companies face (Reinecke et al., 2016) -spanning social, environmental and economic dimensions-, as well as the variety of expectations, relationships and typologies of stakeholders that are involved (see section 2.4.). In respect to this contextual complexity, we believe that a single case study would enable the examination of these factors in a more focused manner, uncovering mechanisms and aspects that might otherwise be overlooked in broader, multi-case studies. As such, a single case study would allow us to gather rich and comprehensive data in spite of our present resource limitations.

3.3.2. Case description

The subject of our case study is the Swedish subsidiary of a multinational company operating within the life sciences sector (referred to as the case company). The case company is offering laboratory testing and analysis services to its customers, serving both corporate and governmental organizations. However, the focus of our thesis is on the case company's operations in relation to their corporate customers, namely their commercial laboratory testing SC.

The case company offers its services in a wide variety of industries, including the pharmaceutical, food, agricultural, environmental and consumer products industries. It operates six facilities across Sweden, each focusing on one or more types of laboratory testing and analysis. The case company's SC and logistics operations involve the domestic movement of laboratory samples from the customers to its laboratories across Sweden, and the international movement of samples between the case company and other European subsidiaries. In the case of international laboratory transportation, this process is outsourced to large logistics providers. In the case of domestic laboratory sample transportation, the process is outsourced to a Swedish third-party logistics provider which handles the transportation process all across Sweden. Although most of the laboratory sample movement is carried out by road transportation, some of it is transported via air transportation as well, with thousands of shipments being sent on domestic and international flights every single year.

Due to the time sensitivity of certain laboratory samples, a significant part of the company's logistics involves same-day delivery (under 12 hours) through the use of 50 pick-up and drop-off points placed strategically across Sweden, placed in close proximity to the case company's customers. These strategic points are connected by pre-planned routes and pick-up times, and adjusted regularly depending on company needs. Other laboratory samples, such as milk samples, are temperature sensitive and require cold-chain transportation. For milk and veterinary laboratory samples specifically, transportation is handled across six strategic line hauls connecting Sweden from north to south, carrying millions of such laboratory samples each year.

As such, the case company's SC relies on a complex web of domestic and international logistics processes, made up of various typologies of stakeholders, each capable of holding a certain degree and type of influence. The case company is currently attempting to enhance its SCS, specifically in regards to working environments and its climate footprint, in line with regulatory requirements and customer expectations. It is in this context that we wish to explore the stakeholder influence mechanisms on the SCS of the case company.

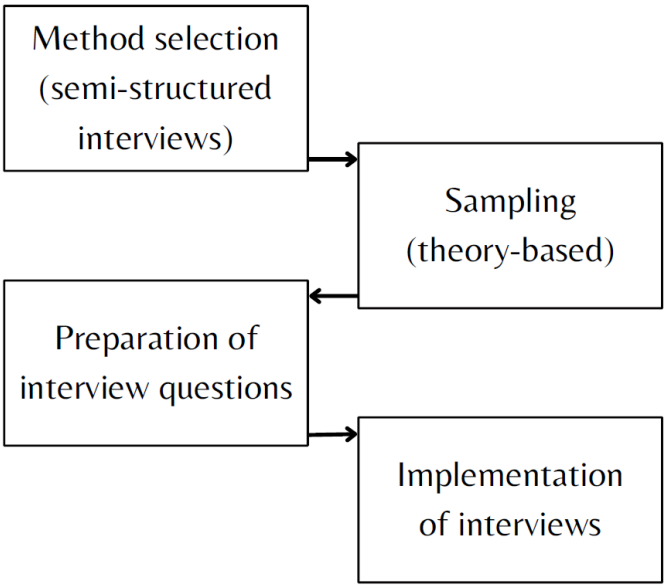
Access to the case company was facilitated through one of the authors' network connections with the Logistics Manager of the case company, which acted as the main contact with the case company and played a key role in the development of our thesis, particularly in the data collection process.

3.4. Data collection

To conduct a more comprehensive analysis of the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies, primary data as well as secondary data was collected. The primary data was collected through semi-structured interviews (as visualized in Figure 3) with respondents representing relevant stakeholders to the case company. The secondary data was collected in the form of industry reports, customer reports and regulatory documents (see Figure 5), which provided additional valuable insights to complement the primary data we collected.

3.4.1. Primary data collection

Figure 4. The primary data collection process.



Source: own figure.

As pictured above, the first step in our primary data collection process was to choose the data collection method. We have chosen interviewing, a widely used method of gathering qualitative data (Jamshed, 2014) that aims to uncover people's lived experiences and their own meanings (Seidman, 2013). McGrath et al. (2019) state that qualitative interviews are most suitable in situations in which the researcher seeks to understand the subjective perspective of the interviewee. As such, we believe interviews to be suitable for our relativist research philosophy and for our research purpose, as we aim to understand the subjective meaning of sustainability to different stakeholders and their resulting influence mechanisms, as well as the case company's perceived influence mechanisms from its stakeholders.

We opted to conduct semi-structured interviews as they represent a middle ground between structured and unstructured interviews, offsetting their individual weaknesses by involving the use of a predefined structure while allowing for flexibility (DiCicco-Bloom & Crabtree, 2006). Semi-structured interviews also allow for versatility, as the interviewer(s) can adjust the level of structure for the interview depending on the study purpose and the RQ (Kallio et al., 2016). For these reasons, we have determined semi-structured interviews to be overall the most advantageous interviewing method, and have subsequently decided to adopt it for our research.

Once a decision was made regarding the data collection method, the selection of data sources became a priority. Because our chosen method involves conducting interviews, the suitable data sources for our research comprise individuals related to the case company that hold relevant insights to help us answer our RQ: *How do different stakeholders influence the SCS of commercial laboratory testing companies?*.

As discussed in section 2.5, stakeholder theory plays a valuable role in identifying suitable respondents for our research. Given that our research aims to explore the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies, stakeholder theory guided the identification of individuals and groups who are likely to exert influence over the case company's SC. This was done through the use of theoretical aspects such as the definition and the typologies of stakeholders as identified in the literature review, which were compared against the case company's SC. As such, we employed the use of theory-based sampling, which involves the selection of respondents in accordance to their relevance to a specific theoretical construct, in this case stakeholder theory (Silverman, 2024). This, combined with practical considerations such as the participants' degree of availability and accessibility, enabled us to strategically determine the right people to approach, inquiring about the possibility of an interview.

Before contacting the respondents, semi-structured interview questions were formulated in accordance with our research purpose and RQ (see Appendix 1). Two sets of interview questions were developed to ensure contextual accuracy for the respondents; one set was aimed at respondents representing external stakeholders and another set was aimed at respondents representing the case company. The interview questions for external stakeholders were discussed with the case company's logistics manager to ensure their relevance and alignment with the case company's actual SC practices. As such, these questions addressed topics such as overall sustainability expectations and involvement in the case company's SC. The interview questions were adapted before each interview to ensure relevance to the respondent's positioning towards the case company and their knowledge.

Contact was established with the potential respondents through the help of the case company's logistics manager, who initially informed the potential respondents of our undergoing case study and their intent to conduct interviews on internal and external stakeholders. This was done to establish a certain level of trust and legitimacy towards the authors before direct contact

was initiated. The respondents were then directly contacted via email, in which the authors were introduced and the purpose of the research was explicitly stated. Interviews were then scheduled based on mutual availability.

The interviews were conducted online, in English, through Microsoft Teams for convenience purposes. Once consent was obtained from the respondents, the interviews were recorded and transcribed through Microsoft Teams to preserve the original data in the participants' own words (Seidman, 2013). The interviewing process consisted of the authors taking two roles: one role involving active listening and the formulation of pertinent follow-up questions, and the other role involving asking questions according to the predefined structure of the interview. This decision was taken for the purpose of dividing responsibilities in an effective manner, allowing one author to focus on guiding the conversation, while the other author ensured key emerging questions were covered.

In total, six interviews were conducted, out of which five interviews were conducted with internal stakeholders, and one interview was conducted with a representative of external stakeholders, namely the domestic logistics provider (see Table 3). The total duration of the interviews amounted to 4 hours and 9 minutes of primary data.

Table 3. Interviews conducted for primary data collection purposes.

No.	**Date**	**Respondent position**	**Company**	**Duration**
1	April 3, 2025	Logistics Manager	Case company	18 minutes
2	April 9, 2025	Logistics Manager	Case company	60 minutes
3	April 11, 2025	Environment & Chemicals Manager	Case company	72 minutes
4	April 22, 2025	Environment & Chemicals Manager	Case company	22 minutes
5	April 25, 2025	Chief Executive Officer	Logistics provider	45 minutes
6	May 8, 2025	Sales & Marketing Director	Case company	32 minutes

Source: own table.

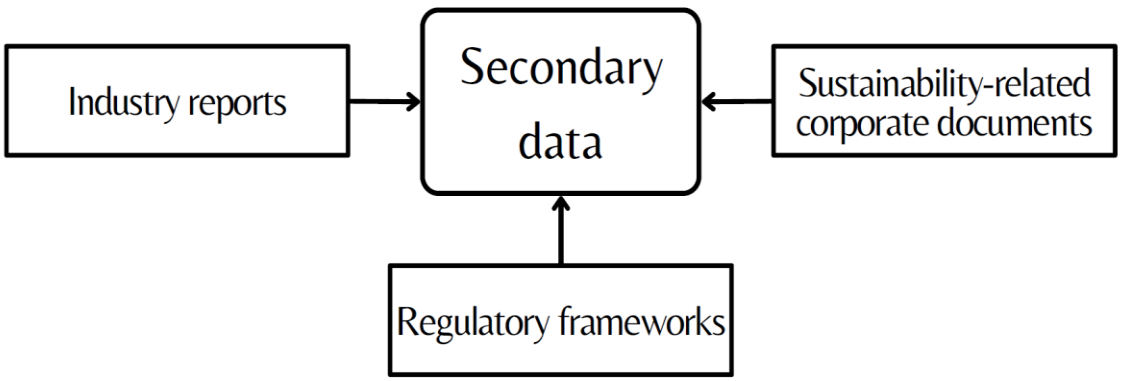
3.4.2. Secondary data collection

In addition to primary data collected through interviews, secondary data was gathered to complement and enrich the findings of this study. As such, the intended purpose is to provide additional perspectives on stakeholder influence mechanisms on the SCS of commercial laboratory testing companies, as well as to help validate the insights gained through the interviews.

The collection of secondary data was considered essential for our research due to several reasons. First, it enabled us to capture a broader and more comprehensive picture of the stakeholder landscape influencing the case company's SCS. Second, it provided access to formal documents that outline sustainability expectations, standards and regulatory requirements which might not have emerged fully from interviews alone. Third, it helped overcome limitations in stakeholder availability and accessibility, particularly with regard to regulatory stakeholders. Lastly, combining primary and secondary data could strengthen the validity and depth of our analysis (Ghauri & Grønhaug, 2020).

The selection of secondary data was guided by its relevance to the primary data, the research purpose and the RQ, specifically focusing on how different stakeholders influence the SCS of commercial laboratory testing companies whenever data scarcity allows. The secondary data was collected from three main categories of sources: sustainability-related corporate documents, regulatory frameworks and industry reports (see Figure 5), which will be elaborated upon below.

Figure 5. Secondary data sources collected.



Source: own figure.

To better understand the expectations and influence mechanisms of key external stakeholders such as customers, we chose to collect publicly available sustainability-related corporate documents from relevant companies that are part of the case company's SC network. As such, the case company provided us with information about their most relevant and representative customers for the purpose of our study, which we used to identify and retrieve relevant documents directly from these customers' official websites. The retrieved documents included sustainability reports, supplier codes of conduct and other relevant sustainability-related policies or guidelines. These documents provided valuable insights into how stakeholders such as customers communicate their sustainability expectations towards suppliers like the case company.

Given the important role of regulatory stakeholders in shaping sustainability practices within the commercial laboratory testing industry, regulatory frameworks were another essential source of secondary data. However, due to resource limitations — including limited access to regulatory stakeholders and constraints in terms of time and available contacts — it was not feasible to conduct interviews with representatives of regulatory bodies. As an alternative, we collected pre-existing regulatory documents available online, including regulations and industry-specific guidelines that are applicable to the commercial laboratory testing and SCS. These documents allowed us to capture the formal sustainability requirements imposed by regulatory stakeholders and understand how compliance with these requirements influences SC practices.

Finally, we collected industry reports and publications that provided additional insights into sustainability trends, challenges and stakeholder expectations within commercial laboratory testing, and the life sciences sector overall. These reports were accessed through online databases and publicly available resources, and selected based on their relevance to our research topic and their potential to complement the primary data collected through interviews. They allowed us to place the case company's sustainability practices within a broader industry context and to identify common stakeholder influence mechanisms that may apply across the sector.

The secondary data we used to validate and complement the findings of the primary data is summarized in Table 4 below. For confidentiality reasons, the sustainability-related corporate documents related to the case company's customers are anonymized.

Table 4. Secondary data utilized.

Year	Author	Title	Description	Type
2024	KPMG	Unravelling Sustainable Business Transformation in Life Sciences	Outlines sustainable action plans for the development of life sciences companies.	Industry report
2024	Scilife	A Long-term View of Sustainability in the Life Sciences	Showcases the path forward for life sciences companies in regards to sustainability.	Industry report
2024	Food industry customer	Sustainability report	Describes customer expectations and requirements for SCS.	Sustainability-related corporate document
2024	Food industry customer	Supplier code of conduct	Describes the customer's expectations and requirements for suppliers.	Sustainability-related corporate document
2024	Agriculture industry customer	Sustainability report	Describes customer expectations and requirements for SCS.	Sustainability-related corporate document
2009	EU	Regulation (EC) No 1107/2009	Describes regulatory requirements in the use of chemicals.	Regulatory framework
2004	EU	Directive 2004/10/EC	Describes several principles of GLP to be applied in laboratory settings.	Regulatory framework
2002	EU	Regulation (EC) No 178/2002	Describes regulatory requirements for the food industry, such as food safety testing.	Regulatory framework

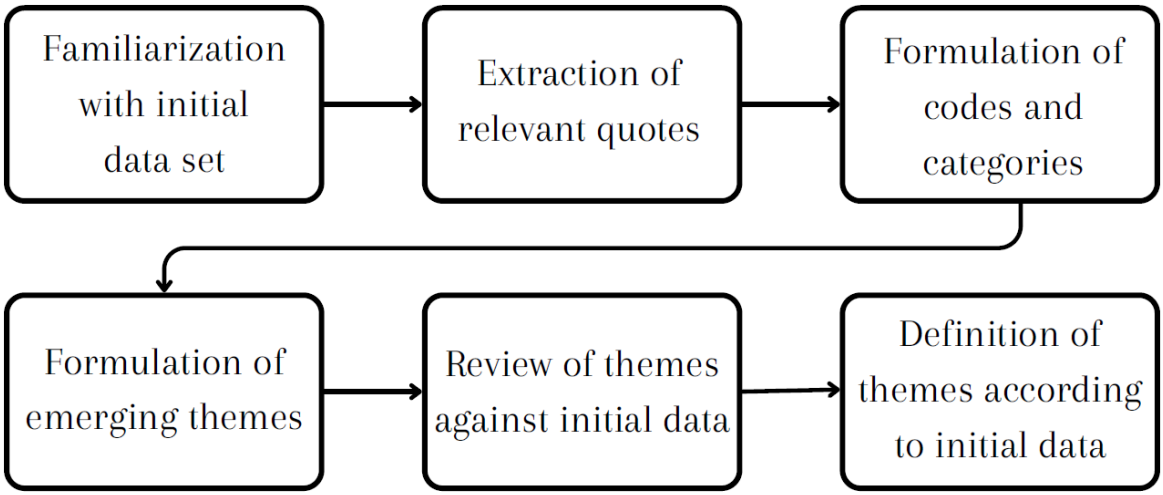
Source: own table.

