Stockholm School of Economics

Department of Management and Organization

Master thesis

May 2022

"What's your particular way of doing standardized emission reporting?"

A Swedish study on measurement and reporting practices of scope 3 emissions

Authors: Ingrid Hedin, 41827 and Tim Ortner, 41818

Supervisor: Svetlana Gross

Abstract:

Following the saying "what gets measured, gets managed" the constructed notion of GHG emissions measurements has, in the environmental sustainability context, increasingly been shaping business decisions and academic debate. However, the current state of measurement and reporting of scope 3 emissions, which generally account for the majority of firms' emissions, is inconsistent and incomplete. As the common understanding of the concept of scope 3 emissions itself as well as their quantification is questionable, this study aims to shed light on how the perception of *Scope 3 Emission Measurement and Reporting* (SEMR), as well as adopted practices, differ across firms. Following an abductive qualitative approach, 21 participants from 10 large Swedish firms were interviewed using a semi-structured format. It was possible to identify coherent sets of SEMR practices that are shaped by underlying values and shared beliefs sitting at the heart of an organization's culture. As such, differences in culture, contribute to differences in the adopted scope 3 approaches, which were described with the help of Quinn's (2011) competing values framework. While these findings complement traditional reporting theories, they raise critical methodological concerns on the relevance of research that aims to understand the adoption and quality of indirect emission measures by quantitatively studying firms' published emission data. The findings further imply that cultural awareness and development are necessary to further drive SEMR both internally as well as through external actors and regulators.

Keywords: scope 3 emissions, sustainability reporting, value chain emissions measurement, organizational culture

Acknowledgements

We feel lucky to have received great support throughout the process of writing this thesis. We would firstly like to thank all the partner companies for participating in our study, especially the interview participants for taking their time helping us to many interesting findings, and for making this process truly enjoyable. We would also like to grant a special thank you to our supervisor Svetlana Gross for her guidance, valuable insights and support throughout the whole process, contributing to making this thesis possible. Lastly, we would like to thank our course directors Markus Kallifatides and Susanne Sweet for the learning opportunities throughout this semester.

Thank you!

Ingrid Hedin & Tim Ortner

Table of Contents

Table of Figures

Definition of Terms

CO2 equivalent (CO2e): The universal unit of measurement to indicate the global warming potential (GWP) of each greenhouse gas, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis (GHG Protocol, 2004).

Direct emissions: Emissions from sources that are owned or controlled by the reporting company (GHG Protocol, 2004).

Downstream emissions: Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment) (GHG Protocol, 2004).

Greenhouse gases (GHG): For the purposes of this standard, GHGs are the six gases covered by the UNFCCC: carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF6) (GHG Protocol, 2004).

Primary data: Includes data provided by suppliers or other value chain partners related to specific activities in the reporting company's value chain. Such data may take the form of primary activity data, or emissions data calculated by suppliers that are specific to suppliers' activities (GHG Protocol, 2011).

Scope 1 emissions: Emissions from operations that are owned or controlled by the reporting company (GHG Protocol, 2004).

Scope 2 emissions: Emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by the reporting company (GHG Protocol, 2004).

Scope 3 emissions: All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions (GHG Protocol, 2004).

Scope 3 emissions measurement and reporting (SEMR): The methodology and practices used by companies and other organizations to measure, prepare, and publicly report a GHG emissions inventory that includes indirect emissions resulting from value chain activities (i.e., scope 3 emissions) (GHG Protocol, 2004).

Secondary data: Includes industry-average data, financial data (spent-based approach), proxy data and other generic data (GHG Protocol, 2011).

Upstream emissions: Indirect GHG emissions from purchased or acquired goods and services (GHG Protocol, 2004).

Value chain: In this study, "value chain" refers to all the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use (GHG Protocol, 2004)

1 Introduction

1.1 Background and Purpose

The world is currently facing a multitude of crises in form of global warming, mass extinction, and extreme inequality to name a few. While the current capitalist economic order may have brought economic growth and prosperity, it also constitutes a major driver in these environmentally and socially unsustainable and irresponsible practices, as such considerations are seen as mere externalities of the market system. On this backdrop, the ideas of the economist Pigou, who was key in focusing economics on public welfare pioneering the notion of measurement and possible taxation of spill over cost or negative externalities, have received a revival in recent years (Kumekawa, 2017). Following Peter Drucker's credo "what gets measured, gets managed" (Prusak, 2010) greenhouse gas (GHG) emissions, the major driver of climate change, ought to be quantified. Measuring can thus be seen as a tangible activity initiating an underlying change in business practices. Under this logic, GHG emissions measurement has not just become a central topic in political, financial, and academic domains but it is actively shaping firms' investment and business decisions (Busch et al., 2022). While critics of Pigou's ideas have long argued that it is extraordinarily difficult to truly measure the social costs of any externality (Baumol, 1972; Boettke, 2012) and a clear assignment of responsibility is impossible (Coase, 1960), the rise of corporate GHG emission measurement - 92% of the Fortune 500 provide GHG data in 2016 (Kaplan & Ramanna, 2021) - does show its relevance for today's economics transition towards a carbon-neutral society.

Despite this increasing adoption, the early criticism mentioned above does indeed pose its challenge towards the measurement of CO^2e, as it "is not so much a 'thing' but rather a series of social agreements between numerous actors as well as a broader implicit pact with the public, authorized and enabled by law" (Dehm, 2018). Significant effort under international cooperation has been devoted to developing a standard understanding and guidelines for calculation. Consequently, the *GHG Protocol Corporate Accounting and Reporting Standard* (GHG Protocol, 2004) has been adopted by both private companies as well as governments (Patchell, 2018). To differentiate accountability the initial standard (GHG Protocol, 2004) constructed the concept of "scope". Scope 1 emissions are defined as "direct GHG emissions from sources that are owned or controlled by the company" (GHG Protocol, 2004) while scope 2 emissions are seen as indirect emissions from purchased electricity. The third category – scope 3, includes all other indirect emissions, which are not in control of the firm itself but rather occur throughout the entire value chain. While the scope 3 accounting and reporting supplement (GHG Protocol, 2011) defines 15 different categories of upstream and downstream emission types and provides guidance on building measurement practices as well as additional calculation guidance, the concept of scope 3 emission measurement and reporting remains rather vaguely defined (Shrimali, 2021).

Though driven through commonly accepted institutions the common understanding of the concept of scope 3 emissions itself as well as their measuring and reporting are questionable. Additionally, the indirect nature of scope 3 emissions requires firms to rethink relationships and engage with stakeholders to jointly make sense of processes and quantify emissions

throughout value chains, which further increases complexity and reduces accountability (Shrimali, 2021).

As such it is unsurprising that published scope 3 emission data is often incomplete, inconsistent (Busch et al., 2022) and many reporting companies ignore scope 3 measurements entirely (Kaplan & Ramanna, 2021). These limitations of measured and reported emissions significantly hamper stakeholders' ability to reasonably assess, monitor, and compare companies' climate performance as on average the scope 3 emissions are 5.5 times the amount of combined scope 1 and scope 2 emissions (BSR, 2020). If data continues to remain unreliable, the idea of taking responsibility for negative carbon-related externalities and mitigating total emissions across value chains will remain an idea.

Although clearly challenging a multitude of leaders and researchers is convinced that it is possible to transition toward a capitalistic system that aligns with environmental values and is devoting its efforts and energy toward driving it (Henderson, 2020). As such the debate on how to drive firms towards developing reliable and standardized measures is lively not only within the academic sphere but also in the public context. Within these debates however, the constructed concept of scope 3 emissions is largely taken for granted, thus missing potential underlying misalignments in understanding. Within this study, the authors challenge this assumption and shed light on how the perception of *Scope 3 Emission Measurement and Reporting* (SEMR) as well as how adopted practices differ across firms.

1.2 Problem Discussion

1.2.1 Practical Perspective

From a practical perspective, it seems necessary to further drive the adoption of scope 3 measurement and reporting practices. Doing so, engaging with businesses to support and pressure from the outside has been shown to be the major driver of adoption (Doni et al., 2019; Liesen et al., 2015; Manetti, 2011; Vitolla et al., 2019). Considering the firm's external environment different stakeholders including climate initiatives or environmental consultants, shareholders, and customers as well as regulators, play a crucial role. While shareholders and customers can exercise pressure toward a more transparent and complete disclosure of data (Goettsche et al., 2016; Liesen et al., 2015), guidance and support through direct engagement are also seen as vital.

As such an increase in engagement is needed to drive adoption throughout the value chain SEMR (Linnenluecke & Griffiths, 2010). While a limited number of studies have explored how stakeholders engage with firms to drive sustainability reporting (Manetti, 2011), little is known about how to address individual firms most effectively along the value chain (Lozano et al., 2016). Lozano et al. (2016) point out that there is no “one size fits all” when it comes to sustainability reporting, indicating that firms have different approaches toward building effective scope 3 measurement and reporting practices. In fact, the scope 3 standard hints toward inherently differing approaches stating that “before accounting for scope 3 emissions, companies should consider which business goal or goals they intend to achieve” (GHG Protocol, 2011). This in turn then implies that different forms of engagement and support are

required. In doing so it seems material to understand how the approach towards SEMR differs across firms in the first place and how it is influenced by management perception.

Similarly, regulators must understand such differences in firms' approach toward SEMR to be able to design regulation which is effective in driving carbon reduction efforts rather than simply becoming a disconnected administrative burden for companies. Among the mechanisms discussed above regulatory pressure is seen as a major driver for the adoption of sustainability reporting and hence SEMR (Ioannou & Serafeim, 2017; Vitolla et al., 2019). The EU Directive 95/2014, which came into power in 2017 (Doni et al., 2019), covering the disclosure of non-financial and diversity information by large companies and groups, shows that efforts from this perspective are increasing. Although this directive does not directly require the reporting of indirect emissions, further regulation which extends the scope for mandatory carbon disclosure is under debate both academically and politically (Bolton et al., 2021; Quinn, 2022). As such it is not only highly relevant but also timely and urgent to build an understanding of different approaches if such regulation ought to effectively take the internal firm perspective into account.

1.2.2 Theoretical perspective

From a theoretical perspective, research on SEMR is limited. Relevant streams of literature can roughly be categorized into input-oriented, studying how firms engage with their value chain to collect data, and output-oriented, studying how firms report available data. Within the former Sustainable Supply Chain Management (SSCM) provides a multitude of touchpoints to SEMR. While addressing relevant questions of supplier engagement incentive and information sharing, this strain of literature adopts an interfirm perspective and thus fails to answer any questions which aim to investigate a firm's internal approach towards SEMR (Patchell, 2018).

Output-oriented literature streams mainly focus on studying firms' sustainability reporting. One of these streams, which is growing fast in the number of studies, is rooted in stakeholder theory (Jaggi et al., 2017; Liesen et al., 2015; Pérez-López et al., 2015; Vitolla et al., 2019). As such it sees differences in firms' SEMR practices as a firm's response to stakeholder interests (Freeman et al., 2010). This view is also closely related to research focused on legitimacy theory, according to which firms disclose social and environmental information to legitimize their actions towards stakeholder groups (Jaggi et al., 2017; Luo, 2019). Further studies around impression management, the conscious influence of the firm's perception (Talbot & Boiral, 2015), are deemed relevant as the nature of SEMR is still voluntary and standards provide significant space for interpretation and manipulation.

While all these streams play an important role in shedding light on the question of how firms approach SEMR and how differences in practices can be explained, they are crucially limited in the sense that the vast majority of research produced in these fields, relies on the study of firm's sustainability reports and data which has been published – the output of the measurement system so to say. As such it is limited to an outside perspective of the firm and only provides a limited understanding of internal motivations and reasoning. Further, the predominant use of quantitative methods limits the ability to understand actors' individual sensemaking which is deemed crucial to successfully engage with firms. Howard-Grenville (2006) concludes that "if

we treat the organization as a "black box" and regard external factors […] as the primary drivers of environmental practice, we cannot necessarily understand why organizations respond to some environmental issues differently than others and why organizations facing similar issues show a range of responses." (Howard-Grenville, 2006).

As such, there is a clear research gap from a theoretical perspective that directly relates to the practical perspective laid out above. Since the nature of SEMR is at this point a diverse, often chaotic one, theory needs to account for and attribute for differences in approach to truly understand the connection between concepts at hand. While some scholars started to open the "black box" and are increasingly encouraging the inclusion of the managerial perceptions and interpretations (Bansal, 2003; Howard-Grenville, 2006) in studying environmental topics, that has to the knowledge of the authors not been attempted at this point in connection with SEMR.

1.3 Research Questions

To address the gap between input- and output-oriented academic literature as well as serve the practical need to drive differentiated forms of engagement towards firms, it seems crucial to understand how the approach towards scope 3 measurement and reporting differs across firms and how it is influenced by management. As such the main purpose of this study is to contribute to the literature in management and organization studies by developing an understanding of the internal organizational aspects, that drive differences in the scope 3 emissions measurement and reporting (SEMR) practices. Furthermore, the study aims to explore the managerial decision-making process regarding scope 3 data disclosure to uncover and understand how managerial perception and interpretation contribute to varying organizational responses towards SEMR.

The research questions to fulfill the purpose of this study are:

(I) *How does the internal approach towards building scope 3 emissions measurement and reporting practices differ across firms?*

(II) *How does organizational perception and interpretation influence the practices of scope 3 emissions measurement and reporting?*

1.4 Delimitations

The study focuses on the organizational and managerial perspective of emissions measurement and disclosure on an individual firm-level, meaning that the study aims to investigate subjective sensemaking from the interviewee's perspective and perception and how it shapes an organization's practice. Although scope 3 emissions are per definition outside the firm's boundaries the study is thus focused on the firm's internal perspective and does not engage with different stakeholders of the value chain.

Given the regional importance of sustainability, the study is delimited to the country of Sweden. Further, only large publicly listed Swedish companies fall into the scope of the study as these are not only likely to be under the scrutiny of stakeholders but also tend to possess more resources to develop the studied SEMR practices. Moreover, though embedded into the

wider context of sustainability reporting and greenhouse gas emissions accounting, the scope of the study is solely set on scope 3 emissions.

1.5 Expected Contribution

The expected contribution of this study is twofold. Firstly, the study will contribute theoretically by, as Howard-Grenville (2006) puts it, opening the "black box" by investigating the internal organizational context and its effect on environmental practices, by studying the phenomenon qualitatively with an interview study. Specifically, it builds an increased understanding of how SEMR practices are shaped and how that is influenced by the internal organizational context.

Secondly, the study will provide a practical contribution by increasing the understanding of the different perspectives and approaches adopted by firms working with scope 3 data. The study will produce relevant insights for stakeholders such as shareholders, customers, industry associations, or consultants to help them engage with firms in building reliable and useful SEMRs. Although a standard like the GHG protocol is rooted in driving standardized practices, inherent variations in the approach of firms must be understood and taken into account when doing so. Further, this understanding is deemed to be highly relevant to policymakers working on the regulation of disclosure of non-financial information.

2 Methodology

This chapter aims to lay out the methodological approach of the study, which crucially enabled the natural progression of the study. Hence the choices are prominently discussed in the second chapter. First, the study's design, the chosen approach, and the methodological development are discussed. Then the methodological considerations of data collection (2.2) as well as the data analysis (2.3) are presented. Finally, quality and ethical considerations are discussed.

2.1 Scientific Research Approach

2.1.1 Ontological Orientation

Investigating variations in SEMR practices across firms is a complex process that entails understanding individual experiences. As the root of these differences may emerge from individual members of an organization making sense of problems, applying thought patterns, and developing strategies to solve them, this study adopts an interpretivist perspective (O'Reilly, 2009). Accordingly, this study attempts to understand the phenomena through the meaning that individuals assign to them (Orlikowski & Baroudi, 1991). The authors view individuals as actors in the social world, trying to understand the shared meanings, cultures, and motives that lead to action (O'Reilly, 2009). According to Edmondson & Mcmanus (2007), the ontological orientation was also a suitable choice as the nature of the study's research field demands an open-mind approach that supports the emergence of new theory.

2.1.2 Qualitative Approach

To conduct research that answers the purpose of this study, the authors adopted a qualitative approach. Studying social construction processes implies more focus on how an organization's members go about constructing and understanding their subjective experiences rather than investigating measurable occurrences and connections (Gioia et al., 2013). A qualitative study aims to analyze the perceptions of humans, in line with the interpretivist approach (Flick, 2014), hence one can argue that a qualitative approach is more suitable than a quantitative approach to collect rich and relevant data. As limited prior research is available addressing the specific question in focus the qualitative approach also reflects the nascent characteristic of the field well (Edmondson & Mcmanus, 2007).

2.1.3 Research Design

Scholars advocating the study of internal factors and motives for sustainability and GHG reporting (Adams, C. & McNicholas, 2007; Pérez-López et al., 2015), deem that such qualitative research, examining and interpreting initially open-ended data for meaning, is well executed by conducting semi-structured expert interviews (Flick, 2014). While conducting interviews is only one of several valid methods of doing social science research, it is considered well suited for the nature of this study, which aims to deepen the understanding of individual experiences in direct relation to the chosen phenomenon (Bryman, 1990).

