

MASTER

Beyond the Buzzword

A Holistic Exploration of the Establishment & Maintenance of Inter-Organizational Information Exchange for Sustainability Reporting

de Jong, G.C.N. (Niek)

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Master's Degree Thesis

Beyond the Buzzword: A Holistic Exploration of the Establishment & Maintenance of Inter-Organizational Information Exchange for Sustainability Reporting

Gerardus Cornelis Nicolaas de Jong

First TU/e Supervisor:
Dr. Myriam Cloudt

First Company Supervisor:
Thijmen Braadbaart

Second TU/e Supervisor:
Dr. Ir. Bob Walrave

Second Company Supervisor:
Koen Crooymans

TU/e Assessor:
Dr. Ing. Joost Wouters

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Abstract

This thesis studies the challenges faced by reporting entities in obtaining accurate, reliable, complete, and timely value chain information about scope 3 emissions, to comply with the Corporate Sustainability Reporting Directive (CSRD). Subsequently, the study aims to understand how a reporting entity can organize and maintain effective information exchange in its value chain. To enhance our understanding of the exchange process dynamics, we conducted a two-phase study. Firstly, a systematic literature review was performed to establish a solid foundation for advancing knowledge. Secondly, an in-depth, multiple case study was conducted, which led to the development of a causal loop model for analyzing the exchange process dynamics. The causal loop model identified two states: the operational state, representing the current situation, and the prospective state, outlining potential improvements. In the operational state, organizations face resource shortages and are negatively impacted by complexity and uncertainty. The prospective state highlights that these challenges can be addressed through a mature collaboration, consisting of (1) engagement, (2) trust, and (3) leadership involvement. A mature collaboration is believed to mitigate resource shortages, address complexity through capability development, and treat uncertainty with trust. The study contributes to both theoretical and practical understanding of inter-organizational information exchange for scope 3 emissions reporting; an underexplored area. It expands on previous research by examining the effects of resource availability, complexity, and uncertainty collectively, and emphasizes the crucial role of a mature collaboration in information exchange success. The findings also highlight the influence of regulatory pressure on organizational behavior and decision-making in the context of environmental sustainability. Thereby, this research provides valuable insights for organizations seeking to improve their sustainability reporting and comply with CSRD regulations, while addressing a research gap in the emerging field information exchange for scope 3 emissions.

Keywords: Sustainability reporting, Scope 3 emissions, CSRD compliance, Inter-organizational collaboration, Inter-organizational information exchange, Causal loop model

Management Letter

Dear reader, I hope this letter finds you well. The study that lies before you has significant implications for organizations involved in, or planning to engage in, inter-organizational information exchange for Scope 3 emissions reporting. In light of our findings, I would like to share key takeaways and recommendations to help your organization address challenges associated with scope 3 emissions reporting. Additionally, I suggest examining the causal loop diagram in Figure 4.1 on page 44 for insights into the interdependencies and dynamics around scope 3 reporting.

Initially, recognizing the obstacles to information exchange is crucial, as three obstacles are commonly found to obstruct the development of processes fostering the information exchange. First, uncertainty among partners, stemming from concerns about information security, reputation harm, or scrutiny, negatively impacts the willingness to participate in a collaborative effect. Secondly, resource scarcity, in terms of available money, time and talent, hinders the development of information sharing systems and processes. And third, complexity, both inherent to scope 3 emissions and derived from the value chain, negatively influences this development as well. Collectively, these obstacles result in the unavailability of high-quality information, causing the inability to accurately report scope 3 emissions.

To overcome these obstacles and facilitate the exchange of information, a mature collaboration must be established with partners. The following strategies for reaching this mature collaboration are recommended: (1) fostering engagement through alignment on a shared vision, mission, values, and culture regarding sustainability, emphasizing collective purpose and harmonious work environment. Furthermore, the provision of incentives can be considered, such as relational incentives or financial incentives; (2) building trust by creating a balance between contractual and relational value, addressing confidentiality concerns and maintain a trusting relationship to ensure compliance, safekeeping, and delivery of information; and (3) ensuring strategic and operational support from management, thereby defining exchange goals, supporting relational engagement processes, allocating necessary resources, and providing operational guidance on sharing specific information. A deeper understanding and further elaboration of these strategies can be found in Chapter 4.3 and 5.2.