3.5. Data analysis

The analysis of the primary data was conducted through thematic analysis. Thematic analysis is a method for analyzing qualitative data based on the construction of themes that represent meaning-based patterns, which are later used to report the researcher's interpretation of the data (Terry & Hayfield, 2021). Clarke & Braun (2017) identify thematic analysis as a flexible data analysis method that can be used regardless of the research philosophy, outside of any theoretical constructs, with any type of reasoning, on any type of qualitative data. Therefore, we can be sure that thematic analysis is suitable for our relativist, constructionist, inductive research.

Our approach to thematic data analysis is inspired by the model of Braun & Clarke (2006), which consists of a six-phase process that involves: familiarization with data, generating initial codes and categories, searching, reviewing and defining themes, and producing the report. While our data analysis process is predominantly similar, we decided to slightly adapt it to our specific circumstances by extracting quotes (step two in Figure 6). This approach facilitated our analysis process, allowing us to create a cleaner and more manageable filtered data set, while basing our analysis on the participants' own words to ensure the authenticity of the identified themes in the case of primary data.

Figure 6. The data analysis process step by step.



Source: own figure.

The data analysis process for the interviews was preceded by a review of the resulting video recordings and transcripts. As mentioned in the previous section, the interviews were recorded and transcribed through Microsoft Teams due to our familiarity with the software and its convenience, but also due to the time-consuming nature of manually transcribing interviews (Seidman, 2013). However, the software is not infallible and we considered verification of the written data to be required. As such, the recordings and the transcriptions were compared side-by-side, and any mistakes or discrepancies made by the software were subsequently corrected verbatim based on the recordings, to ensure data accuracy for the following data analysis.

Once the quality of the transcripts has been confirmed, the primary data analysis process could commence in accordance with the steps in Figure 6. This process was done predominantly manually in order to avoid the many possible shortcomings of autocoding by software, such as

the lack of reflection on the text's overall meaning (Richards, 2005), and also due to the relatively manageable amount of collected data. We did however perform a trial run in the software Atlas.ti (version 25) by running the data through the "Intentional AI Coding" and "AI coding" autocoding tools in order to develop an initial impression of the possible codes and themes that could later emerge from our own, manual data analysis process.

To start the manual data analysis, we first read through each transcript again to familiarize ourselves with the primary data even further. This was done while referring back to the original video recordings whenever the text alone was considered insufficient for complete understanding of the material. Relevant statements relating to our RQ and purpose were simultaneously highlighted and coded in Atlas.ti by using the "Subcodes" tool. Once these selected quotes were coded, we proceeded to classify them into a set of broader categories using the "Codes" tool. Our focus then shifted towards analyzing the categories and their respective codes multiple times to familiarize ourselves with this filtered data, after which we started identifying potential themes as they emerged. These themes were formed by using the "Code groups" tool.

Once we have identified a set of themes, we subsequently reviewed them in accordance with the filtered data set (consisting of selected quotes and codes), as well as to the initial data set (consisting of interview transcripts). This was done to ensure that the chosen themes correspond and are representative to our primary data set as a whole. The resulting themes were then defined in accordance with the aspects of the data that they refer to, drawing directly from the original interview transcripts.

The secondary data analysis process was conducted a little differently. We first read through each industry report, sustainability-related corporate documents and regulatory framework that we collected to familiarize ourselves with the secondary data. We then proceeded to extract supporting information that could coincide with the findings from our primary data analysis. This supporting information was later used to strengthen the validity of the findings from the interviews we conducted, wherever such information was available. Finally, a more comprehensive view of the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies could be formed based on the primary data themes, as presented in the following chapter.

3.6. Research quality

In striving to ensure the quality and trustworthiness of this study, we adopted the four foundational criteria proposed by Guba (1981) and further elaborated by Lincoln and Guba (1985): credibility, transferability, dependability and confirmability. These criteria are especially well-suited to research grounded in naturalistic and interpretive paradigms, as they account for the contextual, constructed and evolving nature of meaning in qualitative studies. Unlike rigid positivist benchmarks, they provide a flexible yet rigorous framework for evaluating qualitative research quality in a way that respects the complexity of human experience and meaning-making (Amis & Silk, 2008; Lincoln & Guba, 1985). By addressing these criteria throughout the research process, we aim to demonstrate that our findings are both thoughtfully produced and worthy of consideration by others working within similar philosophical and methodological traditions.

Credibility, as the first and arguably most critical criterion for establishing trustworthiness in qualitative research, refers to the extent to which the research findings accurately reflect the experiences and meanings conveyed by the participants (Lincoln & Guba, 1985). To enhance the credibility of our study, we implemented several strategies recommended in qualitative research literature. First, we ensured voluntary participation and emphasized confidentiality and the right to withdraw at any point in the process, through techniques that encourage openness and honesty among respondents (Shenton, 2004). Given the use of semi-structured interviews as our primary data collection method, we employed iterative questioning and encouraged clarification through follow-up questions, both during and after the interviews, to improve the depth and accuracy of our understanding (Shenton, 2004; Saunders et al., 2019). Furthermore, by triangulating our findings with relevant secondary data we added another layer of credibility by corroborating participant accounts with independent sources (Lincoln & Guba, 1985; Saunders et al., 2019). These combined efforts allowed us to enhance the authenticity of our findings and ensure they are grounded in both the perspectives of our respondents and the broader stakeholder landscape.

Transferability refers to the extent to which the findings of a qualitative study can be applied or transferred to other contexts, situations, or populations. While generalizability in the traditional sense is not a goal of naturalistic inquiry, providing readers with sufficient contextual detail enables them to determine the applicability of findings to their own settings

(Lincoln & Guba, 1985; Guba, 1981). In line with this, we made deliberate efforts to offer a thick description of our research context, including detailed information about the case company, the stakeholders involved and the methods used in both our primary and secondary data collection. For example, we outlined the characteristics of our interview participants, the number and type of organizations represented, and the process through which we selected and analysed corporate reports and regulatory documents. As Shenton (2004) and Nowell et al. (2017) emphasize, transferability is supported not only through thick description, but also through clear articulation of methodological choices. Accordingly, we have transparently described our purposive, theory-based sampling strategy, interview procedures and thematic analysis process to allow readers to assess whether and how the findings might resonate with or be relevant to other organizational or industrial contexts. By ensuring transparency and depth in our descriptions, we aimed to provide a foundation upon which readers can judge the transferability of our results.

Dependability concerns the stability and consistency of the research process over time and whether similar results could be obtained if the study were repeated under comparable conditions. In qualitative research, exact replication may not be expected, but what matters is that the research process is documented in a way that is logical, traceable and transparent (Guba, 1981; Nowell et al., 2017). To ensure dependability, we carefully documented each phase of our research, including the rationale behind our methodological decisions, our sampling procedures and the steps taken during data collection and thematic analysis. This audit trail allows readers and future researchers to follow the progression of the study and evaluate its consistency. Additionally, we integrated multiple data sources which supports the internal coherence of our findings (Lincoln & Guba, 1985; Shenton, 2004). In line with Titscher et al. (2000), this transparent and systematic approach reinforces the credibility and dependability of our research by making the analytical process comprehensible and repeatable.

Confirmability refers to the degree to which research findings are shaped by the participants and the data rather than by researcher bias, motivation or interest (Guba, 1981; Shenton, 2004). In other words, it addresses the neutrality of the research and ensures that conclusions are grounded in evidence rather than assumptions. To improve confirmability in this study, we made use of strategies such as data triangulation by integrating multiple sources like semi-structured interviews with key stakeholders and secondary data including industry reports, customer documents and regulatory texts. This allowed for cross-verification of findings and

reduced the influence of subjective interpretation (Nowell et al., 2017). By transparently documenting our process and reflexively examining our own role in the research, we aimed to ensure that the results are clearly traceable to the data and not unduly influenced by personal or procedural bias (Tobin & Begley, 2004).

3.7. Research ethics

Ethical considerations are fundamental to qualitative research, particularly when human participants and sensitive organizational data are involved. As our study was grounded in semi-structured interviews with stakeholders from the case company and secondary data from industry, customer and regulatory sources, we took deliberate actions to ensure ethical integrity throughout the research process. Ethics in qualitative research is not a one-time checklist but a continuous reflexive process that spans all phases of a study (Iphofen & Tolich, 2018; von Unger, 2016).

First, to respect the autonomy and dignity of participants, we obtained fully informed consent from all interviewees. This included clearly communicating the voluntary nature of participation, the right to withdraw at any time, and the purpose, scope and goals of our research. By offering transparency, we ensured that participation was based on understanding and trust (Palaskar, 2018; Bell & Bryman, 2007). We also worked to uphold the principle of non-maleficence by minimizing potential harm or discomfort. During interviews, we were sensitive to participants' time and perspectives, created a comfortable atmosphere and explicitly stated that their names, affiliations, or identifying details would not be disclosed.

To ensure anonymity and protect privacy, we committed to data confidentiality. Interview recordings and transcripts were securely stored in the Jönköping University's OneDrive cloud with access restricted solely to the two researchers. Personal identifiers such as names, age, gender, or company affiliations were omitted from all transcripts and published findings. As requested, we extended this anonymity to organizations as well, especially given the competitive nature of the industry. These practices align with recommendations by Vitak et al. (2016), who emphasize the evolving importance of data protection in the digital age, particularly in online and recorded research environments.

Moreover, we embraced the principle of reciprocity and mutual benefit. At the end of each interview, we invited participant questions, shared our motivations, and explained how the findings might contribute to practice. As part of our engaged scholarship approach (Van de Ven, 2018), we will send the final version of our thesis to all participants and remain available for further discussion. This not only supports transparency and accountability but contributes to the co-production of knowledge between academia and practice.

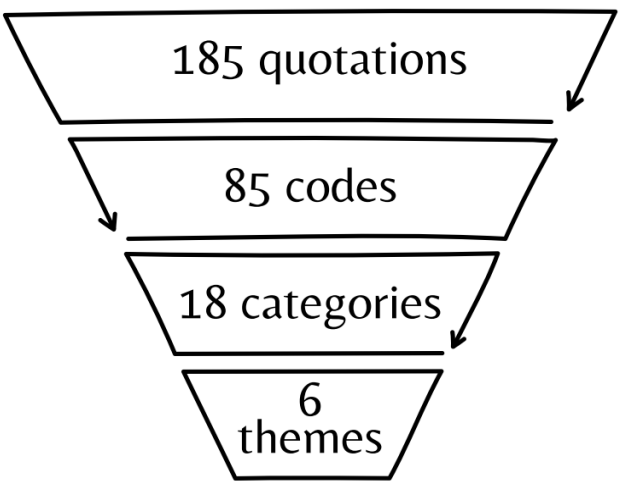
Finally, ethical research demands internal reflexivity. Both researchers were actively involved in all stages—from data collection to analysis—to reduce individual bias and enhance the trustworthiness of our interpretations (von Unger, 2016). By consistently reflecting on our roles, decisions and power relations, we ensured that the voices of our participants were represented fairly and thoughtfully.

4. Results

This chapter illustrates the results of the thematic analysis. Graphical illustrations were used to present each theme along with its corresponding categories and codes, in order to facilitate the reader's understanding of the structure and relationships between the themes, categories and codes. As such, this chapter provides the foundation for the next chapter, Discussion, without the intent of providing interpretations.

The thematic analysis of our data resulted in the extraction of 185 relevant quotations from the interviews we conducted (see Figure 7). These quotations were subsequently assigned to a total of 85 codes, created in accordance with their content. These codes were subsequently categorized into 18 different categories, which in turn were assigned to six overarching themes: Customer influence, Supplier influence, Regulatory influence, Top management influence, Employee influence and Community influence. These resulting themes will be illustrated in the following sections of this chapter through the use of the "Networks" tool from Atlas.ti 25, which will be followed by an in-depth discussion in the next chapter (see Discussion chapter). See Appendix 2 for more detailed information regarding the respective quotations.

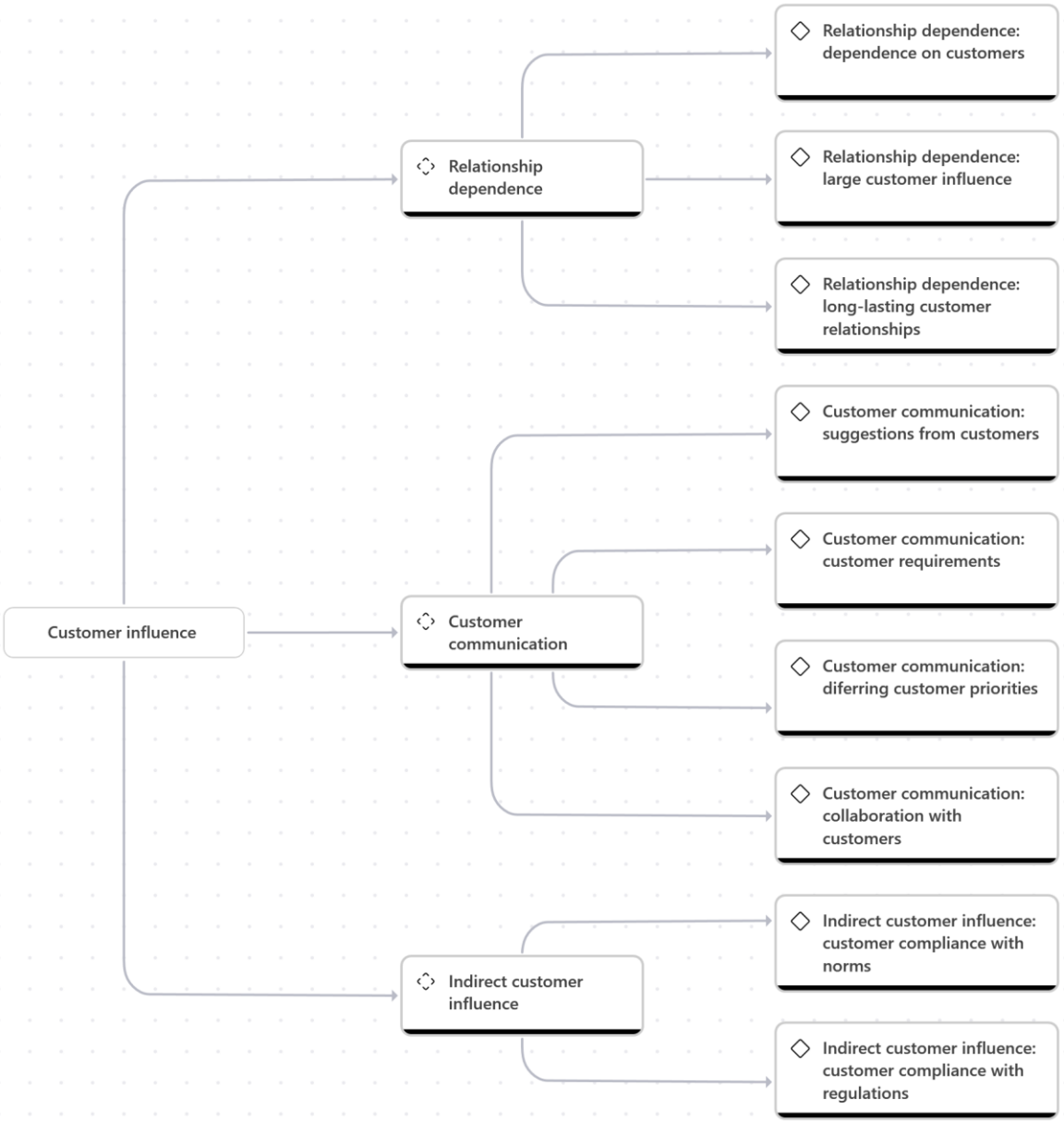
Figure 7. An overview of the resulting quotations, codes, categories and themes.