In designing the structure of this study, the authors aimed to balance building depth in the experience and perceptions of individuals while being able to investigate a multitude of

different organizational perspectives. Initially, it was suggested to conduct a case study and focus on 4-5 firms and the perception of several individuals within the same organization however, during the progress of the initial data collection, it became clear, that not all initial companies were able to yield rich data, as the organizational development of SEMR practices varied significantly. To adapt to the variation and strengthen the validity of the findings, the authors extended the pool of partner companies to a total of 10. In doing so the authors decided to rely on multiple interviews rather than a case study, following a triangulation data collection. While triangulation allows for more robust theory development as it is based on more diverse empirical evidence (Eisenhardt & Graebner, 2007), it was the ability to compare and contrast across more firms that motivated the authors' decisions. This design supports the research ambition of deepening the understanding of differences in an organization's perception and approach towards SEMR.

Following Yin's (2003) advice, the partner companies were carefully selected to produce contrasting results. To identify suitable partner companies, the authors had two selection criteria, firstly the organizations selected were some of Sweden's larger public companies based on market capitalization, to ensure that they were compelled to report on environmental matters (European Commission, 2022), and would have the resources to do so. In doing so the authors excluded firms within the financial- and real estate industry to yield richer and somewhat more transferable data, as both industries work with the management of assets, the character of SEMR is rather different from producing companies.

Secondly, the authors considered companies' state of sustainability reporting. Only companies that report in line with either the Global Reporting Initiative (GRI) or the Task Force on Climate-related Financial Disclosures (TCFD) were considered, to ensure at least a limited engagement with emissions reporting. Although the quantity of reported scope 3 categories and the adoption of *Science-Based Targets* (SBTI) were analyzed by the authors, both factors were not considered a mandatory requirement, to be able to yield contrasting results and insights.

The authors have signed a non-disclosure agreement according to GDPR with all companies and will therefore be treated anonymously in this study, thus the companies will be referred to as the "partner company/companies" henceforth. However, an overview of firms reporting characteristics and respective industries can be found in Appendix 1: Partner Companies.

2.1.4 Abductive Research Approach

Inspired by the inductive grounded theory method, which aims to generate theoretical constructs by establishing plausible relationships between concepts derived from data collected in interview fieldwork (Urquhart, 2013), the abductive Gioia method guided the author's work since it is considered a more credible "systematic approach to new concepts development and grounded theory articulation" (Gioia et al., 2013). Doing so, the authors follow a systematic inductive approach for early concept development, before relating emergent themes and concepts abductively with relevant literature that lives up to rigorous scientific standards. This initially strong emphasis on the collected data and later abductive logic allowed the authors to harmoniously develop the theoretical framework which forms the foundation of the analysis (see 3.3). Adopting an abductive approach was therefore a natural enablement since the purpose

of this study was to explore a new phenomenon rather than confirm already existing theory, hence an abductive approach is considered to be suitable for this situation (Bryman, 1990).

2.1.5 Research Process

Following the inquiry audit technique (Lincoln & Guba, 1985) the first step in the research process entailed identifying relevant actors who were engaged with sustainability reporting practices while identifying concepts and literature explaining differences in organizational sustainability approach. Initially, the study had a broad focus on managerial practices and general internal contextual factors, which reflected the nascent character of the first research question. This was coupled with the initial inductive research approach, embraced in a first round of interviews, including identification of case companies, building interview questions, and collecting empirical data. The analysis of the first round of interviews led to uncovering emerging concepts in the empirical data, which indicated a high relevance of organizational culture within the internal context. As such the second step of data collection focused on, not just internal organizational aspects, but organizational culture and value in particular, as it appeared to be the key factor in shaping differences in environmental efforts and sustainability reporting practices.

This focus shift was paired with a shift from pure inductive to an abductive research approach as it allowed the authors to turn to theory, in trying to explain the connection between the research questions and the empirical findings. This led to a second round of interviews with a somewhat modified research design, focused on organizational culture and its connection to the SEMR approach. The development through the flexible research process contributed to an iterative theoretical framework that mirrors the shift towards focusing the analysis on internal organizational culture.

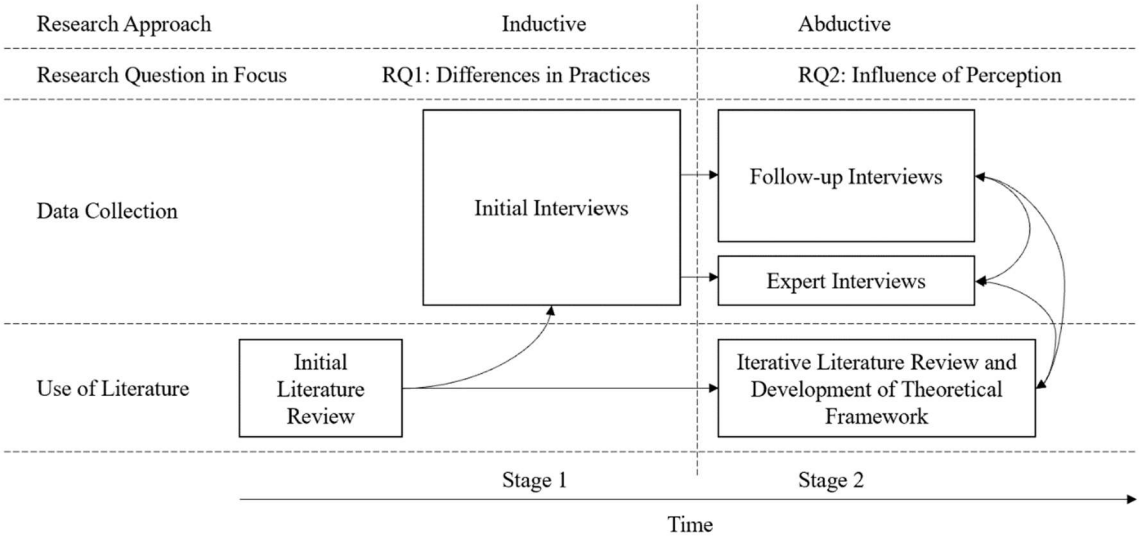


Figure 1: Visualization of Research Approach

2.2 Data Collection

2.2.1 Interview Sample

Based on the research process laid out above, the data collection was separated into two stages (see Figure 1). To achieve a deeper understanding of the internal organizational aspects and managerial processes, the initial interview was conducted with a following follow-up interview within the same organization but with a different employee that participated in the initial interview. Following the concept of theoretical sampling (Bowen, 2008; Urquhart, 2013), the purpose of the follow-up interview was to deepen the understanding of emerging themes around the relationship of organizational context, organizational culture, and sustainability framing, within the firm as well as validate and strengthen insights gained from the first-round participants, also known as member checking (Lincoln & Guba, 1985). Thus, this follow-up interview candidate was selected either within the same functions but on a different hierarchical level or worked in a closely related function. As such, interviewees worked at various organizational levels but with the mutual factor of being responsible or involved in the process of sustainability reporting.

Additionally, expert interviews were also conducted as a continuation of the initial interview stage (see section 8.5). The expert interviews served a similar purpose as the follow-up interviews, although the focus lay on the overall context in which SEMR, and strategy are executed. After the initial interviews with firms, it became clear that some external entities are very intertwined with internal sustainability efforts and scope 3 system design. This contributed to the decisions to engage with experts within sustainability consultancy, the CDP (CDP Worldwide, 2022), and climate initiative experts, even though the study is centered around internal organizational aspects and a prior decision to not engage with external stakeholders, such as suppliers.

The interviewees for both data collection stages were selected through the purpose sampling method, meaning that the interviewees were selected based on relevance to this study and not as a representation of the population, which according to Braun & Clarke (2013) is appropriate for a study of this character. To yield relevant information and insights in the expected depth of study the selection of the initial interviewees was thus based on two criteria. Firstly, focusing on the position and occupation, aiming for interviewees within the field of sustainability, and secondly, the sampling focused on involvement in carbon emissions accounting and reporting. The selection of interviewees was made in collaborating with each partner company to ensure the right candidate within the selection criteria.

In total, the study had 21 interviewees, where 11 participated in the initial interview, 6 in the follow-up interview, and 4 in the expert interviews. The rationale for this selection was firstly the in-depth information gathered from the initial interview compared to other interviews, and secondly, the time and resource constraints of both the interview partners and the research. The number of interviewees for the initial- and follow-up interview was not selected beforehand, instead, the authors decided to end the interview process when sufficient information was collected, and no additional data was significant. Research demonstrated this to be a preferred method for deciding the number of interviewees in a qualitative study (Bowen, 2008).

2.2.2 Interview Design

There are several strategic alternatives to which interviews can be conducted however, to best embrace the purpose of this study the authors chose semi-structured interviews, entailing a conversational tone and a partial structure based on predetermined questions to encourage a fluid discussion around the central topic of organizational aspects and managerial decision-making (Brinkmann & Kvale, 2015). In this type of interview, the interviewers and the participants are both in control of the conversation, exploring responses and emerging topics and their relevance of it (Braun & Clarke, 2016; Brinkmann & Kvale, 2015; Flick, 2018), the questions also have an open-end character to promote detailed and rich answers (Brinkmann & Kvale, 2015) and promoting a follow-up question to ensure the understanding and perception of the participants.

The interview questions were designed differently for the initial interviews and the follow-up interviews (see 8.3 and 8.4). Both question sheets were designed in accordance with the research stage and development, to support the research questions and reflect the study design. Hence the initial interview questions were mainly designed under the guidance of the GHG protocol, actively making an effort to not rely extensively on existing theory. The research focus advanced throughout the progression of the study for the follow-up interviews and the expert interviews, due to the emerging themes in the data analysis of the first empirical findings. The interview questions for the follow-up interviews were thus less standardized and often connected to the individual organizational characteristics. The flexible research design and abductive approach allowed the shift in research focus (Braun & Clarke, 2016) contributing to the development of the questions to be constructed from the emerging categories from the qualitative data, which were showing that underlying values and shared beliefs are particularly important when studying culture. This was eloquent in the questions conducted for the second phase of the interview process which also appeared as guidance for the authors.

2.2.3 Interview Process

The authors conducted each interview digitally, which according to Byman (2015) is a valid option compared to physical interviews. Due to the COVID-19 pandemic, the digital setting was used throughout the whole interview process where the interviews were conducted through the communication platform Microsoft Teams with the combined functionalities of sound and video, which made the environment reflect a physical setting by considering influences of body language. By conducting the interviews digitally, allowing the authors and interviewees to participate from a chosen environment, mostly from home, allowing an environment that feels safe and relaxing, therefore it can be argued that the setting contributed to the open engagement with interviewees and thereby the depth of the study.

The interviews were conducted individually or with a maximum of two participants, and the two authors who participated in all interviews, in this way the authors ensured confidentiality and reduced bias through the interpretation of information (Hillebrand & Berg, 2000). To ensure that language barriers would not affect the study, English was used in all interactions with the case companies, both written and verbal communication. To ensure safety and confidentiality the authors introduced the confidentiality agreement according to GDPR,

confirming the permission from the participant before starting the interview. An overview of the interviewees is shown in Appendix 2: Interview Sample.

At the beginning of the research process, the roles were structured separately, with one author responsible for monitoring the conversation and asking questions to guide the interview, according to a semi-structured interview structure (Braun & Clarke, 2016) and the other author responsible for taking notes and monitoring the recording and transcription. As the research proceeded the authors excelled in their interview technique, seeing that an open space for conversation around questions and comments created the best atmosphere. As such the roles of the authors became more fluid and shared ownership was created.

2.3 Data Analysis

The data analysis was inspired by the thematic analysis presented by Gioia et al. (2013) to identify, analyze and report emerging themes within the qualitative data. In contrast to quantitative content analysis, even though the codes are selected in advance, they do not remain fixed during the analysis, but rather are refined through successive iterations between theory and data (Berelson, 1971; Ryan & Bernard, 2000). One strength of this approach is therefore that it allows for a fresh conceptual understanding that is also grounded in empirical data. The first phase in the analysis process was to transcribe the interviews which were done directly after each interview. Thereafter the coding process was initiated, aiming to "attach conceptual labels to data" by doing so the data analysis emerged, linking codes and finding relationships between concepts. The initial coding approach used in this study is *open coding*, the process in which codes are assigned to pieces of data, by first collecting descriptive open codes, and later on more analytic codes (Urquhart, 2013). The first-order constructs were coded individually by the two authors prior to being compared and synchronized comprehensively to guarantee quality (Barratt et al., 2011). The coding process progressed to be conducted in collaboration between the two authors and was done in a systematic manner covering the whole data set, creating second-, and third-order constructs. Second-order constructs were conducted by organizing the open codes through the process of *selective coding*, as well as validating emerging themes to theory, hence a natural development with the abductive approach of this study. Thereafter the selective codes were organized into third-order constructs through *theoretical coding*, meaning categories were subsequently themed and grouped based on the empirical data itself through emerging concepts and in some sense in relation to the theoretical model (see section 3.3.4) (Urquhart, 2013).

2.4 Quality Considerations

To guarantee a high level of trustworthiness throughout this study the authors have made an effort to fulfill the criteria of conducting qualitative research. Byman (2015) states that credibility, transferability, dependability, and lastly confirmability need to be considered. The authors have therefore evaluated these four criteria throughout this study.

2.4.1 Credibility

Credibility becomes essential in a study examining human perception and interpretations since it confirms whatever the researcher's perception of reality corresponds to the reality expressed

by the participants (Lincoln & Guba, 1985). Through investigator triangulation, meaning both authors being present through all interviews, proves credibility in interpretations of what had been said (Brinkmann & Kvale, 2015). The credibility was also enhanced by confirming perceptions of several interviewees within the same organization, as well as using the process of member checking to verify information with participants if any unclarities appeared (Lincoln & Guba, 1985).

2.4.2 Transferability

Transferability within qualitative research refers to the generalization of the context in empirical findings to other situations (Lincoln & Guba, 1985). The nature of a qualitative approach and a smaller data sample entails circumstantial uniqueness in terms of studying aspects of the social world. However, by extracting transferrable concepts from the finding of this study, principles can potentially be applied to equivalent situations (Lincoln & Guba, 1985). Following the idea that the problem discussion is universal for a large domain and the data sample represents different firms within a range of diverse industries, the principles and concepts can be applicable and relevant to other domains (Gioia et al., 2013).

2.4.3 Dependability

Dependability is secured by creating a systematic, well-documented, and traceable study (Bryman, 2015; Lincoln & Guba, 1985). Accordingly, the inquiry audit technique has been used in this study to consider dependability (Lincoln & Guba, 1985). The process in which the study was conducted, was regulatory monitored by the two authors and a supervisor provided by the academic institution.

2.4.4 Confirmability

In order to enhance the quality of the study conformability, the authors have made a significant effort to practice reflection, which entails the consideration of awareness. Furthermore, conformability was confirmed by preventing theoretical or personal bias in the process of collecting-, interpreting-, and analyzing data (Bryman, 2015). Lastly, through the effort to transparently describe the reasons for methodological, theoretical, and analytical decisions, a better understanding of the process is created which enhances confirmability.

2.5 Ethical Considerations

All participants in this study have been treated anonymously to ensure ethical standards. Hence participants' names, professional roles, company names, and settings have not been disclosed. To further protect confidentiality, the authors have made sure that recorded materials and notes are stored in a safe and restricted storage. GDPR regulations have been followed strictly meaning that all the recorded and transcribed interview material will be deleted after finalizing the analysis. Finally, ethical consideration is driven through informed consent as participants gave their consent to participate in the study, before starting the interview by introducing the purpose and research process of the study (Bryman, 2015).

3 Theory

Throughout the process of the study, literature was incorporated at different stages for different purposes. The following chapter first presents the initial review of existing relevant literature (3.1), ultimately yielding the research gap (3.1.4). Then the later iterative review of related literature connected to emergent concepts is presented (3.2), leading to the development of a theoretical framework (3.3).

3.1 Initial Literature Review

As established throughout the introduction, SEMR practices differ across firms. Considering this issue an increasing body of academic literature has attempted to shed light on the external and internal factors that influence GHG measurement practices and reporting quality. Driving the quest of finding relevant past research for building a foundational understanding of differences as well as evaluating and critically evaluating measurement and reporting efforts throughout the study, different research fields, with different ontological orientations have been reviewed. While this initial literature is relevant in understanding the real phenomenon observed, the authors later put value into the semi-ignorance of such past literature when engaged in initial interviews to avoid confirmation bias and build bottom-up emerging themes during inductive data analysis (Gioia et al., 2013; Urquhart, 2013). Literature that was reviewed and used the abductive phase is presented in chapter 3.2.

3.1.1 GHG Measurement Through the Supply Chain

Driving the adoption of SEMR throughout the value chain effectively requires an understanding of value chain engagement in the measurement of GHG emissions. Due to practical and regulatory reasons, upstream emissions have been the focus of previous literature which essential overlaps with the study of *Supply Chain Management* (SCM) (Hertwich & Wood, 2018). Though traditionally focused on reducing cost and increasing operational efficiency, SCM literature has in recent years increasingly emphasized the integration of sustainable development into the supply chain (Rajeev et al., 2017). Adopting an extended perspective beyond the core of SCM, including areas such as product design, management of product use, or recycling of used products (Srivastava, 2007) SSCM emerged as the dominant body of literature in the 2010s and onwards (Rajeev et al., 2017).