Source: own figure.

4.1. Customer influence

Figure 8. The theme of Customer influence and its associated categories and codes.

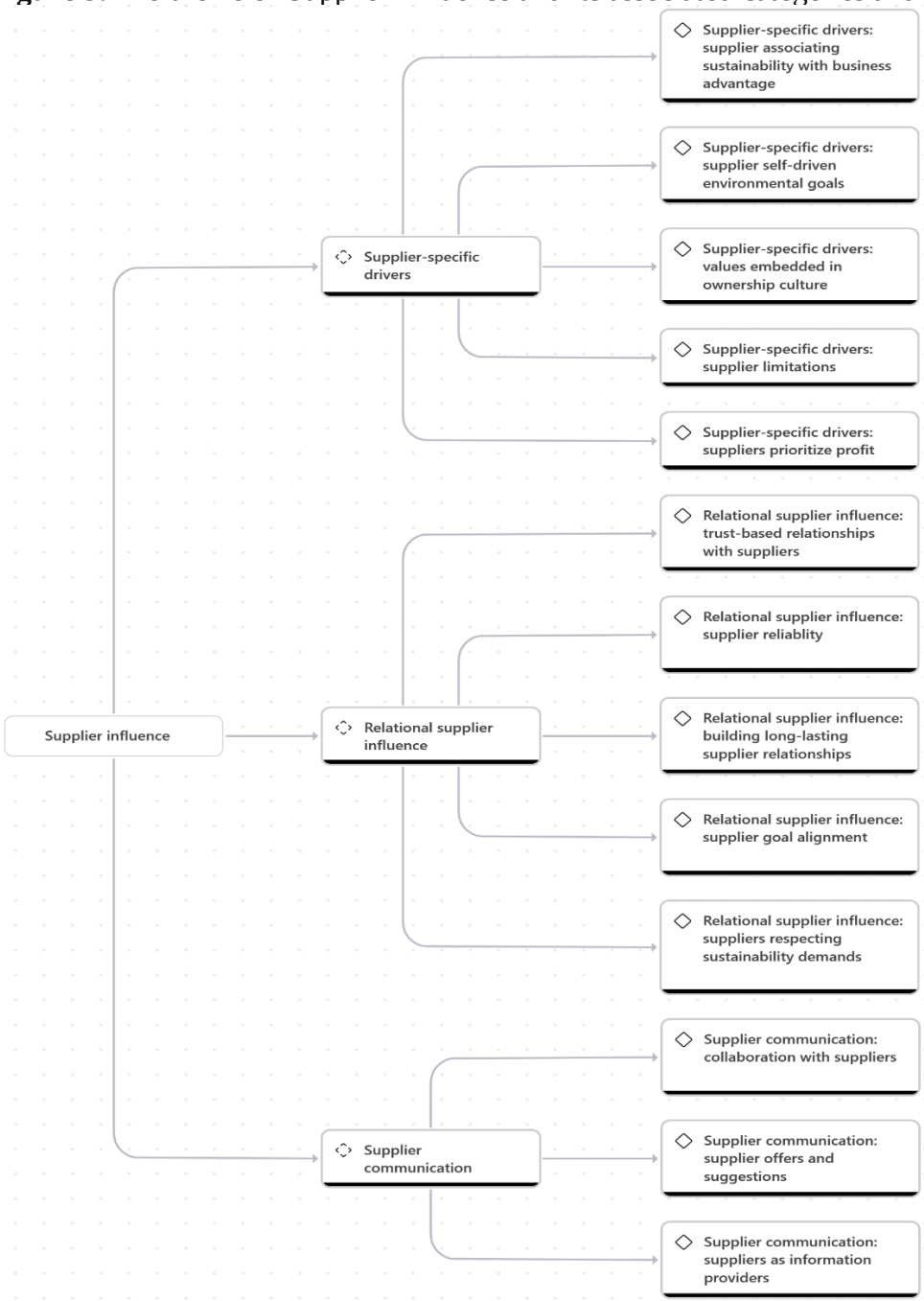


Source: own figure.

The theme of Customer influence consists of three categories: Relationship dependence, with the Dependence on customers, Large customer influence and Long-lasting customer relationship codes; Customer communication, with the Suggestions from customers, Customer requirements, Differing customer priorities and Collaboration with customers codes; and Indirect customer influence, with the Customer compliance with norms and Customer compliance with regulations codes.

4.2. Supplier influence

Figure 9. The theme of Supplier influence and its associated categories and codes.



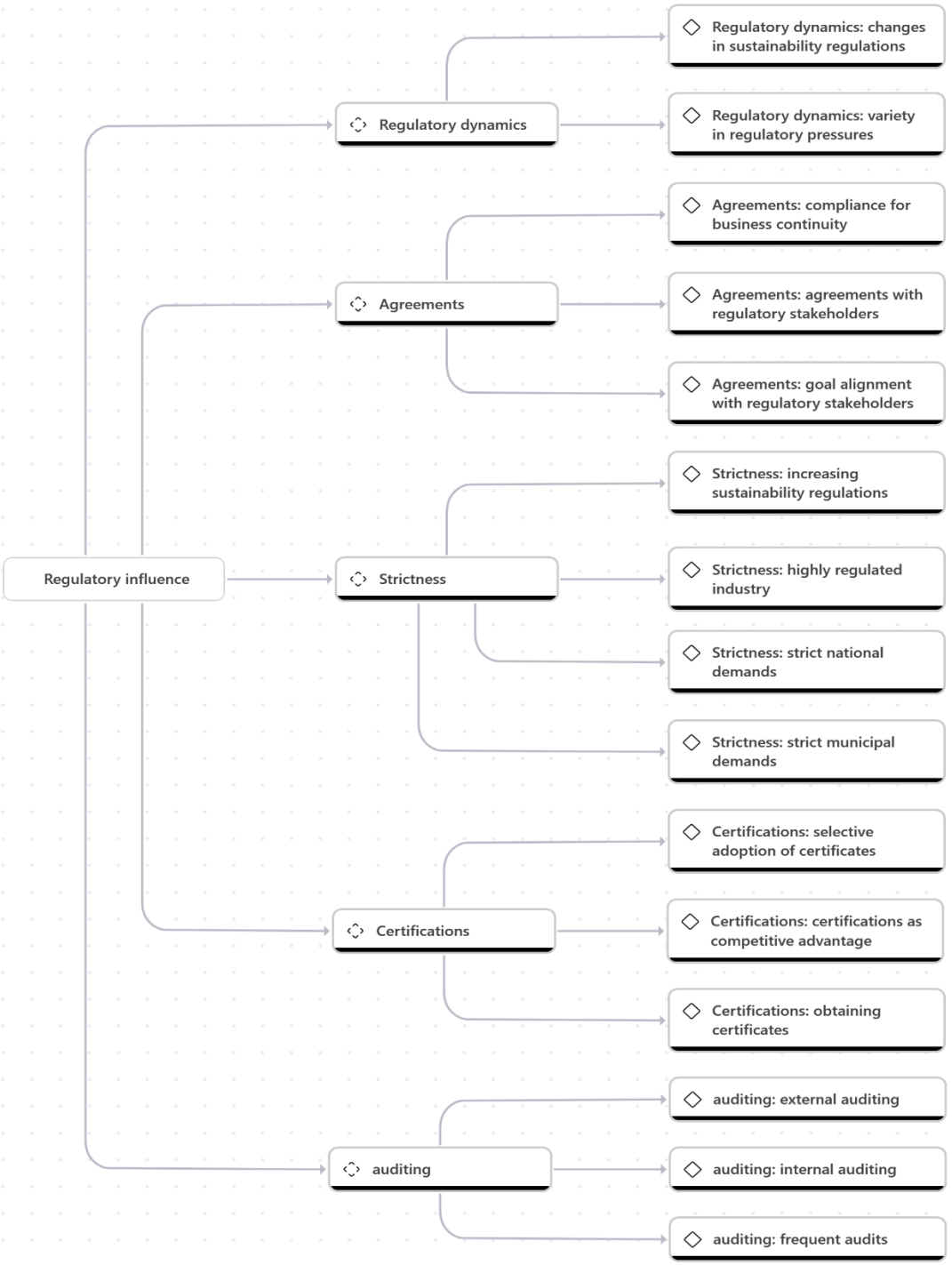
Source: own figure.

The theme of Supplier influence consists of three categories: Supplier-specific drivers, with the Supplier associating sustainability with business advantage, Values embedded in ownership culture, Supplier limitations and Suppliers prioritize profit codes; Relational supplier influence, with the Trust-based relationships with suppliers, Supply reliability, Building long-lasting supplier relationships, Supplier goal alignment and Suppliers respecting sustainability demands

codes; and Supplier communication, with Collaboration with suppliers, Supplier offers and suggestions, and Suppliers as information providers as codes.

4.3. Regulatory influence

Figure 10. The theme of Regulatory influence and its associated categories and codes.



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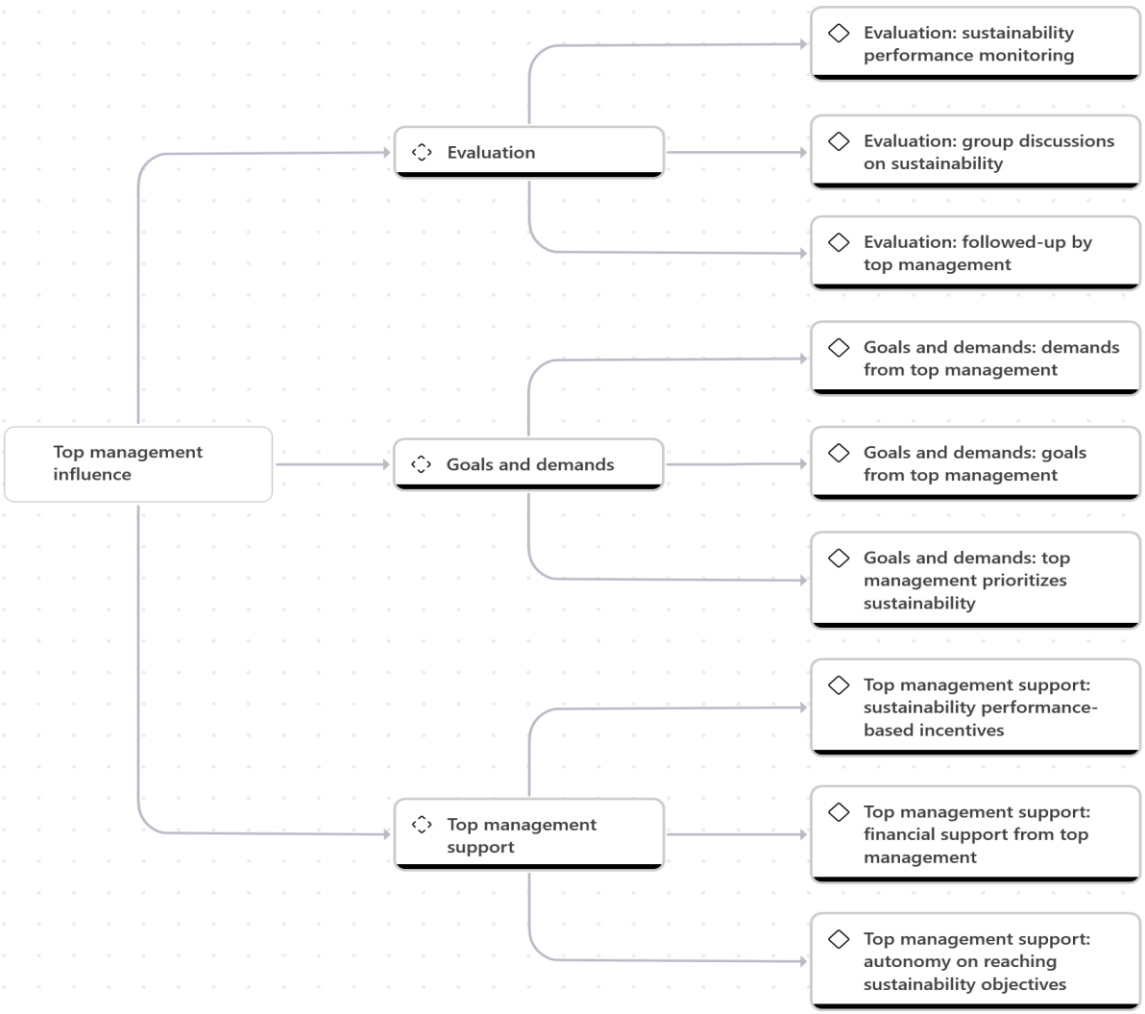
The theme of Regulatory influence consists of five categories: Regulatory dynamics, with the Changes in sustainability regulations and the Variety in regulatory pressures codes; Agreements, with the Compliance for business continuity, Agreements with regulatory stakeholders and Goal alignment with regulatory stakeholders codes; Strictness, with the Increasing sustainability regulations, Highly regulated industry, Strict national demands and Strict municipal demands codes; Certifications, with the Selective adoption of certificates, Certifications as competitive advantage and Obtaining certificates codes; and Auditing, with the External auditing, Internal auditing and Frequent audits codes.

4.4. Top management influence

Figure 11. The theme of Top management influence and its associated categories and codes.

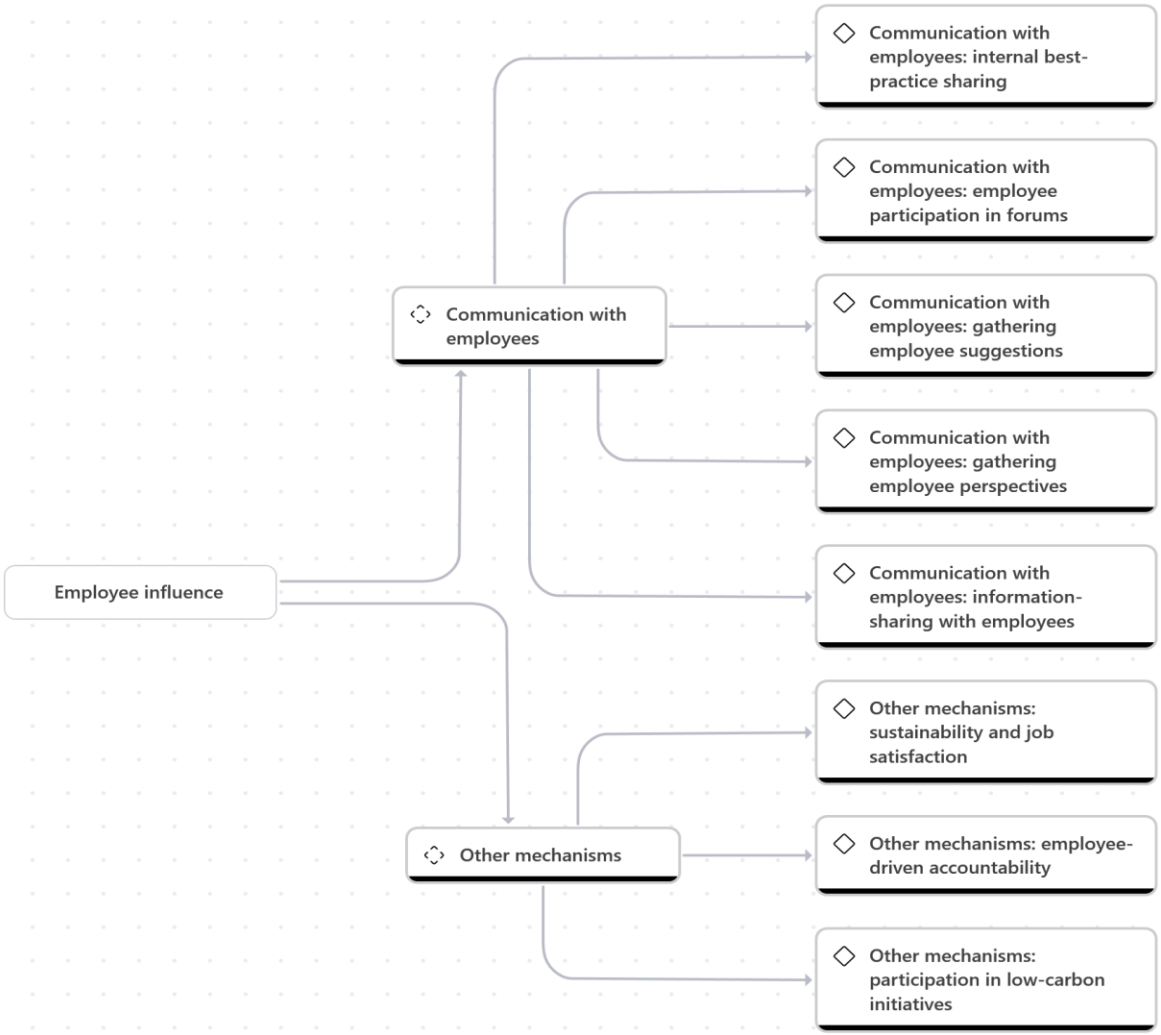


Source: own figure.

The theme of Top management influence consists of three categories: Evaluation, with the Sustainability performance monitoring, Group discussions on sustainability and Followed-up by top management codes; Goals and demands, with the Demands from top management, Goals from top management, and Top management prioritizes sustainability codes; and Top management support, with the Sustainability performance-based incentives, Financial support from top management and Autonomy on reaching sustainability objectives codes.

4.5. Employee influence

Figure 12. The theme of Employee influence and its associated categories and codes.



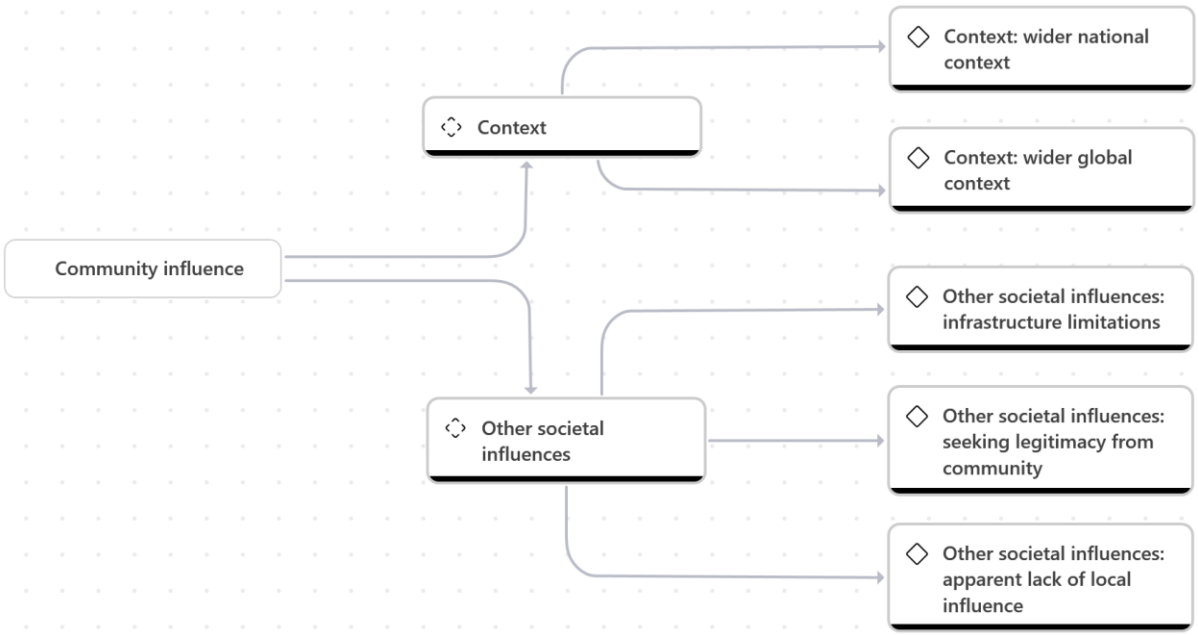
Source: own figure.

The theme of Employee influence consists of two categories: Communication with employees, with the Internal best-practice sharing, Employee participation in forums, Gathering employee suggestions, Gathering employee perspectives and Information-sharing with employees codes;

and Other mechanisms, with the Sustainability and job satisfaction, Employee-driven accountability and the Participation in low-carbon initiatives codes.

4.6. Community influence

Figure 13. The theme of Community influence and its associated categories and codes.



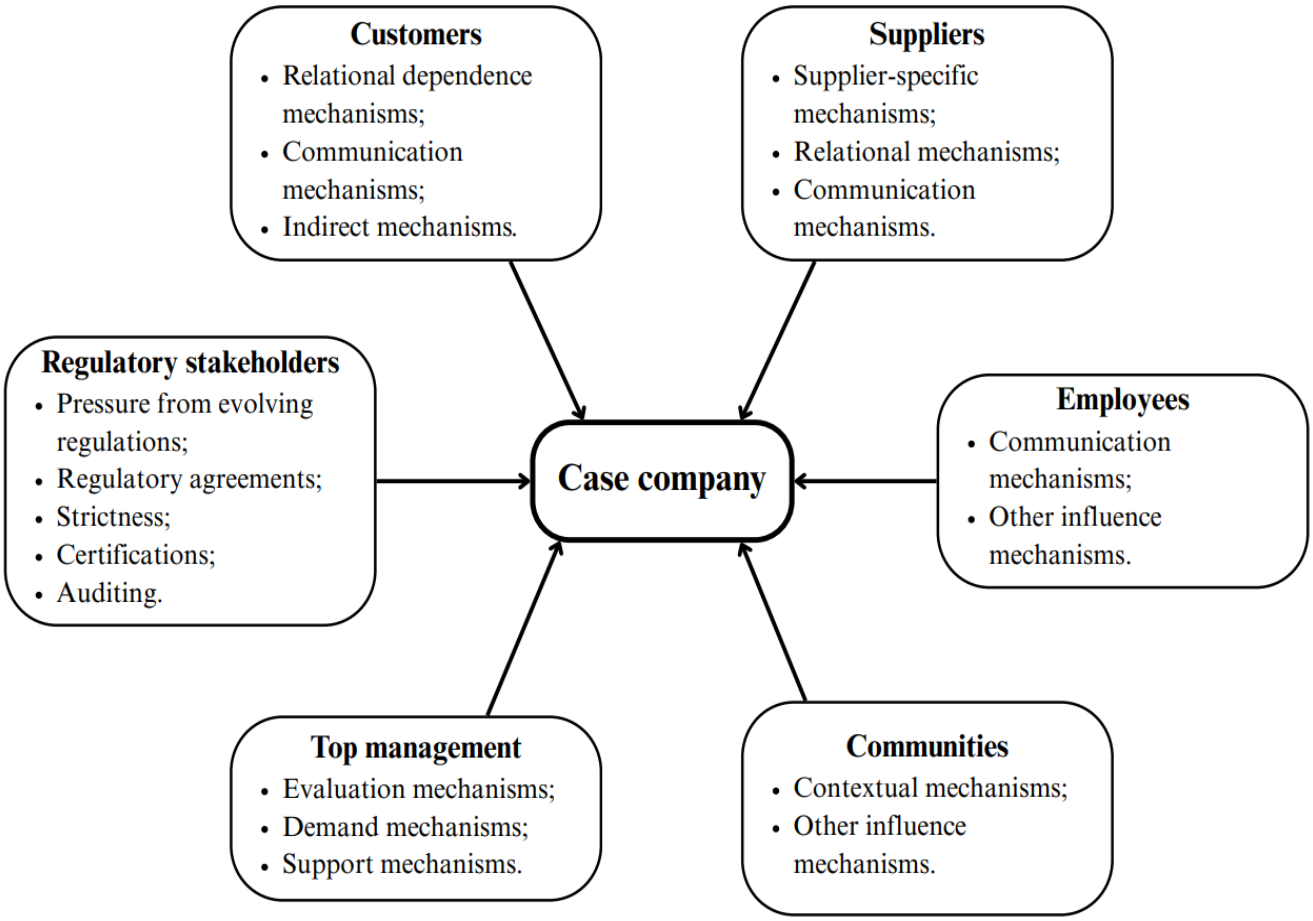
Source: own figure.

The theme of Community influence consists of two categories: Context, with the Wider national context and Wider global context codes; and Other societal influences, with the Infrastructure limitations, Seeking legitimacy from community and Apparent lack of local influence codes.

5. Discussion

This chapter contains the authors' interpretations of the empirical findings illustrated in the previous chapter, starting with a comparison to past research. Each of the six identified themes is then explored in-depth based on its associated categories, codes and interview quotations, with the purpose of exploring the identified stakeholder influence mechanisms on the SCS of commercial laboratory testing companies. The resulting analysis is summarized graphically at the beginning of the chapter.

Figure 14. Stakeholder influence mechanisms on the SCS of the case company.



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Earlier in the Problem discussion section, we argued that commercial laboratory testing companies may exhibit unique stakeholder dynamics due to their positioning between the highly regulated, wellbeing-oriented life sciences sector and the profit-driven, customer-oriented nature of typical commercial industries (see Figure 1). As such, our research was conducted with the presumption of obtaining results that are distinguished from similar research conducted in other industries. Although particularities have been found at a granular level, such as the tracking of laboratory chemical waste and communal agreements on wastewater components, the overall findings remain partly consistent with past research. Referring back to Section 2.4.2. in which we summarized the resulting stakeholder influence mechanisms of seven other studies in various industries (see Table 2), we can identify several similarities between results.

The withholding strategies of Frooman (1999) correlate to the relational dependence mechanisms we identified for the case company's customers. In accordance with these strategies, customers have the ability to cease purchasing from the case company, and therefore withhold their monetary resources in case of dissatisfaction with the case company's sustainability performance. This ability to withhold purchases creates the dependency dynamics on customers that we observed in our case study, which form the relational dependence influence mechanism. In addition, this mechanism has been identified as inputs withholding by Nguyen et al. (2020), who analyzed stakeholder influence strategies in the context of construction projects.

O'Connell et al.'s (2005) concept of legislated access to information partly corresponds to the regulatory stakeholders' pressure from evolving regulations, and to the communities' contextual mechanisms identified in our case study. Our research shows that regulatory expectations for transparency are growing in sustainability reporting, and that the Swedish market environment is increasingly expecting such information to be made available. As such, both regulatory stakeholders and communities more or less match O'Connell et al.'s (2005) concept of legislated access to information, which posits that stakeholder participation is enhanced and encouraged through transparency laws and regulations.

Among Viveros' (2017) identified stakeholder influence mechanisms for the mining industry, all except counselling can also be identified, in one form or another, in our results. As such, demand, communication, control, engagement and involvement are common stakeholder

influence mechanisms between Viveros (2017) and our research, although these mechanisms manifest differently between the two studies. For instance, although demand has been assigned to communities in Viveros (2017), in our research this mechanism is valid in the case of customers, regulatory stakeholders and top management. In addition, we have directly identified communication in the case of customers, suppliers and employees, while Viveros (2017) attributed communication to media and non-governmental organizations. As such, the distinct nature of the industries studied may impact the circumstances in which these various mechanisms are exercised.

Out of Pucci et al.'s (2020-b) identified stakeholder engagement mechanisms for the winery industry in Italy, the mechanism of co-creation and diffusion represents a commonality with our research. The authors identify this mechanism to be manifested through joint projects and communication, which corresponds with our identified communication mechanism for customers, suppliers and employees. Similarly, we have found that stakeholders may engage in collaboration for sustainability purposes, especially in the case of customers.

In the sections that follow, the full extent of our findings will be presented in accordance to Figure 14.

5.1. Customer influence mechanisms

Following analysis, customers emerged as a significant source of external influence on sustainability practices within the SCS of our case company. We believe the influence of customers on SCS to be exercised through the following three mechanisms: relationship dependence, communication and indirect mechanisms (see Figure 7).

5.1.1. Relational dependence mechanisms

The thematic analysis of the interviews highlights customer dependence as a key mechanism through which customers influence the SCS of the case company. The findings reveal that maintaining strong, responsive and adaptive relationships with customers is not just a commercial priority, but also a driver for integrating sustainable practices within the company's SC.

A recurring theme across the interviews is the company's dependence on customers for long-term viability. The respondents consistently emphasized that attentiveness to customer requirements, particularly evolving expectations around sustainability is essential for securing ongoing business. One participant noted, "*...to listen to their requirements and requests is what keeps the company going in the long term.*", underlining how customer demands can serve as catalysts for change within SC operations. This suggests that sustainability initiatives are often reactive, shaped by the need to align with customer expectations to ensure client retention and competitiveness.