The topic of greenhouse gas emissions measurement is closely linked to sustainable SCM as it serves as one of the most used metrics for measurement in the field (Ahi & Searcy, 2015) and authors have been relying on the SSCM literature to discuss scope 3 emissions adoption (Patchell, 2018). As a full implementation of the scope 3 protocol requires information sharing across the value chain, the research body of SSCM examines interfirm relationships and incentive structures across the value chain.

Based on transaction cost theory scholars argue, that high governance or administrative expenses generated through scope 3 related collaboration results in a lack of willingness to generate and share scope 3 emissions data. As such increased transaction costs need to balance with adequate incentives (Patchell, 2018). Further empirical research in this area (Sancha,

Wong et al., 2016; Sancha, Gimenez et al., 2016; Vachon & Klassen, 2008) has shown that such information-sharing requires a commitment of significant resources from both sides, resulting in dependencies and a shift from more transactional to closer relational structures. Whether such collaborative efforts in supplier engagement are aimed at increasing environmental performance or building trust among actors, this research field emphasizes the importance of the relational perspective in exploring the scope 3 emissions measurement (Touboulic & Walker, 2015).

Thanks to these empirical and theoretical contributions in SSCM literature it becomes clear that the engagement with suppliers to collect primary emissions data is inherently complex and there are multiple problems for full engagement in carbon reduction and governance mechanisms along the value chain. However, this academic debate only partially reflects back onto firms' actual scope 3 measurement and reporting systems. While primary data, which differentiates among suppliers, is seen as preferable especially when it comes to high emitting areas of the value chain, secondary data also forms a valid approach to initially report on emissions (GHG Protocol, 2011). The GHG protocol adopts a practical perspective when it comes to selecting data sources, recognizing that in some cases secondary data may be of higher quality than the available primary data for a given activity. In fact, they recommend that data sources are chosen based on a company's goals and if that is to "understand the relative magnitude of various scope 3 activities, identify hot spots, and prioritize efforts in primary data collection, the company should select secondary data" (GHG Protocol, 2011). Hence, this stream of literature, though relevant, relies on the underlying assumption that measured scope 3 data is reported and that differences in measurement and reporting stem from differences in data input.

3.1.2 Influences on GHG Reporting and Data Disclosure

In contrast to the input-oriented perspective adopted by SCM scholars, an alternative research stream focused rather on studying firms' GHG disclosure in their sustainability reports, the output. Research in this field can broadly be categorized into research on general firm stable firm characteristics, such as size, industry group or economic performance, or dynamic changeable contextual factors (Adams, Carol A., 2002), wherein the latter will be in focus.

Studying contextual factors, a multitude of scholars have adopted a stakeholder perspective in explaining the differences in firms' carbon emissions measurement and disclosure levels. This body of research is rooted in the stakeholder theory, which generally argues that organizations, within their own business activities, must take the interest of shareholders into account (Freeman et al., 2010). As the management of such sustainability communication activities has a significant impact on stakeholder relationships and serves as a critical tool to illustrate an organization's strategy, performance, and governance towards those (Vitolla et al., 2019), differences in the scope 3 data disclosure and quality, is seen as a result of different dynamics and interests throughout relevant stakeholders.

Through mostly quantitative empirical studies scholars have attempted to uncover specific contextual determinants that influence a company's capability or decision to disclose environmental data, including scope 3 data. While different studies focus on slightly varying

independent variables, authors overall agree that the primary driver behind sustainability and GHG measurement and reporting stems from pressure and engagement of external stakeholders (Jaggi et al., 2017; Vitolla et al., 2019). Relevant stakeholders range from governmental institutions and shareholders to customers, debtors, and climate initiatives (Huang & Kung, 2010).

While authors also recognize the importance of internal contextual factors and motives (Howard-Grenville, 2006; Jaggi et al., 2017; Liesen et al., 2015; Vitolla et al., 2019), some highlight that relatively little work has examined internal factors and their impact on reporting (Adams, 2002; Linnenluecke & Griffiths, 2010; Pérez-López et al., 2015). Some emergent findings indicate however that the adoption of a firm sustainability strategy, managers' personal values, or organizational structure effect environmental reporting quality, transparency, and adoption (Luque-Vílchez et al., 2019).

While this body of literature then provides a relevant understanding of a firm's external context, the lack of explanatory power of reporting theories, having been developed largely without taking the internal context into account (Adams, 2002; Howard-Grenville, 2006), caused authors in the field call for more research filling this research gap (Pérez-López et al., 2015).

3.1.3 Strategic Corporate Sustainability Communication

As researchers find that "external stakeholder pressure is a determinant of the existence but not the completeness" legitimacy theory is often used complementary to stakeholder theory as the other major theory, relevant to the study of sustainability reporting practices (Jaggi et al., 2017). Accordingly, publishing sustainability or GHG data is a major element with which a firm can control and manipulate its perception among stakeholders to "demonstrate that their activities are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995). As reporting remains a voluntary activity companies may use it as a strategic communication tool and leverage incomplete disclosure to their advantage, in gaining legitimacy (Liesen et al., 2015). Some researchers take this argument one step further (Talbot & Boiral, 2015), suggesting that companies use a set of impression management strategies, like opaque or incomplete information or even strategic omission, to justify or conceal negative aspects of their performance, as emission reduction schemes may result in perverse incentives for keeping uncertainty of Scope 3 emissions high (Shrimali, 2021).

Although studies in this field often adopt a more qualitative approach, critics argue that under legitimacy theory carbon accounting "is, in fact, a response to external pressures and does not necessarily reflect the organization's genuine commitment to sustainable development" (Talbot & Boiral, 2015). As such the root causes for different responses across firms are still seen within a firm's external environment. Calls to further investigate firms' internal context mentioned above can thus not be answered by staying within the realm of traditional reporting theories.

3.1.4 Research Gap

It seems that a multitude of factors shape GHG emission measurement reporting practices and the motivations of managerial decisions are complexly interwoven. Whilst prior research forms a broad understanding of what external contextual factors may attribute to the differences in reporting practices, internal motivations, interests, and relations are thought to add an additional layer of complexity.

The above presented initial literature review shows two separated approaches contributing towards understanding differences in firms' approaches towards SEMR. Rooted in traditional established theories SSCM highlights the unique characteristics of SEMR, demanding a wide-ranging engagement of value chain stakeholders. As it does not differentiate between data collection and reporting however its potential to explain differences remains limited.

Literature focussing on sustainability and GHG emission reporting has in turn taken the opposing approach, studying the output of a firm's reporting practices. Both a stakeholder approach and strategic communication considerations have built a solid understanding of the effects of the external context on measuring and reporting. As this is limited to an outside perspective of the firm, scholars increasingly criticize the limited explanatory power of such theory (Linnenluecke & Griffiths, 2010). Calls for addressing this gap in current literature have started to be addressed by a limited number of scholars, aiming to open the "black box". This direct engagement is deemed necessary to understand why firms in similar settings approach environmental reporting differently (Adams, 2002; Howard-Grenville, 2006). This gap in academic literature illustrated in Figure 2 (see below), forms a nascent field where established theories are challenged, and little prior knowledge exists.

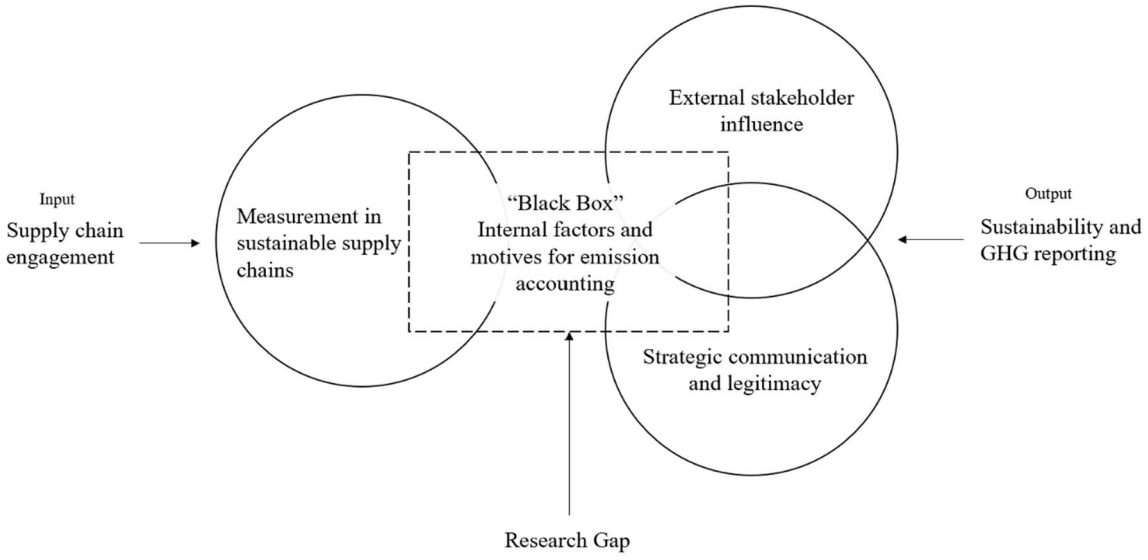


Figure 2: Illustration of Research Gap

3.2 Iterative Literature Review

As the initial inductive approach transitioned towards abductive working, the authors began cycling between literature and data, relating emergent themes to existing theoretical concepts (Gioia et al., 2013). This occurred in an iterative fashion where new data and concepts from literature were integrated throughout the progress of the research. Ultimately, this resulted in a theoretical framework (see 3.3.4) which guided the authors' data structuring and analysis.

A major internal theme emerging from data was the relation of SEMR practices to a firm's organizational culture. Although some authors have previously pointed toward the connection between organizational culture and sustainability, few studies have focused on the specific connection between sustainability outcomes and culture (Dyck et al., 2019). Hence the following iterative literature review briefly introduces the concept of organizational culture (3.2.1) before highlighting previous work that contributes to the connection between culture, sustainability, and sustainability reporting.

3.2.1 Research on Organizational Culture

Emerging in the latter half of the 20th century the concept of organizational culture became a highly influential but also very controversial research field in management and organization studies. The notion of organizational culture has been understood and explained in varying sometimes contradicting ways, hence a commonly accepted definition has not been achieved. A commonly used definition follows a three-step typology based on underlying assumptions, which are unconscious, taken for granted beliefs and perceptions, accepted values, which are accepted explanations of strategies goals, or philosophies, as well as artifacts, which form the visible structure and processes of an organization (Schein, 2004). Other suggested classifications of the concept focus however on shared values, ideologies, and beliefs (Schwartz & Davis, 1981), behavioral norms, rules, and rituals (Trice & Beyer, 1984) as well as fundamentally shared patterns of meaning or understanding (Smircich, 1983).

Despite this seemingly broad understanding of the notion of organizational culture and how it ought to be studied there are numerous commonalities and overlapping themes that can be identified (Dyck et al., 2019). It is believed that underlying values and shared beliefs are especially crucial for understanding a firm's culture, as they are viewed as a solid representation of the phenomenon (Byles, 1990). This leads scholars to often focus on these aspects when conducting empirical studies and also guided the authors throughout this study.

Further building on the overlap between research, several organizational culture theorists have been working towards developing respective frameworks in creating a conceptual foundation. In doing so they aim to structure different core dimensions of an organization's culture. While some scholars aim to conceptualize organizational culture within the wider socio-constructed system (Allaire & Firsirotu, 1984) popular frameworks focusing on cultural differences include among others Hofstede's model of culture differences, defining six different dimensions which are often used in a national context (Hofstede, 1998), Stuard's culture alignment framework (Groysberg et al., 2018) as well as Quinn's *Competing Values Framework* (CVF) (Cameron & Quinn, 2011b), which is based on the two dimensions flexibility/control and internal/external focus. While such models have been criticized for simplifying the complex nature of an

organization's culture, they do offer valuable conceptional guidance in studying the real-life phenomenon.

In addition to developing a holistic understanding of the notion of organizational culture, an important aspect of this stream of research has been the effect and role of a firm's culture on a variety of organizational outcomes. Research on this front includes the connection between culture and organizational change, which describes the influence of organizational culture on attitudes toward organizational change (Abdul Rashid et al., 2004). Similarly, scholars have tried, though criticized for it, to establish a connection between organizational culture and economic performance, essentially arguing that some cultures are more effective than others (Denison & Mishra, 1995). Further, the role of an organization's culture in developing and implementing both managerial as well as technical innovations has been a key focus of such research, which has been able to demonstrate a "congruence of different cultures with organizational goals of innovation" (Büschgens et al., 2013). More recently, scholars have, in a similar fashion also attempted to establish a relationship between organizational culture and sustainability, which will be the focus of the following section.

3.2.2 Organizational Culture and Corporate Sustainability

The role of organizational culture on sustainability practices in firms has recently received increasing attention from scholars. Research that aims to establish a relationship between the two has taken diverging paths, establishing different forms of relationship between the two concepts.

One stream of research examines how organizational culture can be a driver for adopting sustainable practices. As such it relies on the premise that the values of sustainability shall be integrated into the firm's culture, in which the value system forms the underlying foundation, to ensure a natural path towards enhancing corporate sustainability. Essentially authors ask the question of "whether organizations can become more sustainable through culture change" (Linnenluecke & Griffiths, 2010). While limited empirical research is available to support this premise, it relates to established research bodies on organizational change and culture as well as strategy and organizational culture (Schwartz & Davis, 1981).

Secondly, in turn, some scholars have embraced the opposing perspective and studied how changes in a company's artifacts, the structures and processes, translate into changes in beliefs and perception of the environment. Specifically, in connection to environmental accounting, which can be seen as such an artifact, Larrianga Gonzlez et al. find that studied "organizations are not truly changing their conventional perception of the environment, even in those cases where generalized structural and organizational changes are taking place" (Larrinaga Gonzlez et al., 2001), findings that are consistent with stakeholder and legitimacy theory.

Thirdly, an alternative stream of research in the field suggests that there is not a single type of sustainability-oriented culture but rather examines whether there is a link between an organization's culture type and the adoption of corporate sustainability principles. Scholars study how different cultures shift the emphasis on different aspects in their pursuit of corporate sustainability (Dyck et al., 2019; Linnenluecke & Griffiths, 2010). Adopting the CVF

(Büschgens et al., 2013) research proposes that internal process culture tends to focus on unambiguous sustainability measures that translate into measurable long-term profitability in their pursuit of control and predictability. The human relations quadrant of the model places great emphasis on social interaction and collaboration as well as internal sustainability capability development, while the rational goal culture focuses on setting goals, such as CO^2 reduction targets whilst "proactively instituting sustainability practices" in gaining competitive advantages (Linnenluecke & Griffiths, 2010). Finally, researchers suggest that an open system approach emphasizes proactive learning, external engagement as well as innovation in embracing corporate sustainability.

Overall, it can be said that research indicates that management practice of corporate sustainability has a significant relationship with organizational culture (Oriade et al., 2021). However, due to limited empirical research, the "proposed relationships between organizational culture and corporate sustainability will require further exploration" (Linnenluecke & Griffiths, 2010). Such calls for further research are also supported by adjacent research fields such as SSCM as organizational culture has also been identified as a key contextual factor in the adoption of sustainable SCM (Hong et al., 2022).

3.2.3 Sustainability Reporting and Organizational Culture and Change

Combining insights from the above-reviewed research scholars have started investigating the relationship between sustainability reporting, organizational culture, and organizational change (Adams & McNicholas, 2007; Lozano et al., 2016). While this remains a nascent field of study with limited research, findings suggest a reciprocal reinforcing relationship where "the development and publication of a sustainability report drive sustainability changes in the company" (Domingues et al., 2017; Lozano et al., 2016) and the incorporation of "sustainability principles as part of the organizational culture was one of the reasons for the introduction of sustainability reporting" (Adams & McNicholas, 2007). While research touches upon managers' discomfort with the change process involved in the introduction and development of sustainability reporting practices, the relationship between change and different organizational cultures has been discussed Formatting... a direct relationship remains to be established. While Stubbs et al. suggest that a compliance-driven culture, where sustainability reporting is seen as a mandatory requirement can foster an instrumental understanding of sustainability that discourages a proactive engagement, they conclude that more research into "culture may provide further factors that explain organizational resistance to reporting initiatives" (Stubbs et al., 2013).

3.2.4 Performance Measurement and Organizational Culture

While the reporting function of scope 3 measurements forms a key aspect, the objectives of such can also entail internal use such as identifying hotspots or emission reduction potential (GHG Protocol, 2011). Therefore, both in accounting literature as well as supply chain literature the measure of carbon emissions has been seen as part of a non-financial performance measurement and management system (PMS) (Beske-Janssen et al., 2015; Hristov et al., 2021). Reviewing how research discusses the relation between such PMS in a general and within a

sustainability context can build further understanding of how organizational culture as an internal contextual factor affects scope 3 emission data measurement.

Within research on PMS and control systems, organizational culture is considered an important contextual variable, which affects the system as it influences the choices and behaviors of individuals. Though it is generally considered a given that cannot be manipulated, it is recognized that organizational culture influences a systems design – it is so to say embedded in contextual factors and organizational culture (Ferreira & Otley, 2009).