The importance of building long-lasting customer relationships further amplifies this influence. Several respondents stressed that sustainable SC practices are increasingly becoming embedded in the conversations around long-term partnerships. For instance, one respondent remarked:

> "*So we need to change when they have different requirements or requests that they want, because maybe when they have requests, it can be something, OK, in five years this maybe might be a requirement. So we need to start working on that.*".

This proactive attitude demonstrates that customers, especially those with forward-looking sustainability agendas, indirectly set the trajectory for SC adjustments even before formal demands or regulations are made. Long-term deals, therefore, are not only about price or product delivery but are progressively intertwined with shared sustainability goals.

Moreover, the data highlights the disproportionate impact of large and/or significant customers on shaping sustainability efforts. The sentiment, "*because we need to do what many of the customers, important customers want us to do, because otherwise we would be out of the picture.*", reflects the power dynamics at play. Larger customers, often with more strict sustainability policies or corporate social responsibility commitments, may apply significant pressure on suppliers to align with their environmental and social standards. This influence can extend deep into SC operations, motivating the company to adopt practices such as reducing CO_2 emissions or sourcing sustainable materials that might not have been prioritized otherwise. As outlined by the Sales & Marketing Director, such influence is rarely exercised by typical, smaller customers.

Overall, the findings indicate that customer dependence functions as both a reactive and proactive channel through which customers influence sustainability efforts. Dependence on key clients, the desire for enduring partnerships and the effect of influential customers, collectively ensure that sustainability is not an isolated corporate value but a negotiated outcome of ongoing customer interactions. This highlights the essential role of customer engagement in driving SC transformation into more sustainable practices within the life sciences sector.

5.1.2. Communication mechanisms

The analysis further highlights communication with customers as a pivotal mechanism through which customers may influence the company's SCS practices. The data reveals that this communication is not a passive exchange but a dynamic process where customer expectations, requirements and collaborative dialogues actively shape operational decisions related to sustainability. Such communication may not be extended only to the case company's own customers, however. In other cases, customers may intermediate communication from further down the SC, as stated by the Sales & Marketing Director: "*Then they get the question from a customer of theirs, and then they just put that question to us.*". This shows the interconnectivity of SCs, especially in relation to sustainability.

A central finding is the role of customer suggestions and requests in guiding sustainable initiatives. Respondents consistently noted that when multiple customers voice similar preferences or suggestions, whether formal or informal, the company feels it has to evaluate and often act on them. As one participant explained, "*if many customers want us to do one thing, then we of course start looking at that*". This indicates that customer communication acts as an early-warning system or trend indicator, leading the company to preemptively adjust its practices in anticipation of future demands or to strengthen customer relationships.

Beyond suggestions, explicit customer requirements emerged as a direct and formalized channel of influence. Throughout the interviews, many respondents referred to contractual obligations where sustainability criteria ranging from environmental certifications like ISO 14001 to specific conditions on logistics or carbon footprint reporting are mandated by customers. One interviewee highlighted, "*for the customers that we have, they have requirements in the contracts, and there are quite many requirements about sustainability*". This corresponds with the analyzed customers' sustainability reports and supplier codes of

conduct, where such requirements are repeatedly stated by the case company's customers. As such, these requirements are often non-negotiable entry points for doing business, demonstrating how customer-driven standards become embedded into SC operations. The need to respond to such diverse and evolving demands forces the company to maintain flexibility and continuously improve its sustainability performance.

The findings, however, also show challenges that can arise from differing customer priorities. While large, corporate customers often prioritize sustainability and enforce strict requirements, smaller or local customers may show limited interest. As one interviewee pointed out, "*the private customer… they only want to have their samples analyzed as soon as possible*". This divergence requires tailored communication strategies, balancing education about sustainable practices with responsiveness to varying customer expectations and price sensitivities, especially when sustainable solutions lead to higher costs.

Finally, collaboration with customers stands out as a critical extension of communication. Respondents described situations where sustainability challenges were addressed through joint problem-solving and dialogue. Rather than simply accepting customer requests at face value, the company engages in conversations to clarify intentions and where possible, propose alternative solutions that achieve the same sustainability outcomes more efficiently or holistically. This is reflected in comments such as, "*we can ask how they mean or what is the purpose… maybe it's the same result but in another way*". Such collaborative exchanges not only align expectations but also encourage innovation and mutual understanding in sustainability efforts.

These findings illustrate that communication with customers takes place across multiple aspects, from receiving suggestions and following formal requirements, to navigating diverse priorities and developing collaborative solutions. This continuous dialogue ensures that customers remain a driving force behind the company's sustainability trajectory, influencing both strategic decisions and day-to-day supply chain practices.

5.1.3. Indirect mechanisms

Our findings reveal that indirect customer influence plays a subtle but significant role in shaping the SCS practices of the commercial laboratory testing company. Unlike direct requests or contractual requirements, this form of influence appears when customers

themselves respond to external pressures such as industry norms, certifications and regulatory obligations, which in turn are transmitted down to their suppliers.

One mechanism identified is customer compliance with sustainability norms and standards, particularly certifications like ISO. Several respondents noted that larger customers, as well as governmental clients, increasingly request detailed sustainability data not just out of internal initiative, but because they are required to uphold certifications or corporate sustainability strategies. One interviewee highlighted this dynamic by stating, "*they have a strategy they need to provide to uphold their ISO certification*". This illustrates how customers, motivated by their own compliance needs, indirectly drive the company to track, manage and report on aspects such as carbon emissions and environmental impact across the SC.

Similarly, customer compliance with regulations emerged as a significant source of indirect influence. As regulatory frameworks, especially those from the EU, become more stringent regarding sustainability reporting and environmental accountability, customers try to seek greater transparency from their suppliers. One respondent explained, "*our customers will also have more regulations or impact from EU, so they, I think they would like to have even more information from us about our sustainability*". This regulatory ripple effect places pressure on the company to develop strong data collection and communication systems, even when such measures are not directly required by law for the company itself but are important for supporting customer compliance.

Interestingly, this influence is mostly reactive and systemic. Customers act as intermediaries between regulatory bodies or certification agencies and the company. Rather than expressing sustainability expectations based only on corporate values or consumer demand, customers transmit external compliance needs downstream, integrating sustainability principles deeper into the SC.

The findings from the primary data, which emphasize the critical role of customer relationship dependence, communication and indirect influence in affecting SCS, are supported by insights from the KPMG report "*Unravelling Sustainable Business Transformation in Life Sciences*" (2024). This secondary source reinforces the view that customer expectations, both direct and indirect are essential in shaping sustainability strategies within the life sciences sector.

Moreover, the KPMG report emphasizes the growing interconnection between regulatory pressures and customer expectations. It outlines how large customers, especially those subject to strict Environmental, Social and Governance (ESG) reporting obligations, are transmitting these pressures down their SCs. This directly echoes the primary data's theme of indirect customer influence, where customers require sustainability data to meet their own compliance and corporate responsibility goals.

In addition, KPMG highlights the importance of collaborative partnerships in achieving sustainability objectives, especially in areas like circular economy practices and decarbonization. This complements the primary data's findings on customer collaboration as a mechanism for jointly addressing sustainability challenges. The report presents examples of companies working with customers, competitors and other stakeholders to innovate sustainable solutions, supporting the idea that proactive dialogue and cooperation are essential for incorporating sustainability into SC operations.

Finally, KPMG draws attention to the difference in stakeholder expectations, noting that while regulatory bodies and large corporate clients push for advanced sustainability practices, other market segments may not prioritize these issues. This observation aligns with the challenges identified in the primary data regarding differing customer priorities, particularly between large institutional customers and smaller, less sustainability-focused clients.

5.2. Supplier influence mechanisms

Our analysis revealed suppliers to be another significant source of external influence on sustainability practices within the SCS of our case company, alongside customers. We believe the influence of suppliers manifests through the following three mechanisms: relationship supplier-specific drivers, relational supplier influence and communication mechanisms (see Figure 9).

5.2.1. Supplier-specific mechanisms

The particularities of suppliers themselves, their internal motivations, limitations and structural characteristics are shown to play an important role in shaping the sustainability profile of the case company’s SC. These particularities include supplier-driven sustainability goals, values

present in the ownership culture, practical infrastructure constraints and differing attitudes toward profit versus sustainability.

One notable mechanism of influence is the presence of self-driven environmental goals among suppliers, particularly those certified with standards like ISO 14001. Respondents described how some suppliers proactively set yearly sustainability targets, not only to fulfill certification requirements but also to enhance business attractiveness. As one supplier representative explained, "*we put up goals every year… it's not only that it's a good thing, it's also good for the company*." This indicates that some suppliers view sustainability not only as an ethical commitment but also as a competitive differentiator. In such cases, the supplier's internal ambition positively influences the sustainability of the focal company's SC by introducing sustainable options, practices and innovations as part of the business offering.

Another driver comes from owner values reflected in supplier behavior. In smaller or privately owned suppliers, personal values, particularly those tied to diversity, ethics, or fairness can influence decision-making. An illustrative quote highlighted how one supplier-owner emphasized inclusivity in hiring and subcontracting, stating, "*because I am one of the owners… I can do this decision myself.*" This form of value-driven governance can translate into higher ESG alignment without the need for external pressure, creating a supply network where ethical considerations influence not only formal policy but also day-to-day practices.

The data, however, also points to limitations among suppliers that can slow down SCS progress. These limitations are both technical and informational. For example, some interviewees noted the inability of suppliers, especially in the chemical sector, to provide necessary environmental data. As one participant expressed frustration, "*We always ask the 10 biggest suppliers in chemicals […] and there is not one of them that, as far as now, can give us how much CO_2 impact does the chemicals we buy from them cause.*". This lack of transparency and data restricts the case company's ability to evaluate or optimize its purchasing decisions based on sustainability performance. Similarly, infrastructure constraints, such as long lead times for electric vehicle deliveries, limit the implementation of greener logistics, even when the case company is motivated to do so.

Profit orientation among some suppliers emerged as a barrier to sustainability advancement. While large purchase volumes can sometimes provide leverage, stakeholders observed that not all suppliers are inherently committed to sustainability. Instead, they may comply only when

prompted by contractual demands or economic incentives. One interviewee remarked, "*if they care [about sustainability], I'm not sure; I think we need to look at their own environmental policies.*" This conditional commitment suggests that supplier engagement varies widely and requires deliberate efforts to assess and align suppliers' sustainability priorities with those of the purchasing company.

5.2.2. Relational mechanisms

Our analysis highlights that relational supplier influence mechanisms serve as a significant means through which the case company navigates and improves the sustainability of its SC. This influence materializes across several interconnected dimensions: trust-based management, ensuring supplier reliability, building long-term partnerships, aligning sustainability goals and ensuring compliance with sustainability demands.

An important aspect observed in the data is the reliance on trust-based relationships with suppliers. Although formal policies and ethical codes are in place, the company often depends heavily on suppliers' self-reporting, with limited direct verification mechanisms. One participant noted, "*we just rely on them, that they are following it and not checking if they really do so*", illustrating the challenge of monitoring compliance in a vast supplier network. Nevertheless, for critical services, such as logistics providers, the company implements more structured follow-ups, especially concerning sustainability goals like increasing the number of electric vehicles. This dual approach of trust complemented by selective monitoring, reveals a pragmatic balance between resource constraints and accountability.

Supplier reliability also proves to be an important aspect of effective relationship management, especially in ensuring operational continuity. Several interviewees emphasized the importance of suppliers' consistency in product quality, service delivery and long-term commitment. In sustainability terms, this reliability translates into needing suppliers who can sustain quality over time, reducing waste, minimizing disruptions and ensuring alignment with the larger environmental goals. As one respondent noted, "*the quality from the supplier is very important [...] if we buy some instruments from them, and we need them to take care of the instrument when something is broken*," presenting supplier reliability as a component of operational and environmental sustainability.

Another finding concerns the importance of building long-term supplier relationships. Long-term contracts not only provide economic stability for suppliers but also enable investments in sustainable infrastructure, such as better trucks or alternative energy solutions. Stakeholders pointed out that without the security of extended partnerships, suppliers are less willing or able to invest in costly sustainable technologies. Thus, longevity in relationships becomes a tool for achieving shared sustainability objectives.

Moreover, the analysis reveals a strong focus on goal alignment with suppliers. Open dialogue and regular meetings facilitate mutual understanding of sustainability objectives, especially regarding reducing fossil fuel use and increasing the use of electric vehicles or HVO fuels in transportation. Collaborative goal-setting strengthens supplier commitment and ensures that sustainability efforts are integrated into operational practices.

Finally, ensuring that suppliers respect sustainability demands is non-negotiable. The company requires new and existing suppliers to adhere to its ethics and sustainability policies. This requirement is embedded into contracts and ongoing collaborations. While there is recognition that some suppliers initially prioritize sales over sustainability, persistent engagement and contractual obligations help shift attitudes, as noted by one interviewee: "*as we're approaching them [with] this attitude of course, they are delivering.*".

5.2.3. Communication mechanisms

The analysis of stakeholder interviews identifies communication with suppliers as a vital mechanism through which supplier stakeholders can influence sustainability. This communication is not simply transactional, it is iterative, strategic and often integrated in ongoing partnerships. Three interlinked dimensions emerge from the data: collaborative problem-solving, supplier-driven innovation and the transmission of sustainability-related data.

One of the most important aspects of supplier communication is collaboration to improve sustainability practices, especially in high-impact areas like logistics and waste management. Respondents described regular interactions with suppliers aimed at developing environmentally responsible solutions together. For example, one participant noted that waste management strategies are discussed in recurring meetings with the company's waste supplier, where both parties explore possible improvements: "*we have actions each year… we're going to have a meeting with our supplier for the waste to see how can we work in a better way*".

This example reflects a proactive approach to joint sustainability efforts, rather than reliance on one-sided directives. Especially in regards to logistics partners, sustainability collaboration has been described as "*quite close*" due to the customers' targeted requirements on logistics processes.

Further, collaboration is shaped by mutual constraints and goals, such as the need to invest in electric vehicles or adopt alternative fuels. These efforts often come with cost implications, as expressed by the logistics provider: "*every change we do costs money… someone needs to buy this car*", pointing to the economic challenges suppliers face in meeting sustainability goals. Nevertheless, long-term partnerships and shared commitments help overcome such barriers, with both parties aligned toward carbon reduction goals and sustainable practices.

In addition to co-developing solutions, suppliers also play a significant role as sources of innovation and ideas. The interviews reveal that trusted suppliers, particularly those with whom the company has long-standing relationships, often propose new products or services that offer environmental benefits. For instance, suppliers proactively present alternatives like bottles made of reused plastic or transportation models that reduce emissions through consolidation. One stakeholder remarked, "*they can come with ideas and they can inform us so we can decide from that*", highlighting how valuable these supplier inputs are in shaping procurement decisions related to sustainability.

Perhaps most critically, suppliers function as key providers of sustainability-related data, particularly concerning environmental performance. Respondents reported systematic efforts to collect annual reports from suppliers detailing CO_2 emissions, energy sources and transport impacts. This data is essential for the company's own climate footprint assessments and broader sustainability reporting. One participant explained: "*we collect the data and we want, like, proof of something of them*", illustrating how the company depends on accurate and verifiable information from its suppliers to maintain transparency and credibility in its own environmental claims.

The influence of suppliers in shaping sustainability practices is not always equal, however. One interviewee noted that, compared to customers or regulators, "*suppliers are at the bottom of the list*", suggesting that while suppliers can inform and enable, their power to create change is limited unless aligned with top-down pressure or strategic importance.

The findings from Scilife "A Long Term View of Sustainability in the Life Sciences" report (2024) confirm the central finding of the primary data: that suppliers can play a significant role in enabling or limiting SCS. Most notably, the report supports the idea that supplier particularities, such as their internal sustainability commitments and operational limitations, can significantly influence outcomes. The report highlights that up to 71% of total healthcare sector emissions originate from the SC, particularly in the production and transport of pharmaceuticals and medical devices. This emphasizes how deeply suppliers are involved in the sustainability equation and affirms stakeholder concerns over suppliers' emissions.

The report further supports the idea that some suppliers take proactive roles in sustainability by implementing green chemistry, adopting clean energy, or exploring circular material use. This reflects the primary data's observation that some suppliers set self-driven environmental goals and view sustainability as a competitive advantage. Additionally, organizations that choose suppliers committed to renewable resources and sustainable practices are seen as leaders in minimizing environmental impacts and promoting long-term ecological balance. This mirrors our findings that some suppliers make decisions based on their personal convictions and align business operations with ethical or environmental beliefs.

The Scilife report, however, also emphasizes supplier limitations, especially as they relate to infrastructure readiness and data transparency. It describes SC resilience as a vulnerability in the shift to net-zero, noting that dependence on suppliers with limited sustainability practices or climate-related weaknesses can damage decarbonization targets. This directly supports stakeholder frustration in our data over long lead times for electric vehicles and the absence of emissions data from chemical suppliers.

Regarding supplier relationships, the report indirectly reinforces our findings on the importance of trust, long-term partnerships and strategic influence. While it doesn't mention trust-based dynamics, it emphasizes that reaching net-zero requires a collaborative approach across the entire value chain, from procurement to distribution. This aligns with the primary data's emphasis on goal alignment, where suppliers and the case company engage in open dialogue to create strategies for reducing emissions, particularly in transportation.

The theme of communication with suppliers is also found in the report's focus on better ESG reporting, advising companies to develop detailed and dynamic assessments of sustainability performance across their operations and supplier networks. This supports our data, which

indicates that suppliers are not only collaborators but also crucial information providers, particularly for CO_2 reporting. The need for verified emissions data is emphasized both by our participants and the global reporting expectations presented in the Scilife report.

5.3. Regulatory influence mechanisms

Our results show that regulatory dynamics are essential mechanisms that shape the sustainability of the case company's SC. This influence is characterized by the evolving nature of environmental regulations, the multi-level governance structures involved and the variety in regulatory influences that depend on regional and market contexts (see Figure 10).

5.3.1. Pressure from evolving regulations

A clear theme across the interviews is the changing landscape of sustainability-related regulations. Respondents described a noticeable shift in how environmental metrics, particularly carbon emissions are tracked, reported and acted upon. One interviewee reflected on this evolution by noting, "*when we are reporting CO_2 emissions, I would say that's the biggest difference from a couple of years back*", indicating a growing institutional expectation for transparency and measurable improvements in environmental performance. These changes lead the company to not only adapt its internal systems but also to seek greater efficiency and innovation within its SC to meet tightening regulatory norms.

These regulations are not static however, as they are subject to policy reversals and fluctuating expectations. This regulatory instability was also highlighted by stakeholders who described inconsistent changes, such as fluctuating fuel reduction requirements. One participant explained: "*Now they changed the reduction of fuel, before we had a higher reduction to take away some fossil in the gas, then they get back to lower again, so it goes up and down when it comes to environment.*", illustrating the uncertainty that companies must navigate. These oscillations can challenge long-term sustainability planning and require companies to build flexible strategies that can quickly adapt to shifting external requirements.

Another key dimension of regulatory dynamics is the variation in regulatory pressure across jurisdictions. The company operates in a complex legal environment governed not only by EU directives but also by national laws and even local or municipal-level regulations. As one

respondent summarized, "*we have both the EU and Sweden, and the [communes] can have their own laws.*" This layered framework demands that the company maintains constant awareness of legal differences across markets, tailoring SC practices to comply with multiple, and at times conflicting, environmental standards.

Regulatory dynamics function as both a driver and a disruptor of SCS. On the one hand, evolving standards push the company toward greener practices and better data accountability. On the other, policy reversals and jurisdictional complexity pose strategic challenges that require agility, local responsiveness and continuous regulatory monitoring. This dynamic environment makes regulatory influence a central, but unpredictable force in shaping SSCM in the laboratory testing sector.

5.3.2. Regulatory agreements

Our analysis highlights the importance of regulatory agreements and compliance frameworks as a mechanism through which government bodies and regulatory authorities influence the case company's SCS. These agreements operate both as formal legal obligations and as implicit conditions for market legitimacy, reflecting two main functions: ensuring environmental protection while securing long-term business continuity.

A key mechanism identified is the company's compliance with regulatory agreements to sustain its position in the market. Respondents repeatedly emphasized that adherence to national and international environmental regulations is not only a legal imperative but a strategic necessity. As one interviewee put it, "*we are […] a serious business, company that wants to stay on the market for a long time and then it's necessary for us to follow the regulations*". This sentiment was repeated across multiple accounts, reflecting a widespread understanding that failing to comply with sustainability-related laws could damage not just operational capacity but also brand reputation and customer trust. One respondent noted that negative publicity about environmental performance could affect customer perception, suggesting that regulatory compliance is intertwined with market credibility and stakeholder expectations.

In addition to general legal compliance, the interviews revealed the role of formal agreements with regulatory stakeholders, especially in areas with direct environmental impact such as waste management and chemical use. For example, site-specific agreements with local water

authorities govern the permissible levels of chemicals in wastewater. In one case, an operating license stipulates exact thresholds for ethanol, methanol and other substances discharged from a Swedish facility. These agreements define the boundaries within which the company must operate, linking environmental protection directly to regulatory oversight and localized enforcement mechanisms.

Moreover, some interviewees described goal alignment with regulatory stakeholders as an extension of these formal agreements. By voluntarily aligning internal sustainability values and labor practices with government policies and union standards, the company develops a cooperative rather than adversarial relationship with regulators. As one participant remarked, "*we are quite similar to all the big customers, the government, the policies and everything like that*", suggesting a shared vision between the company and public institutions.

5.3.3. Strictness

The interviews emphasize regulatory strictness as another powerful force shaping the sustainability practices of the case company. This strictness manifests through increasing sustainability regulations, the inherently high level of control within the industry and the layered demands imposed by national and municipal authorities. Collectively, these forms of pressure drive the company not only to comply but to continuously evolve its sustainability practices across its SC.

A key insight from the data is the growing intensity of sustainability-related regulations, particularly from European institutions. One participant reflected on this trend, stating, "*I think there will be more regulations from EU about sustainability, absolutely*". Respondents pointed out that these regulations are becoming more detailed and more ambitious, not only guiding what must be done, but also influencing how sustainability efforts are communicated. Another interviewee noted a great shift in public procurement expectations, sharing that "*When I started 3 years ago, this was not a, this was not a big question […] today, it's the most important thing*". This growing regulatory focus pushes the company to reassess and reconfigure its processes in order to meet these changing expectations.

The commercial laboratory testing sector, as revealed in the interviews, is already a highly regulated industry, with extensive controls covering the handling of chemicals, waste and sensitive materials. One stakeholder explained that even minor shifts in the classification of

materials (e.g., cheese samples becoming animal by-products) can impose strict disposal obligations. Others described how the company must sometimes use regulated substances for analytical purposes, requiring careful documentation and oversight. The recognition that "*we have so many laws and so many things that are a direct impact*" suggests that compliance is extremely integrated in operational planning and decision-making.

Additionally, national-level regulations, especially in Sweden, were described as more rigorous than in other parts of Europe. This stricter legal environment leads to advanced environmental performance. As one participant explained, "*the law might be a little tougher in Sweden… and that's why we have come so far in our Swedish environmental work, comparing other companies in Europe for example*".

Beyond national laws, municipal and local government entities were seen as especially demanding and impactful. Numerous interviewees emphasized that municipalities and government-owned utility providers impose particularly strict requirements on water usage, electricity consumption and waste management and that these demands are becoming more rigorous each year. One interviewee described the pressure, stating, "*they are on us all the time and asking questions, can you do better?*".

Regulatory strictness acts as a constant, multi-layered force that requires continuous adaptation and accountability. From broad EU policy shifts to site-specific municipal controls, the company must navigate a dense and intensifying regulatory landscape. This dynamic not only ensures compliance but also leads to ongoing innovation and improvement in sustainability practices throughout the SC.

5.3.4. Certifications

Our analysis further reveals that certifications also play a strategic and complex role in shaping how the case company approaches SCS. These certifications, especially ISO standards, are not only regulatory checkboxes, but also tools for competitive positioning, operational alignment and stakeholder assurance. The data suggest that the company's approach to certifications is nuanced, balancing external demands, internal priorities and cost-benefit considerations.

A central theme that emerged is the selective adoption of certifications, based on both perceived value and customer expectations. One interviewee explained that although the company follows the principles of ISO 45001, it has opted not to pursue formal certification, stating, "*we*

haven't seen that it would be good for us to do the certification … our customer hasn't said that this is something that's important". This perspective reflects a pragmatic approach in which certifications are acquired when they directly support business goals such as customer retention or market access but not necessarily when the benefits are seen as indirect or limited.

At the same time, the interviews make clear that certain certifications like ISO 14001 and ISO 9001 are essential for credibility and commercial viability, as one stakeholder emphasized: "*without the accreditation we couldn't have a lot of the customers that we have*". Certifications are not only expected by many customers but are often written directly into contracts. In this way, compliance with recognized standards becomes a non-negotiable aspect of supplier qualification and customer engagement. This illustrates how regulatory influence is manifested through third-party certification bodies, indirectly reinforcing public regulations and aligning companies with widely accepted sustainability frameworks.

In addition, certifications are used as a competitive advantage. Several participants pointed out that displaying certifications, whether on the company website or in sales presentations increases marketability and reinforces the firm's sustainability credentials. One interviewee noted, "*this is the selling argument for us*", highlighting how certifications serve not only as compliance tools but also as proof of legitimacy, responsibility and strategic alignment with customer values.

Finally, the process of obtaining and managing certifications was noted to be formal and systematized, with responsibilities allocated to designated personnel such as the quality manager. This indicates that certifications are included in the broader operational processes and governance structures, strengthening even more their influence on SCS.

5.3.5. Auditing

Auditing, both internal and external, is a key regulatory mechanism influencing the case company's approach to sustainability within its SC. Through audits, regulatory expectations are not only set but actively enforced, ensuring that compliance is continuous, measurable and subject to verification. These audits function as both a control tool and motivators for maintaining high standards of environmental and operational performance.

One of the most important findings is the frequency and normalization of external audits. Participants described how the company is routinely inspected by governmental and regulatory

bodies to ensure compliance with environmental licenses and operational standards. As one interviewee stated, "*we are very used to having authorities coming to look at us […] many, many times each year*," highlighting how external audits are embedded into the company's routine. This regular oversight reinforces a culture of preparedness and adherence to sustainability obligations, especially in sensitive areas such as chemical handling and emissions reporting.

In addition to government-led inspections, the company is subject to external certification audits, such as those conducted by Swedac. These audits were seen as essential for maintaining the quality and credibility of the company's laboratory operations, which in turn affects decisions within the SC. One stakeholder explained that even product selection, such as choosing lab materials, is guided by audit criteria and cannot be based on cost alone: "*we can't just buy another plastic bottle because that's cheaper*". This demonstrates how auditing indirectly shapes SC procurement by enforcing quality and environmental standards.

The data also point to the company's internal auditing practices, which complement external checks. These include audits of analysis methods, ISO certifications and environmental protocols. As one participant noted, "*internal audits and external audits as well… we are audited by two different kinds of companies*", indicating a layered and complex auditing ecosystem.

The findings of our study are also supported by the principles and requirements presented in key EU legislation that directly or indirectly govern pharmaceutical, laboratory and life sciences operations. Together, Directive 2004/10/EC, Regulation (EC) No 178/2002, and Regulation (EC) No 1107/2009 illustrate the layered, evolving and strict nature of regulatory influence described in the primary data.

Directive 2004/10/EC on GLP aligns with interviewees' observations regarding frequent external audits, internal quality systems and certification requirements. The Directive mandates that testing facilities be subject to inspections by national authorities to verify compliance with GLP standards. This directly supports the stakeholder statements that "*authorities coming to look at us […] many, many times each year*", emphasizing the structured and enforceable nature of regulatory oversight in laboratory environments. The Directive also reinforces the interview-

based insight that compliance is not optional but an operational necessity to maintain scientific integrity and market legitimacy.

Regulation (EC) No 178/2002, which lays down general food law, also reinforces the strictness and traceability expectations discussed in the interviews. While originally intended for the food chain, its provisions on risk assessment, traceability and preventive control measures are highly relevant to laboratory and environmental testing contexts. It mandates that companies must "*identify from whom and to whom a product has been supplied*" (Article 18), echoing the data-driven focus on transparency, responsibility and compliance throughout the SC.

Similarly, Regulation (EC) No 1107/2009 supports the study's themes regarding regulatory dynamics and agreements, especially regarding the approval, classification and handling of sensitive substances. This regulation contains provisions for authorizations, reporting obligations and environmental safety, confirming the complexity and sector-specific detail that interviewees associated with managing chemical inputs and waste. For example, Regulation (EC) No 1107/2009 stipulates environmental risk assessments and periodic reviews, consistent with stakeholder accounts of operating licenses that specify chemical thresholds in wastewater and handling protocols.

These legislative sources support the regulatory themes that emerged from the primary data. They confirm that regulatory influence is not only multi-jurisdictional and evolving but integrated in certifications, operational licensing and audit structures. This creates a complex but clear regulatory environment in which laboratory testing companies must continuously adapt to sustain compliance, competitiveness and environmental responsibility.

5.4. Top management influence

Our research has revealed top management to be another significant source of internal influence on sustainability practices within the SCS of our case company. For the purpose of our case study, we consider top management to be, as the name implies, those stakeholders that hold a high-level position of authority within the company, such as the parent company and the managing directors (MDs). Accordingly, we believe the influence of top management on SCS to be exercised through the following three mechanisms: evaluation, demands, and direct support (see Figure 11).