Van Marrewijk further argues that the design of a sustainability-oriented control system should be based on an organization's value system. He defines a value system as a "way of conceptualizing reality and encompasses a consistent set of values, beliefs and corresponding behavior" (van Marrewijk, 2004), which is quite in line with previously stated definitions of organizational culture. Further, he makes use of the Spiral Dynamics model, which describes an organization's values along an organization's development. He notes that "nowadays, the majority of organizations are functioning predominantly within the range of Order (compliance-driven) to Success and Entrepreneurship (profit-driven)." A true embracing of sustainability, where different stakeholders are incorporated, requires however a development in values towards care- and systemic-driven ones as well as a trust-based culture. He further argues that in this emerging context an organization's tools and concepts, such as the measurement system, have to be further developed, to allow for more systemic and coherent working within and across an organization's boundary, aligning and engaging staff and external stakeholder (van Marrewijk, 2004). Although there is limited empirical research in this field, this view is shared by some scholars (Bititci et al., 2006), arguing that control systems need to develop with an organization's culture and vice versa a developing control system can lead to cultural change.

3.3 Towards a Theoretical Framework

Through this iterative review of literature and the constant reflection on emerging themes in empirical data, the authors developed a theoretical framework in line with the purpose of this study. The framework is inspired by the scope 3 process laid out by the GHG protocol (GHG Protocol, 2011), Otley's framework for *Analysing Control Systems* (Ferreira & Otley, 2009), and the *Competing Values Framework* (CVF) for analyzing different types of organizational culture (Cameron & Quinn, 2011). Below all three of these are briefly introduced before the final theoretical framework is presented.

3.3.1 GHG Scope 3 Process

Within their published guidance on reporting on scope 3 emission, the GHG protocol defines a process to follow (Figure 3). While this served as a natural starting point for developing both the questionnaire as well as the theoretical framework, it is important to consider the following notes. Firstly, not all elements stated are defined as mandatory requirements. Defining business goals as well as emission targets and quality assurance are seen as optional elements while the importance of emissions allocation heavily depends on the data sources used. Secondly, the process is designed to "help companies prepare a GHG inventory that represents a true and fair

account of their scope 3 emissions" (GHG Protocol, 2011). As such it may be a valid structure to understand the initial stages of emission measurement practices but less adequate in understanding mature ones. Thirdly, this process presents an ideal one designed to increase the consistency and transparency of scope 3 emission inventories. It is thus, neither supported by empirics nor purposed to study or analyze existing scope 3 measurement and reporting practices. Finally, the protocol's focus lies in reporting emissions externally. As such the internal use of emission data in control or information systems is not sufficiently depicted by the process laid out.

Concluding it can be said that the process of the GHG protocol's scope 3 guidance influenced and inspired data collection and the theoretical model. However, it was not deemed suitable as a standalone model component.

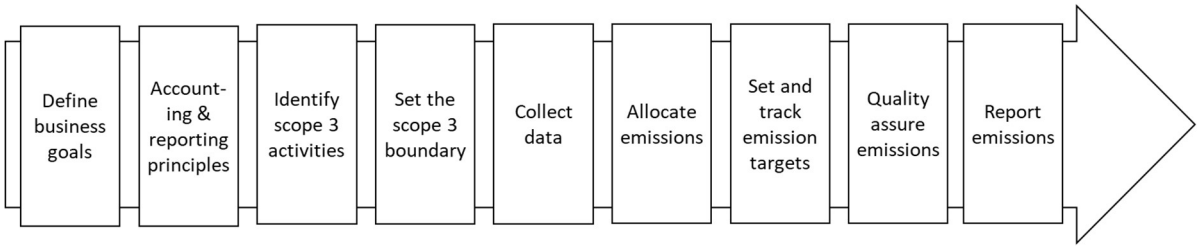


Figure 3: Steps in Scope 3 Accounting and Reporting (GHG Protocol, 2011)

3.3.2 Analyzing Performance Measurement and Management Systems

In search of a more comprehensive, empirics-backed model that was widely supported by scholars, the authors turned towards Otley's framework as this "provides a useful research tool for those wishing to study the design and operation of performance management systems by providing a template to help describe the key aspects of such systems" (Ferreira & Otley, 2009). Backed by empirics, this framework forms one of the latest and most comprehensive management control frameworks (Bui & de Villiers, 2017).

Given the fact that limited research in the field has so far impeded the rise of an accepted framework that specifically addresses carbon emission measurement and management (Bui & de Villiers, 2017), leading scholars tend to rely on such conventional frameworks as the one presented by Otley. The authors recognize that a framework for such control systems mainly aims for the internal use and evaluation of the firm's and employee's performance rather than reporting towards externals. However, in the context of corporate social responsibility it has been found that control systems are used to manage risks, legitimacy, and reputation, evaluate a firm's activities and identify opportunities and threats (Laguir et al., 2019). This is in line with the business goals identified with SEMR.

Finally, organizational culture is deemed a crucial influential factor on adopted practices. While Otley and Ferreira note that there will be natural differences in adopted practices throughout an organization, the subject of study, they "believe the role of the framework is to help a 'snapshot' to be taken of the package of practices that are in operation at a particular point in time and to gain some sense of how these practices have evolved into their current form" (Ferreira & Otley, 2009). Thus, though culture is more seen as a characteristic that cannot

be influenced (in contrast so what some other scholars assume), the embeddedness of any system in the contextual and cultural setting is clearly recognized (Ferreira & Otley, 2009). Otley's framework is henceforth deemed a suitable backbone in combination with the above introduced SEMR process by the GHG protocol and preferred over other control system frameworks. Crucial elements of the framework will be presented in the synthesized framework below.

3.3.3 Competing Values Framework (CVF)

As major emergent themes indicated the importance of organizational culture in SEMR, a theoretical framework true to the purpose of this study ought to capture differences connected to such. As touched upon in chapter 3.2.1 numerous scholars have been working towards establishing such a framework. Out of those, the CVF persists as one of the best-known and widely accepted frameworks of organizational culture (Büschgens et al., 2013). It was empirically derived and validated to reflect the most important elements that define organizational culture (Cameron & Quinn, 2011). In previous research, it had been used to discuss the relationship between corporate sustainability and organizational culture (Linnenluecke & Griffiths, 2010), and has also been interpreted in the context of management information systems (Cooper & Quinn, 1993). As such the authors deem the CVF as a suitable building block toward a theoretical framework for this study.

The CVF is structured through two dimensions with each two "competing" poles. Flexibility, typically leading to a differentiating of activities and an ability to respond to change, competes with stability and control, representing the drive towards organizational order, typically leading to an integration of activities and centralization. In turn, the internal focus, which emphasizes the preservation of an organization's social and technical status, stands in conflict with the external focus, emphasizing the importance of the organization's linkage to its environment, which is seen as a source of threats, opportunities, and resources (Cooper & Quinn, 1993). These competing dimensions yield four cultural quadrants with four different value sets.

The first quadrant, the *internal process orientation* or hierarchy culture is characterized by a strive for control and predictability through measurement and documentation. Clear lines of decision-making authority, standardized rules and processes, and control and accountability mechanisms are valued in such a setting (Cooper & Quinn, 1993).

The second quadrant, the *rational goal orientation* or market culture is shaped by productivity, competitiveness, and profit maximization aspirations and it is assumed that a clear purpose and an aggressive strategy enable such. Hence visionary direction, goal setting, and planning play a key role in the management of such an organization (Cooper & Quinn, 1993).

The third quadrant, the *open systems orientation* or adhocracy culture is built to "foster adaptability, flexibility, and creativity where uncertainty, ambiguity, and information overload are typical" (Cameron & Quinn, 2011). Emphasis is put on individuality, risk-taking, and decentral power to create innovation and change.

The fourth quadrant, the *human relations orientation* or clan culture, relies on the assumption that the firm can best be managed through teamwork and employee development, customers

are best thought of as partners, and that employees need to be empowered to support their involvement, commitment, and cohesion (Cooper & Quinn, 1993).

3.3.4 Final Theoretical Framework

Inspired by the above-presented frameworks and in close connection with emergent themes, the authors developed a holistic framework that supported the data analysis, presented in Figure 4. In the center of the framework lies a conceptual model aim to study scope 3 measurement and management practices, which is focused on RQ1. While this represents a synthesis of the simplified Scope 3 process and the Otley framework it is important to point out that this is seen not as a linear process where one is executed after the other, but as an interconnected iterative one where different components influence and affect each other.

This system of practices is as Otley explains embedded in the organization's culture, described by the two dimensions of the CVF framework. As such, the authors aim to describe differences in scope 3 practices using the core elements displayed in the center, in connection to their cultural setting, to address RQ2.

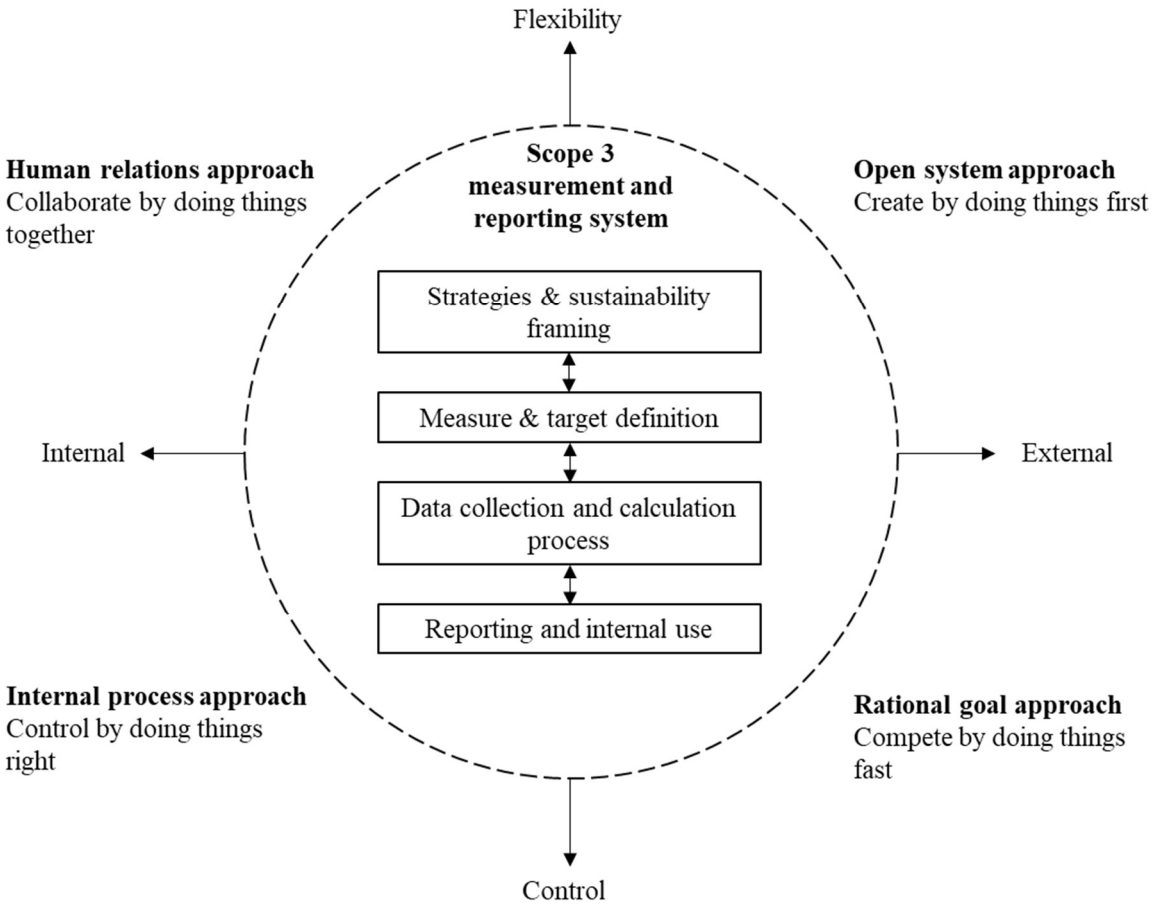


Figure 4: Presenting the Theoretical Framework

The first part of the system, a firm’s strategy, and framing are already closely connected to organizational culture, in the sense that managers and organizational members deal with strategic issues to construct a shared understanding of the issues under consideration and the actions to be taken by the organization in response (Rouleau & Balogun, 2011). As such managers' strategic thinking around sustainability and its overall interpretation of SEMR in connection to its business goals might contribute to the fundamental understanding of how and why firms' approach towards the issue differs. The three other areas, measure and boundary definition, data collection and calculation processes as well as reporting and internal use, then in turn focus on more concrete visible artifacts of the organization (Schein, 2004).

4 Empirical Findings

The following chapter aims to bring forth the empirical findings of the study. The chapter will provide the reader with an understanding of the differences in a firm's measurement and reporting practices and thus address research question one. The section presents major themes that emerged from the data supported by representative excerpts from the data.

4.1 Strategy and Sustainability Framing

Sustainability and ultimately also how SEMR is being framed not only relates to a firm's strategy but also the practices adopted. In the following different relevant patterns that emerged from the data are presented.

4.1.1 Differentiate and Compete

For some firms interviewed throughout the study, sustainability is seen as a mechanism to better differentiate oneself from competitors. Such firms are seen as inherently competitive in nature and culture and constantly look for new ways to grow.

"The company is always trying to set itself apart and to differentiate itself on being more sustainable. It's just kind of in the DNA, I guess it's kind of considered to be the way to do business." (Participant 9)

As such firms adopting this mentality strive to be in a leading sustainability position among their peers. This competitive focus on sustainability seems to require tight integration between a company's values but also its strategy as another participant explains (see quote below).

"You have to be going forwards, be competitive at the same time, and the company's environmental and sustainability strategy, then all of a sudden is in the heart of it or in the core of the general strategy." (Participant 7)

From this perspective becoming more sustainable is seen as an opportunity to drive long-term profitability. In doing so, a firm must also be able to communicate its sustainability efforts to stakeholders to seem credible. SEMR is then seen as an important pillar in driving transparent and credible practices.

"It's really an opportunity, yeah. I mean, I'm sure that [participant] has told you that really digitalization can be really important to clean other industries and to be able to be in that segment and drive that line. I mean you need to be really good yourself, otherwise, you will not have any, you will not have credibility in that area." (Participant 10)

4.1.2 Fulfilling Requirements

In contrast to the above laid out view, some firms interpret sustainability rather as a requirement that they have to adhere to. Although it appears that they accept the fact that environmental sustainability is a key issue and that carbon emissions need to be reduced moving forward, it is framed rather as a problem that needs to be managed than an opportunity to be harnessed.

"That question isn't really on the agenda so much today because everyone understands that we need to do these things. The board of directors, the management, etc. I mean, if there are new requirements that you really need to do as a company, everyone understands that you need to invest of course." (Participant 2)

An adequate response towards environmental sustainability, according to such firms, is often tied to peer comparison or regulation. While a certain investment is declared necessary, extra efforts and risky first moves are generally avoided.

"It's just part of what you need to do to be. The player you want to be in the market and to have a good brand and to be regarded a corporate citizen, of course you look at your competitors and peers and if they are doing things then you need to be at least as advanced as they are. To be on the same level with these things" (Participant 3)

"We will be also we are waiting to see if there are more requirements to also cover for scope 3." (Participant 5)

Although, the need for sustainability work and its measurement is generally accepted it is then also tied to additional work which does not directly contribute to value creation. Firms are careful to adhere to legal requirements but are also frustrated with this extra investment of time and resources required.

4.1.3 Enabler for Innovation

While these are the strongest two perspectives observed additional nuanced framings stood out. One of these was some firms' emphasis on driving sustainability through innovation. This focus relates to the competitive view introduced in section 4.1.1, in the sense that sustainability is seen as an opportunity. However, the data indicates that firms focus less on the differentiation towards competitors but rather drive internal development through innovation.

"Like we have a climate target, but if we want to reach net-zero the organization has really understood that that cannot be made with the solutions that we have today. We need to innovate, new materials, new solutions." (Participant 16)

The urgency of the climate issue seems to be seen as a mechanism to go beyond the traditional business and drive new ways of thinking. As such it becomes a strategic issue which is also reflected by organizational arrangements.

"My manager is now in charge also about innovation, so it's this inability and innovation because we know that these are very closely connected." (Participant 16)

In this context then SEMR is seen as an enabling tool guiding work. Transparent information about emissions helps the firm internally to guide its efforts and innovate successfully.

"We want to work with sustainability. But how do we do that? And then you come down to the fact that you need to improve your tools. You need to invest money in this." (Participant 10)

4.1.4 Enabler to Collaborate and Align Values

Finally, some firms appear to put an increased emphasis on people and partnerships when it comes to framing sustainability as well as SEMR. Though such firms are aware of the competitive nature of the market, it is rather seen as a boundary for a firm's sustainability action but not its purpose. To truly drive sustainable business then is to engage with both employees and external stakeholders to align values and collectively evolve with the challenge at hand.

"It's not only money that talks. It's also the conviction of the people and to convince them you will need to have them aligned with your set of values." (Participant 14)

As both sustainability work but also scope 3 emission reporting seem to require this engagement and alignment, participants in such firms express a strong desire to collaborate.

"This is an area where we, maybe all of us, have improvements to do and we need to learn from each other, so I hope it will be a collaborative effort. Actually, a collaborative approach is what is really beneficial." (Participant 10)

This drive towards collaboration the data points towards seems to address both internal and as well as external actors such as peers but also suppliers.