5.4.1. Evaluation mechanisms

We have identified several instances in which top management implements evaluation mechanisms to influence the case company's SCS performance. This mechanism primarily takes the form of sustainability performance monitoring, group discussions on sustainability and follow-ups on goals and action plans.

Sustainability performance monitoring consists of systematically tracking and measuring various performance indicators over time, many of which typically correspond with the most significant sources of CO_2 emissions that are then used to estimate the company's overall carbon footprint. As such, sources such as "*electricity, heating, chemicals, [...] business travel, [...] commuting, waste, water, paper and refrigerants"* are of particular interest to the case company's top management, in accordance with the current protocols as well as to the case company's particular needs as a laboratory services provider. Waste management is also crucial in commercial laboratory testing SCs specifically, due to the handling of chemicals used in the laboratory process. As delineated by the Environmental & Chemical Manager, the final destination of this waste, which is potentially dangerous, is carefully tracked by the case company: *"...we're following it every year to see how much waste, and how much dangerous waste, and how much for combustion, and how much is recycled and so on."*.

Through this monitoring process, top management stakeholders are able not only to track progress on pre-established goals and demands, but also to follow-up on the case company's action plans. This is done to identify potential areas of improvement and to adjust strategies and goals accordingly; KPMG's 2024 report corroborates this by highlighting that data tracking can aid decarbonization efforts in the complex SCs of the life sciences sector. As such, follow-ups from top management emerged as another form of evaluation mechanisms. As one of the internal respondents put it:

> "*Each year we follow up on the environmental issues during the past year to see [...] our environmental goals and actions that we said we are going to do this year. And then we follow up with the MDs and see, have we succeeded? And if we haven't, why not? So we can make changes.*"

These follow-ups do not only serve as performance audits, but also to support the process of decarbonization and to maintain continuous pressure for improvement. As such, by questioning

and reflecting on the case company's sustainability performance, top management can exert their leadership commitment to the sustainability transition and improve its likelihood of success. Other additional group discussions on sustainability with similar goals may take place among top management, representing another evaluation mechanism with a focus on leadership alignment. In the own words of the Logistics Manager:

> *"We are taking actions by putting a group together that is managed by [the Environmental & Chemical Manager], so we sit down 4 times a year to discuss all these related questions that pop up, and how we are supposed to manage them. We set new goals for the upcoming year, for an example..."*

5.4.2. Demand mechanisms

Another mechanism through which top management exhibits influence over the case company's SCS is through the communication of demands and goals. Top management stakeholders can formulate their expectations and provide directions and therefore shape organizational behaviour by setting clear demands, goals, and by prioritizing sustainability in their overall strategy. When sustainability is strategically prioritized on an executive level, such influence usually shapes the top management's overall leadership approach (Norton et al., 2015), as we have also identified to be the case within the case company. In connection to this, one of the respondents claimed that:

> "*...it's a major [priority], the environmental question, especially for our owners of the company. We have a very tight environmental policy, a global policy that says that [the case company] is supposed to be climate neutral before the year 2025 has ended."*

As such, the level of importance that top management places on sustainability determines its position as a strategic focus in decision-making processes such as supplier selection and internal operations. In our case study, the top management stakeholders are shown to hold sustainability as one of their main strategic priorities, as indicated both by interview evidence (see quote above) and by the company's public communication, such as statements on their official website. This prioritization reflects itself in the tight environmental policy and the ambitious climate neutrality goals set by top management, which subsequently influences the demands and the goals that top management sets out in order for the case company to improve

its SCS. The respondents have identified top management, especially the parent company, as a major influence towards the case company's SCS; as the Environmental & Chemical Manager states: "*[the parent company's center] is in [redacted]. And they have, of course, a lot of things that we need to follow and they have goals they hope we should achieve to make us work in that direction.*".

> *"[The parent company] essentially has, of course, a very big impact. Because they have said to all of the companies [in the group] since 2019 that we need to follow up our CO_2 footprints each year and that we should reduce the impact. And of course, everyone at [the case company] is working with that."*

5.4.3. Support mechanisms

The final type of influence mechanism that we identified in association with top management stakeholders is support mechanisms, which can take the form of performance-based incentives, financial support and autonomy. As mentioned in one of the interviews (see quote below), significant sustainability efforts or milestones can be rewarded financially to encourage recurrence. In addition to incentivization, these financial rewards can reinforce a culture of continuous sustainability improvement within the case company.

> "*And then we have goals for CO_2 emissions for each company in the [group], how much CO_2 emissions we should reduce every year. These goals have an economical impact for the MDs, if they follow the goals they have, I don't know exactly if it's a bonus or some economical effect, if they keep up with the goals*."

As a more proactive form of influence, financial support may also be granted to facilitate the implementation of sustainability initiatives by removing eventual resource barriers: "*So when it comes to our owner, our global owner, they will always provide us with the financial approval if we want to do something that gains sustainability, environmentally friend solutions somehow...*". At the same time, providing autonomy in reaching sustainability objectives may be employed by top management as a more indirect influence mechanism, or lack thereof, to encourage local teams to reach sustainability goals and demands in their own way: *"Of course, we do action plans in Sweden, we can go our own way as long as we just reach the goal and we can present something…".*

5.5. Employee influence

Our research suggests that employees are not simply passive bystanders or recipients of sustainability directives from their employer; they can also be active participants and exercise some influence of their own on the company's SCS efforts. This employee influence primarily takes the form of communication mechanisms, however other kinds of influence have been shown to take place (see Figure 12), as elaborated upon below.

5.5.1. Communication mechanisms

The case company recognizes the value of employee feedback on internal operations due to the employees' proximity and familiarity with specific processes that could accommodate improvement: "*...the employees can really make a change at their workplace, because they have a lot of this, and they work with it every day, so they can see what is, what can we do…*". As such, "grassroots" operational staff may hold insights that MDs might overlook due to their more limited involvement with daily laboratory activities. It is for this reason that the case company has taken measures to facilitate communication mechanisms with individual employees, as a result enabling them to exercise their influence on the company's SCS.

Accordingly, communication with employees in the case company occurs through forum participation, actively seeking out employee suggestions and perspectives, sharing information about sustainability progress and initiatives, and encouraging internal best-practice sharing. Some examples of employee-driven sustainability improvements following suggestions have been provided by the Environmental & Chemical Manager and the Logistics Manager respectively, and they are best visualized by the respondents' direct quotes:

> *"At the lab we use a lot of chemicals and for one analysis we use a chemical containing a little bit of lead; and it's used in the method, and then it went out into the wastewater. Very low concentration, but still an employee […] said, "can't we collect this processed water from this analysis and take care of it as dangerous waste instead? So the lead won't go out with the water." And this we have started to do, and we can see a change in the lead concentration in our waste water."*

> *"We also have ventilation cabins in all the laboratories, if you don't close the hatchet of this, when you're not using this ventilation cabin, it's gonna be a big waste of energy for an example, and by just putting a new routine that you're*

supposed to close this after you work [...], I suppose we saved a lot of energy just by doing that, and that was also suggested from an employee."

In addition to voluntary suggestions, employees can hold valuable perspectives that are often seeked out through the use of forms, in which employees can voice concerns, contribute ideas, offer information about their commuting habits or simply share their own points of view regarding the environmental question. For a more active form of participation, the case company offers the possibility for participation in "*environmental forums with those who want to be a part of this*" with the intent of best-practice sharing. Such forms of knowledge-sharing can foster a workplace culture of continuous sustainability improvement and employee empowerment (Arthur & Kim, 2005).

5.5.2. Other influence mechanisms

Other additional forms of influence from the workforce have emerged in our case study. We have found that employee influence can also manifest itself through job satisfaction, employee-driven accountability and employee participation in low-carbon initiatives. Regarding job satisfaction, the case company's Environmental & Chemical Manager claims that:

"If the company doesn't listen to their pleas, I think the employees will only like, ok, I go to work and I get my money and then I go home. But we [...] want to have committed employees to do a really good job and to improve their business."

This suggests that, if the case company fails to meet the employees' expectations regarding sustainability, it risks weakening their engagement and motivation. When sustainability is a part of the work environment, employees may feel encouraged to contribute through suggestions and perspectives. However, if their expectations are disregarded, the employees' attitude towards the case company and the workplace may become purely transactional, causing them to disengage from broader organizational goals and restricting their participation to a minimum. As the respondent states in the second part of the quote, this scenario is considered undesirable, therefore employees can be a source of internal pressure that can influence the company's sustainability direction and commitment.

Similarly, some employees can expect transparent, evidence-driven follow-ups to sustainability goals and action plans, where management is required to show actions, outcomes and future improvements. By requesting concrete data, employees could pressure the case

company to maintain credibility in its statements regarding sustainability. This employee-driven accountability is best described by the Logistics Manager:

> *"...we have seen that this is very important for employees at [the case company], if we say something they want to see results. I cannot just sit in a meeting and say, "ah, you were great, we decreased our CO_2 emissions by one and a half percent last year". [...]. They want us to show everything we have done. And then yeah, best of all they want us to show them by a PowerPoint presentation and diagrams and stuff like that and see how small things, small changes in the daily work can be affected on the CO_2 emissions."*

Finally, while employee participation in the case company's low-carbon initiatives could be seen as a form of influence by the company towards its employees, we have determined that such actions can also be considered a bottom-up influence, from employees towards the company itself. According to the Logistics Manager, within the case company, commuting has been determined to be one of the "*three biggest crooks when it comes to environmental pollution*", alongside logistics-related emissions and chemical emissions. As a result, the case company is working on providing incentives such as financial aid in purchasing bicycles, electric vehicle charging stations, and even hiring repairmen to offer free bicycle repairs on specific days.

By choosing to engage in such initiatives, the employees actively contribute to the company's sustainability performance through voluntary behavioural changes, such as switching to greener commuting practices, in accordance with the company's incentivization. As a result, employees can influence the company's CO_2 emissions significantly.

5.6. Community influence

For stakeholders representing the local communities, the influence seems to be arguably weaker than for other stakeholders. Regardless, this influence is found to be manifested mainly through contextual mechanisms, but also through other types of influences (see Figure 13).

5.6.1. Contextual mechanisms

Communities —whether local, national or international— can shape the case company's context in which it operates, which could in turn influence its efforts to adopt sustainability in its SC operations. Correspondingly, we have identified two elements to this influence mechanism: the wider national context and the wider global context.

The wider national context, as it appears in our research, consists of country-specific characteristics which can influence the case company's SCS operations in one way or another. In our case study, these characteristics most predominantly take the form of societal perceptions and the political environment in which the company operates. In Sweden, where the case company is active, the respondents noted the welcoming attitude of Swedish society towards sustainability, to the point in which "*it's a no-brainer for everybody that we are working with*". This embedded institutional emphasis on sustainability increases the case company's ability to raise sustainability questions with its business partners, as the subject is normalized through shared norms and societal attitudes, in line with the teachings of institutional theory.

In contrast to these findings, the political environment in which the company operates has been identified as being more volatile, which could hinder long-term sustainability commitments. Regarding social sustainability, one respondent claimed that "*we have also a lot of people in Sweden which are going in the wrong direction when it comes to social things, that people coming from other countries should be thrown out…*", bringing up social tensions arising from complex political phenomenons that could pose a challenge in maintaining inclusive practices across the entire SC. Potential negative shifts in the political environment have also been identified in regards to environmental sustainability, with one respondent claiming: "*I don't think we have a very good government for the moment when it comes to the environment, they're not bad, bad, but they are going a little bit back*". This implies that even in a country with progressive views towards sustainability such as Sweden, institutional support for climate action can subside unexpectedly in accordance with changes in the current political leadership. Such concerns have been extended to the wider global context as well, which have been labelled as a challenge:

> "*The challenges we have, I would say they are the concern in the world at this moment, with a new president in the [United States] and the war in Ukraine. Of course that affects us, it affects everything.*"

This quote highlights how international geopolitical developments are perceived to influence the company's SC operations and sustainability efforts, regardless if they occur outside of the case company's national environment. The mention of political leadership changes in the United States could point to the unpredictability in international climate agendas and trade agreements, which can negatively influence sustainability commitments. Similarly, the mention of the war in Ukraine serves to strengthen the respondent's concern over potential sudden SC disruptions.

5.6.2. Other influences

During the interviews, participants were asked to reflect on potential influences that communities might have on the case company's SCS. Interestingly, the most common answer in relation to this question was an apparent lack of community influence; for example, the Environment & Chemicals Manager claimed "*I don't think I have noticed, like questions from the community in that way about sustainability*". We believe this could be attributed to the case company's Business-to-Business operations, which make it less visible to the public eye, and therefore less likely to interact with it.

Several other miscellaneous types of influence from the community were, however, later identified during the data analysis. In particular, community stakeholders seem to hold the power of legitimacy over companies acting in their local area. Throughout the interviews, there were several instances of respondents claiming that one relevant aspect of taking sustainable action is for the case company to be seen in a positive light by the public:

> "*...sometimes when we are doing something then we try to get it in the newspaper, to write a little about this. So the community can see that [the case company] exists, it's a workplace, and that we try to work with the sustainability.*"

These findings align with institutional theory, which claims that companies seek legitimacy in relation to their stakeholders (see Section 2.5.2.). This pursuit of legitimacy can be seen as part of a broader effort to meet societal norms and expectations. As such, the community serves as a stakeholder whose approval is valued by the case company, thereby influencing its striving for sustainability to align with the community around it.

Another community influence mechanism in this category is represented by infrastructure limitations. Several respondents, including the case company's logistics provider, have named

the lack of infrastructure as a challenge in achieving the transition to green logistics in the case company's SC. "*And the infrastructure, when it comes to typical big line hauls... it's not optimized for using hydrogen cars or electric cars, for example*.". Issues such as the dependence on electric vehicle charging stations for long-distance logistics cannot be overcome if the local infrastructure does not allow it, most often acting as a bottleneck on the case company's SCS efforts. These findings suggest that even when companies are motivated to switch to low-carbon logistics solutions, their efforts are influenced by the infrastructural circumstances of the communities in which they operate.

6. Conclusion

This chapter summarizes the findings of our research, outlines its theoretical and practical contributions, reflects on its limitations, and presents opportunities for future research.

6.1. Conclusion of research

The purpose of this thesis was to explore the stakeholder influence mechanisms on the SCS of commercial laboratory testing companies. For this purpose, we employed a single case study based on the Swedish subsidiary of a multinational company operating within the life sciences sector that offers commercial laboratory testing services. To collect data, six semi-structured interviews were conducted with upper management representatives of the case company and one of its stakeholders; these interviews were later supported by secondary data whenever available. Our thematic analysis of the primary data led to the identification of 18 distinct stakeholder influence mechanisms distributed across six stakeholder groups, namely customers, suppliers, regulatory bodies, top management, employees and the community.

We have found that each aforementioned group of stakeholders contributes to SCS through a variety of influence mechanisms (summarized in Figure 14) that are shaped by their role, interests and interaction with the case company. Customers are found to influence SCS through mechanisms of relational dependence, communication mechanisms and indirect mechanisms. Suppliers influence SCS through their own internal practices, through relational mechanisms and communication mechanisms. Regulatory stakeholders establish their influence through evolving legislation, formal agreements, strictness, certification requirements and audit processes. Top management exerts internal influence evaluation mechanisms, demand mechanisms and support mechanisms. Employees influence through communication channels and other influence mechanisms, while communities influence through contextual mechanisms and other influence mechanisms.