"We work together with different actors in every market we operate, in every business unit in Sweden, and there is a lot of collaboration with other companies as well." (Participant 16)

"And things we do kind of have a closer relationship with them then actually [...] We've been collecting kind of environmental data from them in a while, so it's become a more positive relationship and that's the advantage." (Participant 1)

Building relationships and engaging in collaboration with actors accordingly leads to an alignment in values, which lies at the core of sustainable development. The mechanism seems to also work the other way in that aligned values seem to drive collaboration.

"At the end of the day we're all there to try and do our best and everyone was interested in actually protecting the environment and that is why I think people are passionate to kind of share best practices." (Participant 1)

As such, such firms' strategic framing of sustainability and SEMR is centered around a self-reinforcing focus on engagement with others.

4.2 Measure and Target Definition

From examining the partner companies' disclosure of scope 3 data (see Appendix 1: Partner Companies), it can be observed that the range of scope 3 discloser differs. However, of interest to this study is rather how firms go about defining what it is they want to measure and why some diverging positions have been observed. As most participants point out, practices for scope 3 measurement and reporting as well as the measurements in place are developed over time. However, there are different paths that companies take in approaching this practice and measurement development.

4.2.1 Transparent Overview and Ambitious Targets

In driving their SEMR practices some firms are particularly vocal about setting ambitious and competitive reduction targets driven by top management.

"If we're going to have our sort of commitments it needs to be embraced from our kind of senior leadership team, so our CEO has been very vocal on it and has set us to set extremely tough and challenging targets and has set that ambition." (Participant 6)

Doing so capturing the entire spectrum of relevant emissions based on the 15 categories defined by the protocol is necessary. Such firms adopt a top-down approach in defining their measures, which requires a broad scan of upstream and downstream activities. This leads firms to work largely with estimates in the beginning.

"In some areas we have more accurate estimates than for others. But this gives us a kind of overview at this stage of what our footprint is." (Participant 1)

Although such firms are aware that they are working with estimates they feel comfortable doing so as this gives them a broad overview and allows them to set a focus on key categories, improving data quality over time.

"We are capturing the emissions that we should be, but we're not kind of ignoring parts of our footprint because it's a high emitter or something like that. You have to be as transparent as possible. So that gives us a lot of kind of confidence in the approach that we take." (Participant 1)

4.2.2 Precise Measures and Careful Targets

In contrast, some firms are careful with defining aspired reduction targets for scope 3 emissions, but rather focus on defining precise measurements. Although such firms recognize that sustainability-related metrics are often hard to quantify in a precise manner, the concept of carbon emissions as in one tonne of CO^2 equivalent does seem to encourage such measures.

"You can boil it down to concrete action to concrete figures, and climate is indeed one of the few things where you can really on your toes and say OK, if we calculated this way then they have this CO2 emission. So something where you have a somewhat of a precision" (Participant 14)

The use of wording like "science" further emphasizes this inherent completeness of the natural sciences associated with climate-related measures. That said participants recognize that precision and concrete measures are part of a development process and are not achieved from the beginning. However, there seems to be an inherent discomfort associated with this intermediary state of imperfect data, which seems to be tied to participants driving things correctly or the right way.

"If we are not very scientific or very correct the way it just does not feel right." (Participant 7)

"We want to be in control of things we want to understand what we're doing, and we want to make sure that we're doing the right things." (Participant 2)

To be able to have somewhat control over their measures, such firms tend to narrow down their measurement definition rather than establishing a top-down overview, they instead pick only a few categories to focus on and strive for high data quality within. Further, they occasionally limit their measures within the categories to a critical aspect, which they can exercise control over.

"[The categories] are not chosen by accident, but we have chosen them in regard to match reality […]. You have to start somewhere and you have to have good quality of that data. Then that's why we have looked at the more carbon intense materials like cement concrete and steel, and we have chosen to report on those as start, to get good quality" (Participant 16)

4.2.3 Measure Where We Can Have an Impact

Another approach that has been observed among partner firms when it comes to deciding what to measure and include in the organization's scope 3 emissions is centered around the internal usefulness to the organization. In such organizations measuring scope 3 related data is connected to changing or improving sustainability performance as one participant states well.

"We would like to improve what we measure. It takes time and money to measure, and I think the same way about this. If we decide that we should work with other materials to reduce the impact from materials, we will measure and we will look into that." (Participant 5)

It is as such both measure and category definition as well as the depth of measures that is often determined by the organization's perceived ability and willingness to reduce emissions. Rather than engaging in long-term target setting and planning firms take ad hoc decisions.

"When it comes to digging deeper and improving data quality, we are focusing on the ones where we can have an impact." (Participant 4)

In addition to guiding measurement definition, participants that shared this view questioned the overemphasis on measuring sometimes entirely.

"And then my question was: But how does it help us to better make decisions within the company? I mean, of course, it's always good and we should strive for the most accurate scope 3 data. But to be honest […] we should rather take our time and try to innovate [our process and] development phase of our products, than on calculating emissions that end up in a number but cannot help you in." (Participant 4)

Emission measurement, participants explain, ought to be seen as a tool to drive and track the process. It is henceforth important that one defines scope 3 measurements in a way that they are in line with current reduction efforts. Though firms are generally convinced that this way of measure definition suits them best, some participants raised concerns stating that it would be helpful to gain a more comprehensive overview of driving emission reductions.

4.3 Data Collection and Calculation Process

When it comes to how firms go about collecting data to evaluate their performance on scope 3 emissions, the data indicates differences across firms. Data indicating different approaches to

both the process itself as well as the organizational structures facilitating data collection are presented in the following.

4.3.1 Hierarchical, Structured, and Sequential Process

Some firms approach the data collection of scope 3 emissions in a quite structured way. Both this structural process as well as the above-discussed need for exact measurements are tied to the need for precision and control. The data indicates that this drive is deeply rooted in the firm's corporate identity which is made visible among others by a company's structure and processes.

"It is actually quite a structured process. It's a reporting structure on the top level and then every business unit and every segment needs to report progress on certain targets. […] There are so many levels of engineers. They are really professional technical guys, they work with a technical problem, they deep dive, but then you need to aggregate it upwards. So, it will be followed up on top-level in different segments of the organization. So that is super structured right now. I think that is really the DNA of the company in a way. We are really an engineering company. It's very clear when you come to these structures" (Participant 10)

As also indicated by this participant such structured data collection processes appear to be driven from the top of the firm. Such top-down driven processes are generally designed hierarchically and generally tie into the sequential measurement definition.

"The leadership team and executive team really deep-diving into the climate. They have taken decisions on the top level, they tell their teams, you know to deliver and then they tell their team to deliver. So, then it ripples down." (Participant 14)

4.3.2 Responsibility Embedded in Organization

In contrast to the above laid out approach, the data also suggests that some firms see data collection as something that needs to be embedded into the organization. While defined processes are not secluded within this thinking the focus lies on engaging people to actively be part of the effort.

"Essentially what we have to do is we have to partner with people within the organization to kind of get the information and actually drive progress. We can manage to report and make sure it's accurate, centrally, but it's got to be embedded within the organization if you're going to have an impact." (Participant 1)

In doing that the responsibility is effectively spread out through the organization and data collection is not just owned by one person or one department. Additionally, efforts are not solely driven top-down but also bottom-up as employees are encouraged to contribute towards data collection and calculation efforts.

"There are of course amazing ideas from a business when they say we want to do that, uh, can we find a way to calculate this? And then we say, yeah, why not? If it's a great idea, which also happens quite so, it's not actually one way. It's a two-way direction." (Participant 7)

To be able to achieve a wide-ranging engagement of people within an organization, they have to be aware and knowledgeable of the concept of scope 3 emissions and their respective potential to create impact. As such educational programs and training seem to be common within this approach.

"We're going to start in an upskilling program for them because they need to know more and they need to be more secure having these discussions with the customers […]. Everyone needs to learn more about the area." (Participant 10)

4.3.3 Inter- and Intra-organizational Learning

Another pattern the data suggests in connection to data collection and the process involved is centered around the theme of organizational learning. Rather than having processes in place firms focus on the internal and external development process framing it as an educational journey within the company's also an educational journey towards the suppliers. Some firms describe this as a dynamic cyclical learning process that focuses on development and improvements.

"We are actually now in the middle of one of the cycles and as soon as this cycle finishes, we start reviewing what can be improved, what we can include for next year. Scope 3 is one of these dynamic areas where we constantly try to get more, understand better." (Participant 7)

Within this dynamic developmental thinking, firms express a high tolerance toward embracing the risk of making mistakes as a natural part of learning. Mistakes happen, in fact, they are a necessity in moving forwards, essentially it is a form of experimentation with different data collection and calculation practices, which seem to be rooted twofold. On one hand, the data suggests that the nature of scope 3 emissions is inherently uncertain and per definition out of control, leading firms to accept mistakes and learn from them rather than controlling against them, which is expressed well by the participant below.

"We will probably never have 100% certainty of our scope 3 because that's out of our hands. […] We tried to get better all the time, but I have no problems with putting up data that turns out afterward to not be correct." (Participant 8)

On the other hand, however, it seems to be inherent in the way a firm generally tends to work. The experimental dynamic approach used for scope 3 emission calculations may be generally connected to fast-moving innovation-focused projects, as the data suggests. While one participant connects this to potential differences across industries, which the data of this research otherwise cannot support, it does support in this regard a connection between a firm's internal working mentality and dynamic scope 3 practices aligned with organizational learning.

"The mentality is that we just need to start somewhere and try how it works and develop it as we go and I think maybe that is the thing for the IT sector, that's basically how projects work many times at the same time, we do have a lot of public customers and there can be like quite strict rules, but it's like within those frames we can be experimental anyway." (Participant 8)

4.3.4 Estimated Data and Senior Engagement

Finally, for some firms, active data collection was less in focus. In line with the estimation-based measure definition described in section 4.2.1, such firms relied heavily on data that was already available within the organization. The data suggests that together with external sources emission factors the spent-based calculation method was often applied to estimate data. This allows firms to quickly get a broad overview of their emissions without having to engage with suppliers, to begin with.

"At the moment we have to use kind of a spend-based estimate to kind of assign a carbon footprint per dollar spent as our approach. So basically, what happens is we get for spend data and it's classified into different sections as to what you actually spend it on. And then you assign an emissions factor against the spend, so we use a database for that." (Participant 1)

Based on these initial calculations firms describe using forecasting models as well as creating road maps to eventually source data from suppliers to compare with spent-based data.

Paired with these high-level estimations lies and structural theme that emerged from the data. As such planning is often strategically of nature, calculation efforts tend to involve senior engagement within the firm.

"We almost directly report to CEO and in that sense the CEO between my manager and the CEO, there is direct communication on a regular basis. […] All the senior managers already have the literacy for this kind of information, so we don't need to go through an additional process." (Participant 7)

4.4 Reporting and Internal Use

So far data patterns in firms' strategic framing of sustainability, the connected measure definition as well as the data collection structure have been discussed. To link back to the public output of a scope 3 measurement system, a key part of this study focuses on investigating reporting practices in connection to scope 3 data. Several considerations play a role when firms go about deciding how and what to disclose and how such data is used internally. Major themes which emerged from the data are presented below, focussing on variations between firms.

4.4.1 Reporting to Improve Practices and Data Quality

Some firms follow the strong belief that reporting data to the public, will contribute positively to their development of SEMR practices. As such they express that it is important to publish data even, or because, it is just an estimate that may not yet reflect a company's emissions adequately.

"We're never going to have 100% certainty of Scope 3 and we need to work with what we got and develop it as we go. And I think also disclosing data pushes us to develop." (Participant 8)

Disclosing data then is seen to create internal pressure and driver further improvements. On one hand, it creates a certain pressure from the outside as data will be exposed to public scrutiny. On the other hand, it also creates an internal awareness of the relevance of certain

emissions, which will encourage staff to both work on improving data quality but also lower the disclosed emissions.

"We know there are improvements there, but if you don't report it, people don't won't be working to improve that area or kind of footprint. It's one where I think a lot of companies do kind of scope it out about in part because how can you influence that area of your footprint, it's something that we need to be aware of and kind of working on." (Participant 1)

Companies adopting this mindset tend also to focus on the internal use of scope 3 data. In doing so they aim to improve processes and products to better differentiate from competitors. Achieving better data quality through external reporting thus is then seen as a way to better compete.

"To be able to use it internally, and I think if you really put this effort into reporting externally, you need also to be able to use it in your own work. Otherwise, it sort of missed the point, right? So, one thing is disclosure, but one thing is also to improve your own way of working internally." (Participant 10)

As such reporting efforts sometimes even exceed requirements as firms establish internal reporting structures. Such could contain more detailed data, a breakdown of different business units or products as well as a higher frequency of reporting.

"We have quarterly reporting of the data from the units, so they collect the data in their different units and then they reported some probably dated to us. That is done on a quarterly basis and it's also reviewed later buy both our board and our top management team." (Participant 16)

4.4.2 Uncomfortable with Reporting Imperfect Numbers

Another pattern which emerged was a certain uncomfortable with publishing imperfect scope 3 data due to the consequences of not reaching a high enough standard of accuracy. Such firms were focused on being in control of their data and publishing imperfect numbers and the uncertainty involved in that, would go against that intuition.

"It's more about that we really want to be sure about the quality of the data we are reporting when we are reporting something. If we are not very scientific or very correct the way we are getting it just feels not right and we aim to." (Participant 7)

"Well, we have a good reputation when it comes to our transparency in our reporting so if we started pushing out data that we weren't at all sure about and see what happens. It's not really, the engineer approach that [our company] wants to have." (Participant 2)

This "engineering approach" expressed by the participant seems to be deeply rooted in the organization's values. In fact, below one participant explains how it is connected to organizational culture, and how high quality is connected to proudness and honesty.

"You need to be sure that the information you give out is of high quality. And I think our culture is to be proud and one should be honest. […] It should be possible to face all the customers

and to give the correct information. That's very important in our values and business principles." (Participant 5)

This deeply rooted drive towards only reporting high quality data, led firms to only report "scientifically proven" information and drastically reduce the information that is published, until better data quality is achieved.

"I like to talk about sustainability, not what our aspiration is and what we hope for a wish for or believe in, I want to show concrete steps we have taken only if the outcome is clear, and it is scientifically proven, and we can rely on that. And I can stand up in the public and say it is so. Then we can communicate about that." (Participant 14)

Some in fact, refrain from disclosing scope 3 data completely, following the same argumentation as expressed by the participant stated below.

"We don't report so scope 3 today at all. And the reason for that is to it, we are not able to quality assure all the figures we have." (Participant 5)

4.4.3 Reporting Shaped by Political Decisions

Reporting of scope 3 involves all actors in the value chain which entails internal- and external collaboration, which appears to be an important factor in building reporting practices and the disclosure of data. For some firms the concern for actors, whether internal or external very much guided their decision on what data should be disclosed, thus making it a political decision. In this context one participant explained how he feels that extensive reporting could put the long-lasting relationships with their suppliers in danger. A public disclosure of information that relates to the personal connection between the supplier and the firm could, according to this thinking corrupt the relationship itself.

"If you trust someone, and if you basically build a trusted relationship with some specifics, like a certain product range only is produced by that particular person because you trust them or a certain material only comes from that particular factory because you trust the owner, then the owner does not want to disclose all these information because there's a big fear. There is somehow the big fear, the big fear that their relationship we have built over years will be corrupted." (Participant 14)

There is also a concern around the relationship towards external stakeholders. While this could be a positive one where the reporting responsible works with stakeholders to develop a report that addresses their needs, a negative relationship can also have consequences on a firm's reporting efforts. The data suggests that firms seem to feel accountable towards rating agencies, media, or NGOs as these interpret data and evaluate a firms sustainability level. This seems to create fear, even paralysis in the sense that it prevents firms to confidently publish their scope 3 data.

"Still, I'm afraid reporting because I know that someone will misunderstand what we are writing and twist it and write something bad about it. […] So, I'm telling my company not to report everything because I know media will come and misinterpret." (Participant 6)

While such firms are not necessarily preventing the disclosure of scope 3 data as a result of this fear, they still seem to apply strategic communication measures when it comes to scope 3 data disclosure. These range from the way information is presented within the report to make comparisons more difficult to disclosing certain information only in the CDP report rather than the sustainability report. The participant stated below explains her rationale behind such decisions.

"Now we have the numbers hidden in text. It just kind of yeah, political decision. […] We disclose more towards the CDP though. I think the reason why we do it in this report but not in the annual report is that we have the feeling that more people read our annual report." (Participant 4)

4.4.4 Reporting More than Numbers

Other firms emphasised that their focus does not lie of reporting but making the world a better place as ultimately what will count is that emissions have been reduced and not that they are being sort of reported. As such an increased transparency through reporting can be seen as a mechanism that allows firms to better shape the sustainability narrative initiated by their climate initiatives.

"It in order for us to be actually allowed to tell our story - Look at the climate benefit that we actually contribute to - we felt we need to somehow clean before front of our own door and we need to put a stamp on - look at this how good we are. And now we are allowed to go out and brag about the climate benefit that we contribute to." (Participant 6)

At the same time however, the communication of sustainability impact of their actions, seems to be more nuanced as one participant illustrates then discussing her considerations when taking decision on scope 3 data disclosure.

"I think there is a risk from a sustainability perspective with higher transparency and also being over precise, over-focused on the measurability of things so that you get people to focus too much on reporting and too little on taking action. I mean, of course, measuring things are supposed to drive action, but I also think that there is a risk with measuring that you get too focused on the measurement itself." (Participant 10)

As such, there is a concern that when too much, too detailed information is published by the firm it will direct attention towards numbers rather than actions.

"People just pretty easily draw conclusions from what kind of numbers they see, but they don't have the background information to really understand why there's a difference, or why there's no difference." (Participant 4)

To avoid such overfocus on reported numbers of firms apply different measures. On one hand some firms stress the importance of including metadata, additional information and background on the calculation and data, within the report. On the other hand, some firms simply put increased emphasis on the categories that matter to them or direct the readers focus using the report structuresub. Examples for both responses are shown below.

"But you, you need to understand the assumptions behind the numbers. How were they collected? What was the data coverage, how were data gaps handled and all of these things and so, I think that the metadata is as important at the data itself." (Participant 10)

"We haven't included use of sold products in this year's report and that is a strategic decision on our behalf. […] The reason for that decision is that we want to focus on the emissions from the production. So, the purchase goods and services." (Participant 8)

4.5 Concluding Findings

Overall firms' approach to SEMR seems to differ across a broad spectrum. While the above stated patterns that have emerged from the data are not mutually exclusive, in the sense that a specific firm can be solely allocated towards one, it becomes apparent that different firms set different priorities and adopt different thought patterns in making sense of the issue at hand.

Independently of the chosen approach, firms seem to overall be proud of the way they are building their SEMR practices. They acknowledge the differences across firms but are confident and convinced that generally their own way works best for them.

"We need to find our way to approach it and that is also a little bit how things are done in the company. We want to do it the [company's] way because we feel that we know best what the right way is for us" (Participant 14)

This proudness seems to be linked to the core identity of the firm. As emerged throughout all sections of empirical findings stated above, the consistent set of values forming the core of the organizational culture seems to not only influence how a firm takes decisions around SEMR but also how they make sense of the concept as a whole. Whether it be the "Company DNA" the internal mindset or firm values that participants referred to, the notion of organizational culture seems to be a crucial internal determinant in shaping measurement and reporting practices.

That said, culture does not seem to be a factor taken for granted but is subject of change itself. As companies build new practices around the inherent uncertainty and imperfectness of scope 3 measurements, some consciously leave their comfort zone of control and embrace a new mindset.

"We are going beyond the comfort zone and go into the supply chain and say OK, there is a supplier somewhere, we don't know the farmer but that one has our emissions, and we need to embed it and embrace it" (Participant 14)

Such instances can indicate that it is not just an organization's culture that shapes scope 3 measurement and reporting practices but that adopting such practices can also shape a company's culture. While this reciprocal enforcement is indicated by data, the design of the study and limited resources at hand did not allow for an in-depth exploration of this connection.

5 Analysis

The following chapter analyzes the empirical findings in relation to the theoretical framework of the study and previous research. It is structured according to the four cultural quadrants of the theoretical framework and aims to address research question II in exploring how interpretation and culture influence the practices of scope 3 emissions measurement and reporting.

5.1 Relating Patterns to Organizational Culture

The data has shown how on a firm-level underlying values and taken-for-granted beliefs influence managerial perception and interpretation of sustainability and its relation to a firm's strategy. Further the data yielded profound patterns in firms' visible structures and processes of scope 3 emission measuring and reporting – the cultural artifacts following Schein's three-level classification of organizational culture (Schein, 2004). As concluded in the empirical findings, underlying values and shared beliefs, form a crucial internal determining factor. It shapes internally accepted explanations and beliefs which in turn shape a firms' adopted SEMR practices. As such, differences in culture contribute towards differences in the adopted scope 3 approach. Throughout this analysis, this connection is further developed. Similar to Linnenluecke & Griffiths (2010), who have explored the connection between organizational culture and general corporate sustainability, authors will rely on the four quadrants of the CVF framework incorporated into the theoretical framework proposed, to create a coherent understanding of how different cultural orientations yield different SEMR practices.

5.2 Internal Process Approach - Control

The cultural orientation that is characterized by a strong internal focus as well as an emphasis on stability and control is named internal process approach. In such a setting predictability and clarity is valued and firms tend to aim for controlling by defining standardized processes as well as compliance (Cooper & Quinn, 1993). In the context of SEMR the empirical data yields an overall congruent expression of this approach.

As the sustainability transition entails potentially wide-ranging changes, it poses a threat towards the stable state promoted by such a culture (Cameron & Quinn, 2011). The data on framing shows that for firms characterized by such shared values, sustainability is seen as a burden or requirement that has to be managed or solved. Strict adherence and orientation towards regulatory requirements are prevailing. Proactive investments in scope 3 measuring and risk taking is avoided as the outcome is uncertain. These findings are in line with Stubbs et al.'s who argue that compliance driven culture, where sustainability reporting is seen as a mandatory requirement, contribute towards an instrumental understanding of sustainability that discourages a proactive engagement (Stubbs et al., 2013).

As scope 3 emissions are per definition out of control, their measurement poses a particular challenge towards firms characterized by a control culture. A focused definition of scope 3 emission measurements, as found in the data, allows them to reduce complexity and thus more easily create a controllable situation which yield precise measures. These findings are in line with previous research which suggests that in their pursuit of control and predictability internal

process cultures tend to focus on unambiguous sustainability measures (Dyck et al., 2019; Linnenluecke & Griffiths, 2010).

Realistic measurement and high data quality are however considered a product of long-lasting practice development and not achieved from the beginning. This leaves firms with discomfort and prevents them from reporting imperfect scope 3 emission data to the public. Though researchers have previously attributed discomfort in the context of introducing and developing sustainability reporting practices to a lack of knowledge and emotional stirrup connected towards change (Adams & McNicholas, 2007), the data specifically suggests a need for precise measures and scientifically proven results as emerging from the control driven *engineering mindset*.

Rather than communicating aspirations externally, such control-oriented firms, focus internally by building organizational structures and scope 3 data collection processes. The hierarchal nature connected to such are well in line with internal process approach, which is sometimes also referred to as hierarchy culture.

5.3 Rational Goal Approach - Compete

As the data has shown, some firms see sustainability as a business opportunity that allows them to differentiate from competitors. They situate it at to core of their strategy to better compete in the market by maintaining a competitive edge. This initial shared understanding sets the bases for a cultural orientation that is in line with the competitiveness aspirations of the rational goal culture. As such visionary direction, goal setting and planning play a key role in the management of such an organization (Cooper & Quinn, 1993).

These characteristics can also be observed when it comes to firms' SEMR practices. As found in the data such firms are outspoken and proud about their ambitious reduction targets set for scope 3 emissions and senior management engage in strategic planning to be able to deliver competitive results. To be able to set such targets firms are in need for a complete overview of scope 3 emissions, reflected in their measurement definition. They use estimates in order to guide strategic reduction initiatives. These findings are congruent with previous literature suggesting that rational goal culture would focus on setting CO^2 reduction targets whilst proactively instituting sustainability practices in gaining competitive advantages (Linnenluecke & Griffiths, 2010).

As with the communication of scope 3 reduction targets, firms are not held back of publishing imperfect scope 3 data, but rather actively encourage and support external publication of such. For such firms reporting is seen as a mechanism to raise awareness, provide a visionary direction for the firms and align the firm to collectively develop. Previous research in the field, does in fact suggest that publication of a sustainability report drives and reinforces sustainability changes in the company (Domingues et al., 2017; Lozano et al., 2016). The embracing of external communication thus forms a core pillar for the competitive orientation of such firms and ties together a coherent picture of SEMR practices shaped the rotational goal culture.

5.4 Open System Approach - Create

Turning towards a culture that embrace flexibility rather than control the open system approach remains externally oriented. Within such an approach firms focus on creating things and reducing the firms impact first rather than engaging in intensive planning and structuring. While still seen as an opportunity for development, sustainability and scope 3 data is seen as an enabler to drive purposeful innovation as suggested also by previous research. (Linnenluecke & Griffiths, 2010).

As SEMR serves the purpose of guiding innovation and development efforts, firms define them according to relevant impact areas. As such measures should only be focused if they help a firm take better decision on their product development, sourcing or internal process. It is not just the firm's internal development that aims to continuously improve and learn throughout development cycles but also the data collection and calculation processes themselves are seen as subject of organizational learning. Both within the organization as well as across the supply chain SEMR is seen as a joint learning journey. This is in line with previous research, which suggests that an open system culture puts emphasis on proactive learning and external engagement (Linnenluecke & Griffiths, 2010).

Finally, mixed views on external communication of scope 3 emissions are expressed under this cultural orientation. On one hand, increased transparency can help firms to frame their impact efforts and create a sustainable firm narrative. On the other hand, however an overemphasis on numbers could direct attention away from the focused actions and initiatives. Meta-data communication seems to be one practice that emerged within the wider context on SEMR shaped by such an open systems culture.

5.5 Human Relation Approach - Collaborate

From the empirical findings it emerged that when it comes to SEMR, some firms place particular emphasis on a self-reinforcing focus on engagement with employees and other actors. Firms see measurement and data collection as an enabler to build positive relationships, engage into collaboration and align values. This great emphasis on social interaction and collaboration as well as internal sustainability capability development, is in the context of sustainability associated with the human relations quadrant of the CVF model (Linnenluecke & Griffiths, 2010).

Just like the transition towards a sustainable economy, SEMR inherently requires a rethinking of economic relationships. Rather than individualistic transactions, direct engagement and collaboration with the value chain but also employees are required. Thus, firms focus on embedding responsibility for data collection and calculation in the organization, while no coherent themes on measure definition itself could be identified in this context. Employees receive trainings to build knowledge and align values. Bottom-up solution development is encouraged which may explain why coherent findings for measurement and target definition within this cultural quadrant are limited. Potentially such top-down direction giving is not emphasised in this cultural setting.

Within reporting however, findings indicate that firms with a human relation approach tend to be careful with what to communicate publicly. They potentially strategically limit their communication as they fear that the disclosure of scope 3 emission data, could disrupt trust within relationships towards value chain partners. Further, a strong concern for relationships also towards other stakeholders, such as media or NGOs, creates a feeling of accountability for communicated data which can be overwhelming. On the positive side however, the data indicates on how firms work together with stakeholders to set reporting priorities. Though not supported by data of this study, previous research suggests that sustainability reporting is also seen as a mechanism for further incorporate shared values and sustainability principles into the organization (Adams & McNicholas, 2007).

5.6 Synthesis and Conclusion

Based on the empirical findings of this study it was possible to identify coherent sets of SEMR practices, relate those to respective shared understandings and beliefs of the phenomenon itself and further connect them different culture orientations. Structured into the four different culture archetypes by Cooper and Quinn (1993), the below presented figure 5 summarizes the different sets of observed practices discussed in the analysis above.

	Control	**Compete**	**Create**	**Collaborate**
Strategy and framing	Fulfilling requirement	Differentiating from competitors	Enabling innovation	Increasing collaboration
Measure & target definition	Precise measurements and careful targets	Transparent overview and ambitious targets	Measure where we can have an impact	*No significant findings*
Data collection & calculation process	Structured sequential processes	Estimated data and senior engagement	Inter- and intra organizational learning	Responsibility embedded in organization
Reporting & internal use	Uncomfortable with reporting imperfect information	Reporting to improve practices and data quality	Reporting more than numbers	Reporting shaped by political decisions

Figure 5: Synthesised Results

It is important to point out that these cultural orientations and the SEMR practices associated are not mutually exclusive, and adopted practices are a product of firms unique a mix of different archetypes. Accordingly, firms can have a more balanced culture and scope 3 approach or a culture where one or more specific quadrants can have a stronger expression leading to a focus on specific practices. Cameron and Quinn (2011) argue that a balanced

culture is not necessarily the ideal approach, but rather "the extent to which [an] organization needs a strong dominant culture as opposed to a balanced culture is a matter of individual circumstance and environment." A key factor among these circumstances they argue is the nature of the challenges a firm is facing, in this context SEMR, and in a broader context the sustainability transition. As such one could argue that some cultural orientations and practices adopted are more adequate in this context than others. Van Marrewijk (2004) takes up this thinking and argues that to truly embrace sustainability, organizations must move on from order-, control- and profit-driven compete-cultures towards care- and trust-centred values found in the open systems and human relations approach. For SEMR this would mean that firms ought to leave behind their control focused of self-serving precise measures, to work towards increasing collaboration in the value chain to drive real impact, trust internal and external actors, instil them with responsibility for measurements and actions and jointly learn and develop practices. Building such close trust-based relationships has previously been shown to increase information sharing and drive adoption of sustainability reporting (Sancha et al., 2016; Sancha et al., 2016; Vachon & Klassen, 2008). In a firm with such extend boundaries however reporting becomes a hygiene factor and scope 3 data a tool systematic and coherent cross-firm working and ultimately the improvement of sustainability performance.

Van Marrewijk's (2004) argumentation however is built on the belief that different cultures orientations and values do not substitute but rather build on top of each other. As such foundational practices associated with control focused cultures, such as a transparent overview of value chain emissions - an initial GHG screening (GHG Protocol, 2011), structured processes or a clear assignment of responsibilities to name some examples, cannot be neglected in building a functional system. The empirical data shows that a lack of such can lead to frustration and intransparency, which are arguably inhibiting effective collaboration. Henceforth, the evaluation of different scope 3 emission reporting practices identified in terms of their internal effectiveness but also their environmental performance remains a task for future research (see 6.4).

As a final remark in this open-ended discussion Crona et al.'s argues that the refinement of complexity reducing measures, associated with a control focused internal process culture, will increase precision, that is the closeness of measures among each other, but fails to address accuracy, the closeness of measurements to real world phenomenon (Crona et al., 2021). As this would make us more precisely wrong, instead of generally right, it is crucial to continuously remember the underlying purpose of measuring scope 3 emissions, that is to reduce them by transitioning towards sustainable business practices.

6 Discussion

In this final chapter, the study's theoretical contributions (6.1) and its practical implications (6.2) are discussed. Further, limitations of the study are presented in section 6.3 and directions for future research (6.4) summarized.

6.1 Theoretical Contribution

This study has been able to shed light onto how the internal approach towards SEMR differs across firms. By adopting an internal organizational perspective, it was possible to build a deeper understanding of how a firm's underlying values and shared understanding of the phenomenon, encompassed by the notion of organizational culture, influence and actively contribute towards shaping a firm's adopted practices of SEMR. Though the potentially reenforcing nature between cultural change and sustainability practices adoption (Linnenluecke & Griffiths, 2010) remains a topic for further research, this study contributes towards research at the intersection of organizational culture and sustainability, as it demonstrates that different sets of practices, including adopted processes and structures, are associated with different expressions of organizational culture.

This understanding of differences in adopted SEMR practices and what they attribute to forms a crucial cornerstone in truly comprehending the connection between the concepts at hand. It thus creates a relevant addition towards management and organization literature and contributes towards theory building within the diverse and complex topic of SEMR. Previous research constituted a gap, as it either focused on intrafirm engagement in the value chain or adopted an output-oriented perspective studying a firm's published data. Largely ignoring firm-internal factors, this led to the development of stakeholder theory and legitimacy theory (Jaggi et al., 2017) which argue that external stakeholder pressure as well as firm's active manipulation of its perception towards these stakeholders is thought to be the primary driver behind GHG measurement and reporting efforts (Linnenluecke & Griffiths, 2010). The findings of this study support scholars questioning the explanatory power of these reporting theories, (Adams, 2002; Howard-Grenville, 2006), as it demonstrated that SEMR is not a direct product of external factors, as adopted measurement and reporting practices, shaped by a firm's culture, function as an intermediary translator. However, this study does not discredit existing theory but rather complements, as it does not address what drives SEMR but rather how firms go about doing it. It does however raise critical methodological concerns on the relevance of research which aims to understand the adoption and quality of indirect emission measures solely by quantitatively studying firms' published emission data.

6.2 Practical Implications

The measurement and reporting of carbon emission data has become a central pillar in driving the transition towards sustainable business practices (Busch et al., 2022). In order to push the adoption of SEMR throughout the value chain, an increase of stakeholder engagement is needed. Differentiated engagement and support towards firms however requires an understanding of firms' individual approach towards the issue as there is no "one size fits all" (Lozano et al., 2016). This study contributes towards building such an understanding by

identifying sets of coherent practices adopted by firms that can be attributed towards the organizational culture of a firm. The practical implications that arise from the awareness for such are threefold.

Firstly, external actors who understand a firm's approach better can adjust judgement, communication and recommendations when engaging to foster further development of SEMR. For both stakeholder evaluating and requesting data and actors such as consultants who aim to directly support a firm's development, a more profound understanding how a firm's perception and interpretation shaping adopted practices of SEMR is key as building a shared understanding of the issue in question is crucial for collaboration (Bittner & Leimeister, 2013). As the study has also shown that a reduction of a firm's practices and actions to the mere emission data published can induce frustration and mistrust among firms, it is advised to external actors to interpret disclosed data in the respective firm context and develop an understanding for the meaning and practices behind it.