6.2. Theoretical and practical contributions

From a theoretical perspective, this study contributes to a growing body of knowledge on stakeholder influence in SSCM by offering an exploratory framework based on the commercial laboratory testing industry, which we believe to be understudied. As previously noted, this industry has received limited attention in life sciences research despite its vital role in ensuring product compliance and safety across various domains such as agriculture, food and pharmaceuticals. Moreover, commercial laboratory testing companies occupy an interesting position at the intersection of life sciences and traditional commercial businesses, which we believe to merit further academic exploration. As such, by focusing on these circumstances, the study offers new insights into the niche but impactful SCs of commercial laboratory testing companies.

From a practical perspective, our findings could offer practical benefits for companies aiming to strengthen their SCS. By gaining awareness of the potential external and internal influences that could affect their companies' SCS efforts, practitioners could make more informed strategic decisions and proactively engage with diverse stakeholder groups in accordance with these mechanisms. Moreover, based on our findings, practitioners could identify and reflect on which stakeholder influence mechanisms take place into their own organizational context.

Based on this information, companies could, for instance, formalize stakeholder inputs by integrating sustainability criteria into contracts, performance reviews and communication protocols. In addition, organizations can benefit from investing in transparent data-sharing systems to respond more effectively to supplier limitations and customer information requests, requirements or suggestions. Building internal alignment across departments and leadership levels ensures that top-down strategies are reinforced by employee-level execution and stakeholder responsiveness. As such, this awareness and proactive action regarding stakeholder influence mechanisms can enhance competitive advantages.

6.3. Limitations and future research

This study faces several limitations that must be acknowledged, most notably the sample size which consisted of only six interviews. This limited sample size was the result of both the time-bound nature of the study and the specific research purpose, which required insights from

individuals with strategic decision-making authority. Within the case company, the limited number of MDs that relate to our research purpose and RQ constrained the pool of potential interview participants. In addition, upper management individuals typically have a lower level of availability than other types of personnel, which became apparent upon reaching out to the case company's external stakeholders; as such, we were only able to conduct one interview with representatives of external stakeholders within the given time-frame. More comprehensive research can be done in the future to address this sample size limitation.

In addition, the decision to focus on a single case study, which was driven by access constraints and resource limitations, enabled us to explore the case in-depth but also limited the generalizability of our findings. Future research could expand the scope by including multiple companies, different stakeholder levels and cross-national comparisons to better understand the variability and transferability of influence mechanisms across different settings and contexts. Future research could also build on our findings by deepening the investigation into individual stakeholder groups, exploring sector-specific dynamics and testing interventions that strengthen sustainable collaboration across supply networks.

7. References

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8. Appendix

Appendix 1. Interview guideline.

Questions for the Logistics Manager:

- How important is sustainability in [the case company's] SC strategy? How is it prioritized?
- What concrete measures does [the case company] take to enhance SCS?
- How do different stakeholders influence [the case company's] SCS?
- Which stakeholder types hold the most and least influence over [the case company's] SCS? How/why?
- How does [the case company] respond to sustainability-related requirements or pressures from stakeholders?
- How does [the case company] ensure compliance with sustainability requirements?
- What challenges does [the case company] face in meeting sustainability expectations?

Questions for the Environment & Chemicals Manager (first interview):

- How important is sustainability in [the case company's] SC strategy? How is it prioritized?
- What concrete measures does [the case company] take to enhance SCS?
- How do different stakeholders influence [the case company] SCS?
- Which stakeholder types hold the most and least influence over [the case company's] SCS? How/why?
- How does [the case company] handle sustainability-related expectations, requests or pressures from stakeholders? What strategies are used to respond or adapt?
- How does [the case company] work with its partners to ensure that sustainability expectations are understood, implemented and maintained across the SC?
- What challenges does [the case company] face in meeting sustainability expectations?
- How do you see stakeholder influence on [the case company's] SCS evolving in the next 5-10 years?

Questions for the Environment & Chemicals Manager (follow-up interview):

- How do different stakeholders influence [the case company's] SCS?

- Which stakeholder types hold the most and least influence over [the case company's] SCS? How/why?

Questions for the logistics provider's Chief Executive Officer:

- How would you define sustainability?
- How important is sustainability in your company's SC strategy? How is it prioritized?
- How does your company take sustainability decisions?
- How would you describe your company's role as a stakeholder in [the case company's] SC?
- Does your company engage with sustainability in [the case company's] SC? How?
- To what extent does your company hold influence over [the case company's] SCS?
- Does your company collaborate with [the case company] on sustainability? How?
- Does your company face any challenges in driving sustainability in [the case company's] SC? Which?
- How do you see/hope sustainability evolves in [the case company's] SC over the next 5-10 years?

Questions for the Sales & Marketing Director:

- What kinds of sustainability requirements/expectations do your customers usually express?
- How do your customers communicate these requirements/expectations?
- Does [the case company] experience any challenges in meeting these requirements/expectations?
- Is there any sort of sustainability collaborations between [the case company] and any of its customers?
- Do sustainability preferences vary between different customer sectors (for example: pharma vs. food industry, public vs. private)?
- Have customer expectations influenced your choice of suppliers (for example: testing equipment, chemicals, logistics)? If so, how?
- Can you give an example where a customer requirement led to a specific change in [the case company's] operations?

Appendix 2. The thematic analysis process (simplified).

The Customer influence theme:

Quotation example	**Code**	**Category**
"It's customers that that has put us on the market, so we need to listen to them to be, you know, still working in five, 10-20 years."	Dependence on customers	Relationship dependence
"W*e need to do what many of the customers, important customers want us to do because otherwise we would be out of the picture*."	Large customer influence	
"*We want to make long-term deals with our customers."*	Long-lasting customer relationships	
"*Sometimes they also have requests. And if there are several customers that are asking for the same thing. Then we of course start looking at it."*	Suggestions from customers	Customer communication
"*For customers, to able to win that customer some of them have [requirements], you know, "you must have all these to be able to sell to us*"".	Customer requirements	
"When it comes to the local customer, the private customer, I don't think they don't even care, they only want to have their samples analyzed as soon as possible."	Differing customer priorities	
"We want to make long-term deals with our customers and we will do it together."	Collaboration with customers	
"And some of them have some kind of corporate sustainability, you know, the ethics…"	Customer compliance with norms	Indirect customer influence
"Our suppliers and our customers will also have more regulations or impact from EU, so they I think they would like to have even more information from us about our sustainability."	Customer compliance with regulations	

The Supplier influence theme:

Quotation example	**Code**	**Category**
"*We put up goals every year: "We should do this and this in 2025, 2026". When you do that it's easier to get clients, because a lot of clients are looking for that as well."*	Supplier associating sustainability with business advantage	Supplier-specific drivers
	Supplier self-driven environmental goals	
"When you employ people also, it doesn't matter […] if they come from Stockholm or Afghanistan […]. I think that's a normal thing to think so, because I am one of the owners of the company, I can do this decision myself, so we'll never have a problem with that."	Values embedded in ownership culture	

"I would say that [the case company] has done so much already that it's getting hard to improve because we are so […] dependant on the other suppliers providing us the correct infrastructure and all the solutions, yeah, we are so dependent on that they are doing their job as well."	Supplier limitations	
"If we demand other types of products they have to change, because the volume we are purchasing from these suppliers is so big that we are able to [influence them] to make changes for us. But in the aspect if they care, I'm not sure."	Suppliers prioritize profit	
"If [we] hear something, then we can start looking at it. But most of it we just rely on them, that they are following it and not checking if they really do so."	Trust-based relationships with suppliers	Relational supplier influence
"*The quality from the supplier is very important. So, sustainability, if you look like they need to be on the market in five years, we need to have a long term. So, if we buy some instruments from them, and we need them to take care of the instrument when something is broken. Sustainability in that way that needs to be serious, and a long-term supplier is important."*	Supplier reliability	
"It's really critical that it works with them because they are moving almost all of our samples, and if it shouldn't work one day then we have big problems. So that's very crucial and we have, yeah, we have a good relationship with them."	Building long-lasting supplier relationships	
"*We try to use subcontractors with this, what we call, ESG. […]. Using the same people to work with, as our view over the global goals.*"	Supplier goal alignment	
"*When we made an agreement with [the logistics provider] a couple years ago, for the coming three years or something, then we had requirements how much of that transportation has to be done by electric or HVO 100 and so on. So that was part of the agreement*."	Suppliers respecting sustainability demands	
"*For some of the bigger suppliers that we have very good relations with, we can talk about how to solve different questions and what one could do in a better way.*"	Collaboration with suppliers	Supplier communication
"The suppliers are now calling me and want to present new types of articles that are maybe 80% reused plastic bottles for example."	Supplier offers and suggestions	
"We have to have good data from the suppliers to be able to put it in our report."	Suppliers as information providers	

The Regulatory influence theme:

Quotation example	Code	Category
"When we are reporting CO2 emissions, I would say that's the biggest difference from a couple of years back."	Changes in sustainability regulations	Regulatory dynamics
"...government laws that we need to adjust to and it's not only the Swedish laws, it's the European laws [too]."	Variety in regulatory pressures	
"We must follow the laws because we are a sustainable company and we want to be on the market for a very long time."	Compliance for business continuity	Agreements
"We have an agreement that we are allowed to do it, but under these [conditions], they say "then you need to follow this and you need to explain for us how you can make sure that's safe to work with."	Agreements with regulatory stakeholders	
"We follow what we call unions in Sweden that we work very closely with, so every employee gets fair enough what they should be paid and things like that."	Goal alignment with regulatory stakeholders	
"I think there will be more regulations from EU about sustainability, [...] how we should act and also how we can communicate when we're doing something within sustainability."	Increasing sustainability regulations	Strictness
"And then we have regulations for, we have a lot of chemicals at [case company], of course [there are] many regulations about that."	Highly regulated industry	
"The law might be a little tougher in Sweden than the rest of Europe, and that's why we have come so far in our Swedish environmental work."	Strict national demands	
"[The communes] and the municipal companies, they have their own policies and very hard policies, [...] that we need to apply to."	Strict municipal demands	
"The standard ISO 45001 is for work environment and [...] we haven't got the certification, but we are kind of following it anyway, but we haven't seen that it would be good for us to do the certification."	Selective adoption of certificates	Certifications
"We do [it] because this is the selling argument for us, if we can show the certificates to our potential customers, I think our product would sell itself."	Certifications as competitive advantage	
"The quality manager of Sweden, will arrange all this certificate, the agreements with the provider of these certificates."	Obtaining certificates	
"*Internal audits and external audits as well, on our analysis methods, the environmental, the ISO certifications, and we are audited by 2 different kinds of companies: one is a government company, the other one is working on the private sector as well."*	External auditing	Auditing
	Internal auditing	
"We are accredited on our analysis methods, and so we have audits, maybe 3, 4, 5 times a year."	Frequent audits	

The Top management influence theme:

Quotation example	Code	Category
"We measure us in so many ways you cannot imagine we're measuring us in…"	Sustainability performance monitoring	Evaluation
"We are at taking actions by putting a group together that is managed by [the environmental manager], so we sit down 4 times a year to discuss all these related questions that pop up, and how are we supposed to manage them."	Group discussions on sustainability	
"…new action plans that get followed up 4 times a year to see how far have we gone in this project? Can we do more?"	Followed-up by top management	
"[The parent company] has this code of ethics on how we should behave. And our supply chain also has to follow these rules, regarding the rights for humans among the world and the economics and whistleblowing and all those topics that we need to follow. So, they are mandatory that our supply chain has to accept that they are following those."	Demands from top management	Goals and demands
"It's important with sustainability because [the case company], the owner, they have goals that they want the separate business unit to achieve. Among [which is] CO2 reduction."	Goals from top management	
"…a major priority, the environmental question, especially for our owners of the company."	Top management prioritizes sustainability	
"These goals have an economic impact for the MDs, if they follow the goals they have, I don't know exactly if it's a bonus of some economical effect; if they keep up with the goals."	Sustainability performance-based incentives	Top management support
"When it comes to our owner, our global owner, they will always provide us with the financial approval if we want to do something that gains sustainability and environmentally friendly solutions somehow."	Financial support from top management	
"We can go our own way as long as we just reach the goal and they can present something to our owners."	Autonomy on reaching sustainability objectives	

The Employee influence theme:

Quotation example	Code	Category
"And then we look at the different sites to see […] if it's a big difference, why do we think that [is the case]? […] we look at this to see if we can learn something from the different sites."	Internal best-practice sharing	Communication with employees
"Yeah, we have forum that our employees can be committed to… because we want everybody's help. The management at [the case company] cannot do all the work by themselves, we need other voices to help us move in the right direction"	Employee participation in forums	
"*We also have ventilation cabins in all the laboratories, if you don't close the hatchet of this, when you're not using this ventilation cabin, it's gonna be a big waste of energy for an example, and by just putting a new routine that you're supposed to close this after you work […], I suppose we saved a lot of energy just by doing that, and that was also suggested from an employee."*	Gathering employee suggestions	
"*We do some forms that goes out to all our employees; "How important is this environmental question for you?""*	Gathering employee perspectives	
"We reach out to our employees about the work we are doing at [the case company]."	Information-sharing with employees	
"If the company doesn't listen to their pleas, I think the employees will only like, ok, I go to work and I get my money and then I go home. But we […] want to have committed employees to do a really good job and to improve their business."	Sustainability and job satisfaction	Other mechanisms
"…we have seen that this is very important for employees at [the case company], if we say something they want to see results. I cannot just sit in a meeting and say, "ah, you were great, we decreased our CO_2 emissions by one and a half percent last year". […]. They want us to show everything we have done. And then yeah, best of all they want us to show them by a PowerPoint presentation and diagrams and stuff like that and see how small things, small changes in the daily work can be affected on the CO_2 emissions."	Employee-driven accountability	
"To make the people, at the lab to commute in a better way. Then we try to make it easier for them to bicycle to the job."	Participation in low-carbon initiatives	

The Community influence theme:

Quotation example	Code	Category
"The mentality is Sweden, if you compare it to other countries, is that these questions are so important, so it's a no-brainer for everybody that we are working with."	Wider national context	Context
"Uh, the challenges we have, I would say they are the concern in the world at this moment, with a new President in the US and the war in Ukraine. Of course that affects us, it affects everything."	Wider global context	
"And the infrastructure, when it comes to typical big line hauls... it's not optimized for using hydrogen cars or electric cars, for example."	Infrastructure limitations	Other societal influences
"*...sometimes when we are doing something then we try to get it in the newspaper, to write a little about this. So the community can see that [the case company] exists, it's a workplace, and that we try to work with the sustainability."*	Seeking legitimacy from community	
"*I don't think I have noticed, like questions from the community in that way about sustainability."*	Apparent lack of local influence	