Secondly, an increased awareness for a firm's own perception of SEMR and its differences in approach towards others can stimulate firms to reflect on their orientation, challenge taken for granted beliefs and develop one's culture and practices further. Though the discussion on which culturally induced approach should be focused on, remained open-ended, it raised critically stimulating thoughts. This fundamental questioning of how and why things are done within a firm can have powerful redefining implications, not only towards how firms measure their business activity but also how they do business in light of the sustainability transition.

Thirdly, the findings of this study have concrete implications for regulators and policy makers involved in development of regulation covering the disclosure of non-financial information. As this study has shown that significant culturally rooted difference in understanding and adopted practices of SEMR exist between firms, regulation demanding the publication of emission data could not only favour certain approaches, but also contribute towards cementing existing cultural orientations within firms. As an overemphasis of measurements and compliance towards regulation is associated with a control-based approach such regulation could potentially be counterproductive in encouraging the needed development of sustainability motivated and trust-based collaboration-orientation (van Marrewijk, 2004), as they are associated with inhibiting change (Abdul Rashid et al., 2004). While the authors want to crucially emphasis the need for cultural development at this point, they recognise the need for regulation wherein meta-data and contextual considerations could potentially mitigate some of the above raised concerns.

6.3 Limitations of this Study

As this study focused on adopted practices and representative managers' perception of the issue at hand, the exploration of the connection towards firms' culture dependent of a matching of available data and literature based cultural characteristics. By using qualitative interviews, the risk of interpretation bias among interviewees arises, when presenting a picture of the circumstances of partner firms. Though these limitations have been considered, they form a constraint to the study which could be addressed by further research.

Further the purposeful sampling adopted as well as the qualitative character limits the context of the study to managers in large Swedish firms. Though it has been shown above, several relevant themes and principles for both theory and practice have been generated, it is important to recognize that this study was not aimed to develop completely generalizable knowledge.

Another limitation of the study is the assumption that organizational culture influences practices – they are so to say embedded in contextual setting of organizational culture (Ferreira & Otley, 2009). Although this is accordingly to the perspective of Otley's framework which influences the adopted theoretical framework, it is important to recognize that this study did not investigate the potentially two-directional reenforcing relationship between cultural and practices. As measuring can also be seen as a tangible activity initiating an underlying change in mindset and culture, one might raise the question on what should be addressed first (Bititci et al., 2006).

6.4 Future Research

Due to the exploratory nature and limitations of this study, the authors recognize that future research is needed to further explore the relationship between organizational culture and measurement practices in connection to sustainability. A more extensive cultural assessment, such as put forth by Quinn (2011) could help to further strengthen the connection between culture and practices observed. Further, a more in-depth study of SEMR practices by collection additional data and observations as well as extension of practices in study could help to drive more robust theorizing.

Further, scholars have previously argued that measuring practices are not only shaped by culture but also that developing measuring practices can lead to cultural change (Bititci et al., 2006). As this study does not actively address this potentially reenforcing nature between cultural change and practices adoption, it remains a topic for further research that should be further explored. However, this study highlights the importance of cultural development within the context of sustainability and supports calls for further exploration of the two-directional reenforcing relationship between measurement and culture (Linnenluecke & Griffiths, 2010).

Not just the question on how such cultural change can be brought about, but also what cultural developments should work towards, form a critical question to be addressed by future research. This study shows how culture leads to differences in practices but refrained from assessing or comparing those. A deeper understanding of their connection towards environmental performance and concrete results in the sustainable business transition would certainly add towards a more nuanced picture while entailing crucial practical implications.

7 References

Abdul Rashid, Z., Sambasivan, M., & Abdul Rahman, A. (2004). The influence of organizational culture on attitudes toward organizational change. *Leadership & Organization Development Journal, 25*(2), 161-179. 10.1108/01437730410521831

Adams, C., & McNicholas, P. (2007). Making a difference: sustainability reporting, accountability and organisational change.10.1108/09513570710748553

Adams, C. A. (2002). Internal organisational factors influencing corporate social and ethical reporting: beyond current theorising. *Accounting, Auditing and Accountability Journal, 15*(2), 223-250. 10.1108/09513570210418905

Ahi, P., & Searcy, C. (2015). An analysis of metrics used to measure performance in green and sustainable supply chains. *Journal of Cleaner Production, 86*, 360-377. 10.1016/j.jclepro.2014.08.005

Allaire, Y., & Firsirotu, M. E. (1984). Theories of Organizational Culture. *Organization Studies, 5*(3), 193-226. 10.1177/017084068400500301

Bansal, P. (2003). From Issues to Actions: The Importance of Individual Concerns and Organizational Values in Responding to Natural Environmental Issues. *Organization Science, 14*(5), 510-527. https://www.jstor.org/stable/4135146

Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: Trends, research outcomes, and future research implications. *Journal of Operations Management, 29*(4), 329-342. 10.1016/j.jom.2010.06.002

Baumol, W. J. (1972). On Taxation and the Control of Externalities. *The American Economic Review, 62*(3), 307-322. https://www.jstor.org/stable/1803378

Beske-Janssen, P., Johnson, M. P., & Schaltegger, S. (2015). 20 years of performance measurement in sustainable supply chain management – what has been achieved? *Supply Chain Management, 20*(6), 664-680. 10.1108/SCM-06-2015-0216

Bititci, U. S., Mendibil, K., Nudurupati, S., Garengo, P., & Turner, T. (2006). Dynamics of performance measurement and organisational culture. *International Journal of Operations & Production Management, 26*(12), 1325-1350. 10.1108/01443570610710579

Bittner, E. A. C., & Leimeister, J. M. (2013). Why Shared Understanding Matters -- Engineering a Collaboration Process for Shared Understanding to Improve Collaboration Effectiveness in Heterogeneous Teams. Paper presented at the 106-114. 10.1109/HICSS.2013.608 https://ieeexplore.ieee.org/document/6479847

Boettke, P. J. (2012). *Living economics*. Independent Inst. [u.a.].

Bolton, P., Reichelstein, S., Kacperczyk, M. T., Leuz, C., Ormazabal, G., & Schoenmaker, D. (2021). *Mandatory Corporate Carbon Disclosures and the Path to Net Zero.* (). Rochester, NY: https://papers.ssrn.com/abstract=4059588

Bowen, G. A. (2008). Naturalistic inquiry and the saturation concept: a research note. *Qualitative Research: QR, 8*(1), 137-152. 10.1177/1468794107085301

Braun, V., & Clarke, V. (2016). Successful qualitative research: A practical guide for beginners. *Feminism & Psychology, 26*(3), 387-391. 10.1177/0959353515614115

Brinkmann, S., & Kvale, S. (2015). *Interviews: learning the craft of qualitative research interviewing* (3rd ed.). Sage Publications.

Bryman, A. (1990). Quantity and Quality in Social Research. *Contemporary Sociology, 19*(2), 325-326. 10.2307/2072662

Bryman, A. (2015). *Social Research Methods (4th Edition) by Alan Bryman, Oxford University Press, New Delhi, 2012, Pages 766, Price Rs. 825*. Foundation for Organizational Research and Education (FORE).

Bui, B., & de Villiers, C. (2017). Carbon emissions management control systems: Field study evidence. *Journal of Cleaner Production, 166*, 1283-1294. 10.1016/j.jclepro.2017.08.150

Busch, T., Johnson, M., & Pioch, T. (2022). Corporate carbon performance data: Quo vadis? *Journal of Industrial Ecology, 26*(1), 350-363. 10.1111/jiec.13008

Büschgens, T., Bausch, A., & Balkin, D. B. (2013). Organizational Culture and Innovation: A Meta-Analytic Review. *Journal of Product Innovation Management, 30*(4), 763-781. 10.1111/jpim.12021

Byles, C. M. (1990). The organizational culture perspective. J. Steven Ott, Brooks/Cole Publishing, Pacific Grove, CA 1989. *Journal of Organizational Behavior, 11*(3), 245-247. 10.1002/job.4030110308

Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework.* John Wiley & Sons, Inc.

CDP Worldwide. (2022). *CDP.* CDP Worldwide. https://www.cdp.net/en

Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law & Economics, 3*, 1-44. https://www.jstor.org/stable/724810

Cooper, R. B., & Quinn, R. E. (1993). Implications of the competing values framework for management information systems. *Human Resource Management, 32*(1), 175-201. 10.1002/hrm.3930320109

Crona, B., Folke, C., & Galaz, V. (2021). The Anthropocene reality of financial risk. *One Earth, 4*(5), 618-628. 10.1016/j.oneear.2021.04.016

Dehm, J. (2018). One Tonne of Carbon Dioxide Equivalent (1tCO2e). *International Law's Objects* (). Oxford University Press. 10.1093/oso/9780198798200.003.0026

Denison, D. R., & Mishra, A. K. (1995). Toward a Theory of Organizational Culture and Effectiveness. *Organization Science (Providence, R.I.), 6*(2), 204-223. 10.1287/orsc.6.2.204

Domingues, A. R., Lozano, R., Ceulemans, K., & Ramos, T. B. (2017). Sustainability reporting in public sector organisations: Exploring the relation between the reporting process and organisational change management for sustainability. *Journal of Environmental Management, 192*, 292-301. 10.1016/j.jenvman.2017.01.074

Doni, F., Bianchi Martini, S., Corvino, A., & Mazzoni, M. (2019). Voluntary versus mandatory non-financial disclosure. *Meditari Accountancy Research, 28*(5), 781-802. 10.1108/medar-12-2018-0423

Dyck, B., Walker, K., & Caza, A. (2019). Antecedents of sustainable organizing: A look at the relationship between organizational culture and the triple bottom line. *Journal of Cleaner Production, 231*, 1235-1247. 10.1016/j.jclepro.2019.05.287

Edmondson, A. C., & Mcmanus, S. E. (2007). Methodological fit in management field research. *The Academy of Management Review, 32*(4), 1155-1179. 10.2307/20159361

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory Building From Cases: Opportunities And Challenges. *Academy of Management Journal, 50*(1), 25-32. 10.5465/amj.2007.24160888

European Commission. (2022). *Corporate sustainability reporting.* European Commission website. https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

Ferreira, A., & Otley, D. (2009). The design and use of performance management systems: An extended framework for analysis. *Management Accounting Research, 20*(4), 263-282. 10.1016/j.mar.2009.07.003

Flick, U. (2014). *An introduction to qualitative research* (Ed. 5 ed.). Sage.

Flick, U. (2018). *The SAGE handbook of qualitative data collection*. SAGE reference.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., de Colle, S., & Parmar, B. L. (2010). Stakeholder Theory: The State of the Art. *Academy of Management Annals, 4*(1), 403-445. 10.5465/19416520.2010.495581

GHG Protocol. (2004). *The Greenhouse Gas Protocol: a Corporate Accounting and Reporting Standard, Revised Edition*

GHG Protocol. (2011). *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*. World Resources Institute and World Business Council for Sustainable Development.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15-31. 10.1177/1094428112452151

Goettsche, M., Steindl, T., & Gietl, S. (2016). Do Customers Affect the Value Relevance of Sustainability Reporting? Empirical Evidence on Stakeholder Interdependence. *Business Strategy and the Environment, 25*(3), 149-164. 10.1002/bse.1856

Groysberg, B., Lee, J., Price, J., & Cheng, J. Y. (2018, -01-01T05:00:00Z). The Leader's Guide to Corporate Culture. *Harvard Business Review,* https://hbr.org/2018/01/the-leaders-guide-to-corporate-culture

Henderson, R. (2020). *Reimagining Capitalism in a World on Fire* (Illustrated ed.). PublicAffairs.

Hertwich, E. G., & Wood, R. (2018). The growing importance of scope 3 greenhouse gas emissions from industry. *Environmental Research Letters, 13*(10), 104013. 10.1088/1748-9326/aae19a

Hillebrand, J. D., & Berg, B. L. (2000). *Qualitative Research Methods for the Social Sciences*. American Sociological Association. 10.2307/1319429

Hofstede, G. (1998). Attitudes, Values and Organizational Culture: Disentangling the Concepts. *Organization Studies, 19*(3), 477-493. 10.1177/017084069801900305

Hong, J., Guo, P., Chen, M., & Li, Y. (2022). The adoption of sustainable supply chain management and the role of organisational culture: a Chinese perspective. *International Journal of Logistics Research and Applications, 25*(1), 52-76. 10.1080/13675567.2020.1795094

Howard-Grenville, J. A. (2006). Inside the "Black Box": How Organizational Culture and Subcultures Inform Interpretations and Actions on Environmental Issues. *Organization & Environment, 19*(1), 46-73. 10.1177/1086026605285739

Hristov, I., Appolloni, A., Chirico, A., & Cheng, W. (2021). The role of the environmental dimension in the performance management system: A systematic review and conceptual framework. *Journal of Cleaner Production, 293*, 126075. 10.1016/j.jclepro.2021.126075

Huang, C., & Kung, F. (2010). Drivers of Environmental Disclosure and Stakeholder Expectation: Evidence From Taiwan. *Journal of Business Ethics, 96*(3), 435–451. 10.1007/s10551-010-0476-3

Ioannou, I., & Serafeim, G. (2017). *The Consequences of Mandatory Corporate Sustainability Reporting.* (). Rochester, NY: https://papers.ssrn.com/abstract=1799589.

Jaggi, B., Allini, A., Macchioni, R., & Zagaria, C. (2017). The Factors Motivating Voluntary Disclosure of Carbon Information: Evidence Based on Italian Listed Companies. *Organization & Environment, 31*(2), 178-202. 10.1177/1086026617705282

Kaplan, R. S., & Ramanna, K. (2021, -11-01T04:00:00Z). Accounting for Climate Change. *Harvard Business Review,* https://hbr.org/2021/11/accounting-for-climate-change

Kumekawa, I. (2017). *The first serious optimist*. Princeton University Press.

Laguir, L., Laguir, I., & Tchemeni, E. (2019). Implementing CSR activities through management control systems. *Accounting, Auditing, & Accountability, 32*(2), 531-555. 10.1108/AAAJ-05-2016-2566

Larrinaga Gonzlez, C., Carrasco Fenech, F., Caro Gonzlez, F. J., Correa Ruz, C., & Mara Pez Sandubete, J. (2001). The role of environmental accounting in organizational change -An exploration of Spanish companies. *Accounting, Auditing, & Accountability, 14*(2), 213-239. 10.1108/09513570110389323

Liesen, A., Hoepner, A. G., Patten, D. M., & Figge, F. (2015). Does stakeholder pressure influence corporate GHG emissions reporting? Empirical evidence from Europe. *Accounting, Auditing & Accountability Journal, 28*(7), 1047-1074. 10.1108/aaaj-12-2013-1547

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Linnenluecke, M. K., & Griffiths, A. (2010). Corporate sustainability and organizational culture. *Journal of World Business, 45*(4), 357-366. 10.1016/j.jwb.2009.08.006

Lozano, R., Nummert, B., & Ceulemans, K. (2016). Elucidating the relationship between Sustainability Reporting and Organisational Change Management for Sustainability. *Journal of Cleaner Production, 125*, 168-188. 10.1016/j.jclepro.2016.03.021

Luo, L. (2019). The influence of institutional contexts on the relationship between voluntary carbon disclosure and carbon emission performance. *Accounting & Finance, 59*(2), 1235-1264. 10.1111/acfi.12267

Luque-Vílchez, M., Mesa-Pérez, E., Husillos, J., & Larrinaga, C. (2019). The influence of pro-environmental managers' personal values on environmental disclosure. *Sustainability Accounting, Management and Policy Journal (Print), 10*(1), 41-61. 10.1108/SAMPJ-01-2018-0016

Manetti, G. (2011). The quality of stakeholder engagement in sustainability reporting: empirical evidence and critical points. *Corporate Social Responsibility and Environmental Management, 18*(2), 110-122. 10.1002/csr.255

O'Reilly, K. (2009). Key Concepts in Ethnography; pages 119-124. (). SAGE Publications Ltd. 10.4135/9781446268308

Oriade, A., Osinaike, A., Aduhene, K., & Wang, Y. (2021). Sustainability awareness, management practices and organisational culture in hotels: Evidence from developing countries. *International Journal of Hospitality Management, 92*, 102699. 10.1016/j.ijhm.2020.102699

Orlikowski, W. J., & Baroudi, J. J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research, 2*(1), 1-28. 10.1287/isre.2.1.1

Patchell, J. (2018). Can the implications of the GHG Protocol's scope 3 standard be realized? *Journal of Cleaner Production, 185*, 941-958. https://doi.org/10.1016/j.jclepro.2018.03.003

Pérez-López, D., Moreno-Romero, A., & Barkemeyer, R. (2015). Exploring the Relationship between Sustainability Reporting and Sustainability Management Practices. *Business Strategy and the Environment, 24*(8), 720-734. 10.1002/bse.1841

Prusak, L. (2010, -10-07T13:25:00Z). What Can't Be Measured. *Harvard Business Review,* https://hbr.org/2010/10/what-cant-be-measured

Quinn, I. (2022). *New Scope 3 emissions reporting won't have to be made public, industry told.* The Grocer. https://www.thegrocer.co.uk/suppliers/new-scope-3-emissions-reporting-wont-have-to-be-made-public-industry-told/664378.article

Rajeev, A., Pati, R. K., Padhi, S. S., & Govindan, K. (2017). Evolution of sustainability in supply chain management: A literature review. *Journal of Cleaner Production, 162*, 299-314. 10.1016/j.jclepro.2017.05.026

Rouleau, L., & Balogun, J. (2011). Middle Managers, Strategic Sensemaking, and Discursive Competence. *Journal of Management Studies, 48*(5), 953-983. 10.1111/j.1467-6486.2010.00941.x

Sancha, C., Gimenez, C., & Sierra, V. (2016). Achieving a socially responsible supply chain through assessment and collaboration. *Journal of Cleaner Production, 112*, 1934-1947. 10.1016/j.jclepro.2015.04.137

Sancha, C., Wong, C. W. Y., & Gimenez Thomsen, C. (2016). Buyer–supplier relationships on environmental issues: a contingency perspective. *Journal of Cleaner Production, 112*, 1849-1860. 10.1016/j.jclepro.2014.09.026

Schein, E. H. (2004). *Organizational culture and leadership*. Jossey-Bass.

Schwartz, H., & Davis, S. M. (1981). Matching corporate culture and business strategy. *Organizational Dynamics, 10*(1), 30-48. 10.1016/0090-2616(81)90010-3

Shrimali, G. (2021). *Scope 3 Emissions: Measurement and Management*. Stanford University. https://energy.stanford.edu/sites/g/files/sbiybj9971/f/scope_3_emissions_-_measurement_and_management_0.pdf

Smircich, L. (1983). Concepts of Culture and Organizational Analysis. *Administrative Science Quarterly, 28*(3), 339-358. 10.2307/2392246

Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews, 9*(1), 53-80. 10.1111/j.1468-2370.2007.00202.x

Stubbs, W., Higgins, C., & Milne, M. (2013). Why Do Companies Not Produce Sustainability Reports? *Business Strategy and the Environment, 22*(7), 456-470. 10.1002/bse.1756

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. *Academy of Management Review, 20*(3), 571-610. 10.5465/amr.1995.9508080331

Talbot, D., & Boiral, O. (2015). GHG Reporting and Impression Management: An Assessment of Sustainability Reports from the Energy Sector. *Journal of Business Ethics, 147*(2), 367-383. 10.1007/s10551-015-2979-4

Touboulic, A., & Walker, H. (2015). Love me, love me not: A nuanced view on collaboration in sustainable supply chains. *Journal of Purchasing and Supply Management, 21*(3), 178-191. 10.1016/j.pursup.2015.05.001

Trice, H. M., & Beyer, J. M. (1984). Studying Organizational Cultures through Rites and Ceremonials. *The Academy of Management Review, 9*(4), 653-669. 10.2307/258488

Urquhart, C. (2013). *Grounded Theory for Qualitative Research: A Practical Guide*10.4135/9781526402196

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International Journal of Production Economics, 111*(2), 299-315. 10.1016/j.ijpe.2006.11.030

van Marrewijk, M. (2004). A Value Based Approach to Organization Types: Towards a Coherent Set of Stakeholder-Oriented Management Tools. *Journal of Business Ethics, 55*(2), 147-158. 10.1007/s10551-004-1898-6

Vitolla, F., Raimo, N., Rubino, M., & Garzoni, A. (2019). How pressure from stakeholders affects integrated reporting quality. *Corporate Social Responsibility and Environmental Management,* 10.1002/csr.1850

8 Appendices

8.1 Appendix 1: Partner Companies

Company	Industry	TCFD or GRI compliant	Scope 3 Categories reported	SBTI approved
Company 1	Health Care	TCFD	12	Yes
Company 2	Industrials	TCFD	0	No
Company 3	Energy	TCFD and GRI	Only Consolidated	No
Company 4	Customer Staples	GRI	4	No
Company 5	Materials	GRI	7	Yes
Company 6	Industrials	GRI	0	No
Company 7	Information Technology	GRI	6	Yes
Company 8	Information Technology	TCFD and GRI	8	Yes
Company 9	Energy	TCFD	7	Yes
Company 10	Industrials	GRI	5	Yes

8.2 Appendix 2: Interview Sample

Participant	Interview Type	Industry	Type of Role	Gender	Date	Length	Interview Type
Participant 1	Initial Interview	Health Care	Sustainability Specialist	M	11/02/2022	01:26	MS Teams
Participant 2	Initial Interview	Industrials	Sustainability Leadership	M	12/02/2022	00:51	MS Teams
Participant 3			Sustainability Specialist	F			
Participant 4	Initial Interview	Customer Staples	Sustainability Specialist	F	16/02/2022	01:16	MS Teams
Participant 5	Initial Interview	Industrials	Sustainability Leadership	M	16/02/2022	01:08	MS Teams
Participant 6	Initial Interview	Materials	Sustainability Specialist	F	17/02/2022	01:18	MS Teams
Participant 7	Initial Interview	Energy	Sustainability Specialist	M	17/02/2022	00:52	MS Teams
Participant 8	Initial Interview	Information Technology	Sustainability Specialist	F	18/02/2022	01:26	MS Teams
Participant 9	Initial Interview	Energy	Sustainability Leadership	M	21/02/2022	00:47	MS Teams
Participant 10	Initial Interview	Information Technology	Sustainability Specialist	F	22/02/2022	00:54	MS Teams
Participant 11	Expert Interview	Consultancy	Sustainability Expert	F	01/03/2022	01:09	MS Teams
Participant 12			Sustainability Expert	F			
Participant 13	Follow-up Interview	Information Technology	Sustainability Leadership	F	02/03/2022	01:14	MS Teams
Participant 14	Follow-up Interview	Customer Staples	Sustainability Leadership	M	08/03/2022	00:40	MS Teams
Participant 15	Expert Interview	CDP	Sustainability Expert	F	09/03/2022	00:45	MS Teams
Participant 16	Initial Interview	Industrials	Sustainability Specialist	F	10/03/2022	00:53	MS Teams
Participant 17	Follow-up Interview	Industrials	Communication Leadership	M	14/03/2022	01:05	In-Person
Participant 18	Expert Interview	Climate Initiative	Sustainability Expert	M	17/03/2022	00:47	MS Teams
Participant 19	Follow-up Interview	Energy	Sustainability Leadership	M	18/03/2022	00:33	MS Teams
Participant 20	Follow-up Interview	Health Care	R&D Leadership	M	18/03/2022	00:45	MS Teams
Participant 21	Follow-up Interview	Information Technology	Sustainability Leadership	M	21/03/2022	00:55	MS Teams

8.3 Appendix 3: Interview Guide for Initial Interviews

Topic	Question
Background	• Can you describe your **role** within [organization]?
General status of emission measurement and reporting	• How would you assess the importance and quality of GHG reporting within [organization]? • How would you assess the importance and quality of scope 3 emissions? • Do you see your reporting in full accordance with the GHP Scope 3 standard?
Approach towards scope 3 emission measurement and reporting	• Why did you decide to engage in scope 3 data measurement and reporting? • How did you first approach scope 3 emissions? • How did you go about setting scope and boundary for emission reporting?
Development and handling of challenges	• How have your practices been changing? Why? • Which challenges have you been facing have you been facing regarding scope 3 emissions?
Future outlook	• What are you planning on changing in the future? • How do you deal with changes in your method?

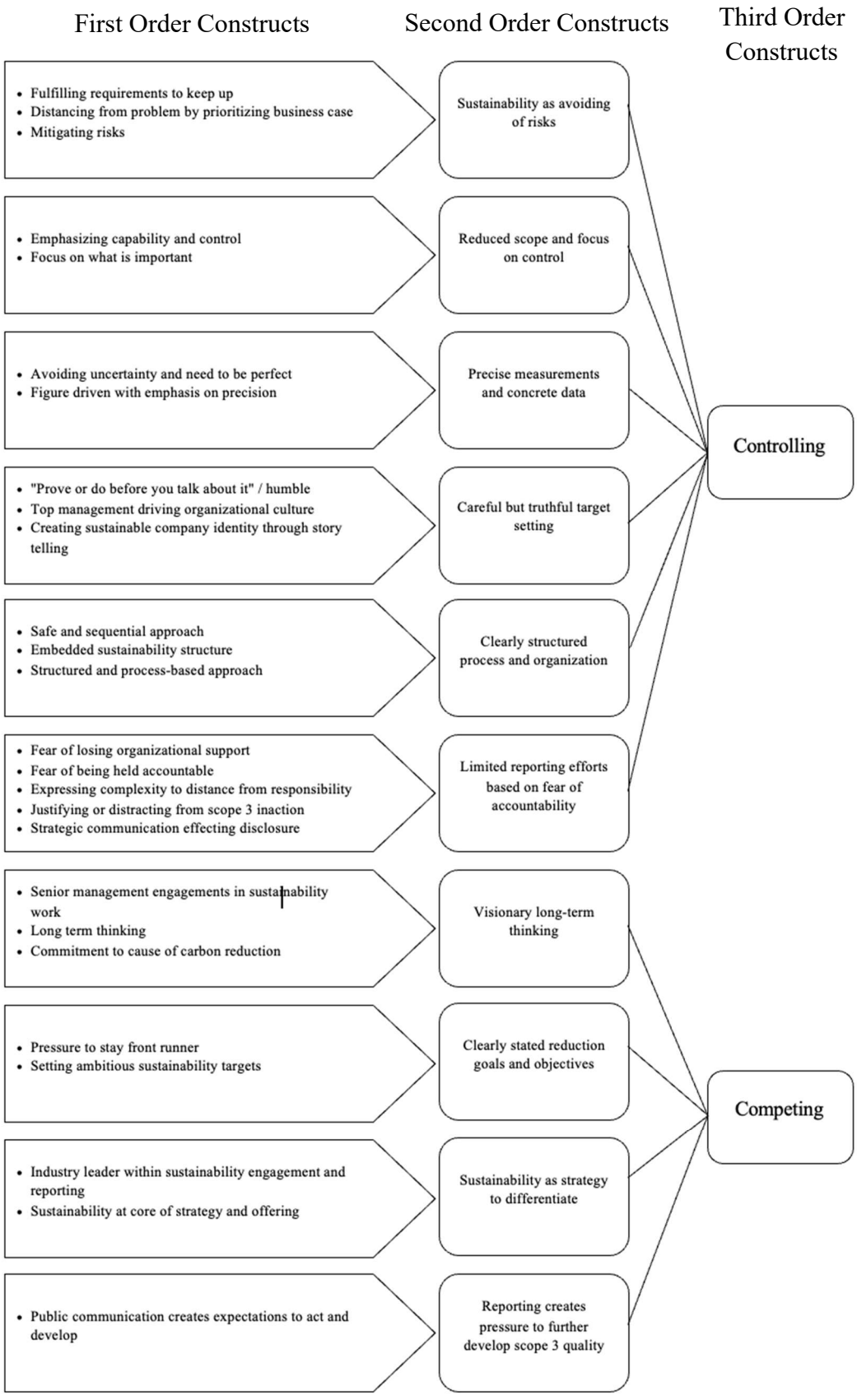
8.4 Appendix 4: Interview Guide for Follow-on Interviews

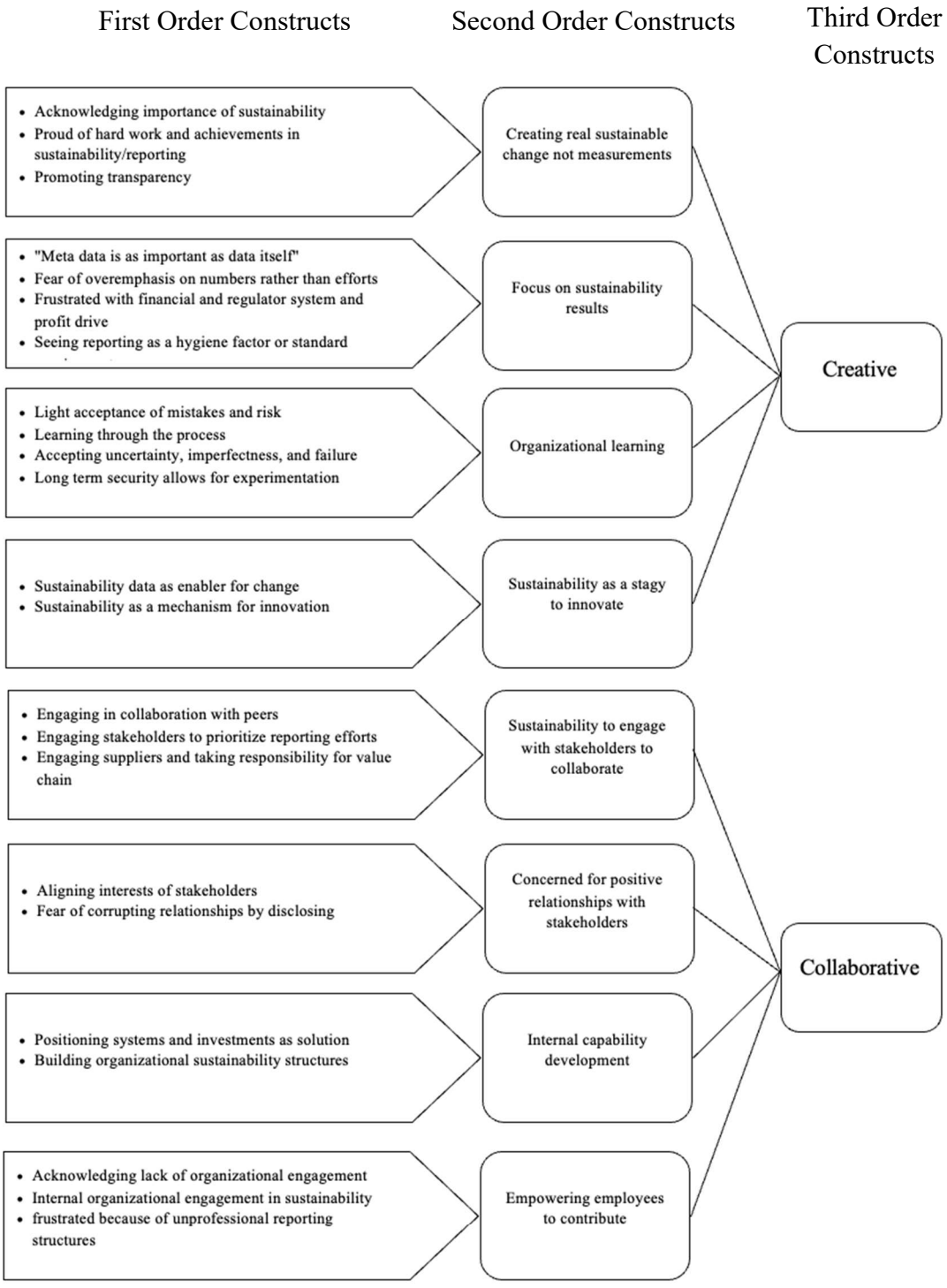
Theme	Question/Topic
Background	• Can you describe your **role** within [organization]?
General status of emission measurement and reporting	• How would you assess the importance and quality of scope 3 emissions?
Organizational Culture	• How would you describe the culture at [organization]? • What core principles are at the core of the company DNA/ corporate identity? • How would you describe the core values of [organisation]? • How would you say does the organizational culture guide your work?
Strategy	• How is sustainability driving strategic positioning and strategy? • How does the strategy affect scope 3 measurement?
Use of data	• How are KPIs used in sustainability work, promoting transparency and change? • How do you use scope 3 data when it comes to implementing sustainability initiatives?

8.5 Appendix 5: Interview Guide for Experts Interviews

Topic	Question
Background	• Can you describe your **role** within [organization]?
Engagement with Firms	• How do you engage with companies when it comes to scope 3? • What are the reasons companies engaging in scope 3? • In your experience, what is the biggest contributor towards differences in reporting companies/industries?
Organizational Culture	• What differences among companies approach towards scope 3 have you noticed? • In your experience, how do a firms values affect their approach towards scope 3?
Concerns	• What concerns do companies have regarding scope 3? • What fears do they bring with them and how do you deal with it?
Future outlook	• What kind of trends can you see within your work on scope three connected to reporting practices?

8.6 Appendix 6: Coding Tree




First Order Constructs
Second Order Constructs
Third Order Constructs
Acknowledging importance of sustainability
Proud of hard work and achievements in sustainability/reporting
Promoting transparency
Creating real sustainable change not measurements
"Meta data is as important as data itself"
Fear of overemphasis on numbers rather than efforts
Frustrated with financial and regulator system and profit drive
Seeing reporting as a hygiene factor or standard
Focus on sustainability results
Light acceptance of mistakes and risk
Learning through the process
Accepting uncertainty, imperfectness, and failure
Long term security allows for experimentation
Organizational learning
Sustainability data as enabler for change
Sustainability as a mechanism for innovation
Sustainability as a stagy to innovate
Creative
Engaging in collaboration with peers
Engaging stakeholders to prioritize reporting efforts
Engaging suppliers and taking responsibility for value chain
Sustainability to engage with stakeholders to collaborate
Aligning interests of stakeholders
Fear of corrupting relationships by disclosing
Concerned for positive relationships with stakeholders
Positioning systems and investments as solution
Building organizational sustainability structures
Internal capability development
Acknowledging lack of organizational engagement
Internal organizational engagement in sustainability
frustrated because of unprofessional reporting structures
Empowering employees to contribute
Collaborative