By addressing these factors simultaneously, organizations can effectively face the multi-dimensional challenges, ensuring cohesive collaborative efforts. This approach helps to establish the required capabilities that enable the development of sophisticated systems. First, focus should be on the alignment of roles and responsibilities regarding measurement and exchange processes with partners. Secondly, homogeneous measurement standards and methodological clarity should be emphasized, to enhance the understandability of each other's information. Lastly, understanding each other's abilities and needs regarding technological infrastructure is the third essential capability. By incorporating these recommendations, your organization can ultimately support compliance with the Corporate Sustainability Reporting Directive (CSRD) regulations regarding Scope 3 emissions. If you have any questions or would like further clarification on the findings and recommendations, please do not hesitate to reach out. I am more than happy to assist you in navigating the challenges and opportunities associated with Scope 3 emissions reporting.

Preface

When I first set foot on campus of the Eindhoven University of Technology around 6 years ago, I immediately knew that the journey was going to be an exciting time, full of challenging adventures, learning opportunities, and new persons. In retrospect, I then couldn't have imagined all the things that I was going to experience. Both academically and personally I am convinced that the TU/e developed me into where I stand today. The thesis that lies before you marks the end of this journey and symbolizes the final step in obtaining my masters degree in Innovation Management.

Nonetheless, journeys rapidly become hard or monotonous if you have no one to share the experiences with. Therefore, I would like to wholeheartedly thank everyone who walked this path with me, may it be in academical or personal spheres. Specifically, I would like to thank Myriam Cloodt for mentoring me during this academic endeavor. Although you became my mentor via a slight unorthodox way after I came back from my exchange semester, I am still grateful that you replied so benevolent to my open application and guided me while writing this thesis. Secondly, I also want to thank Bob Walrave for being my second supervisor and steering the development of this research.

When I was in university, I had plenty of opportunities to interact with the business world that I would undoubtedly enter after graduation. Over the years, consultancy practises repeatedly caught my attention, and I became convinced that this field was something that I had to experience in my journey. Therefore, I am also thankful to KPMG for providing me with the opportunity to conduct my thesis in the empirical setting of their organization. A special thanks goes to Thijmen Braadbaart and Koen Crooymans for guiding and supporting me during the thesis. However, this thanks surpasses the proverbial boundaries of the thesis, as you also supported me towards the professional journey I am facing after graduation. Additionally, by any means, I would like to express my appreciation to the whole ITA Eindhoven department for the open atmosphere, great learning experience, and the fussballtable. I am looking forward to our further collaboration.

Still, I cannot proceed to the actual contents of this thesis before thoroughly thanking my friends and family. I am convinced that friends and family form the foundation on which you grow as a person and constitute the fellowship that you take your journey with. My dear family, thank you for the endless and unconditional support and happiness; Anouk, thank you for being my adventurous companion and exciting my journey, and my friends in Eindhoven and Stolwijk; thank you for rejoicing me with your friendships.

I am astonished by the journey so far, and I am now up for a new adventure. Enjoy reading my thesis.

All the best,
Niek de Jong
Eindhoven, April 16, 2023

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1 Introduction

The climate conferences of Glasgow (2021) and Sharm el-Sheikh (2022) were loud and clear: align business strategy with sustainability targets and achieve (monetary) rewards. Take too long, and you will lose out. All stakeholders, from employees to investors and governments, expect a clear vision and resolute impact by organizations. Corporate actions in relation to integrating the environment, society, and governance into business models are commonly appointed as ESG conduct. Both policymakers and corporations are increasingly giving attention to the matter, with for example: the European Union's Green Deal; already 86 percent of S&P500 companies reporting on ESG proceedings; and investors and service providers agreeing to protect 86 trillion dollars of asset management with the Principles of Responsible Investment act (Gillan, Koch, & Starks, 2021; Governance & Accountability Institute, 2019). All examples show the dedication of corporations, governments, and investors in ESG, but what is meant by it exactly? **Environment** takes into account direct and indirect resource consumption, and effects on surroundings that are caused by businesses and governments, such as carbon footprint, water consumption and energy efficiency (Peterdy, 2022); **Society** is concerned with the workforce, the population it operates in, and the political environment (S&P-Global, 2020b); and **Governance** refers to the factors of decision-making, ranging from policy-making to individual responsibilities in organizations and the division of rights, including all stake- and shareholders, managers and the board of directors (S&P-Global, 2020a).

The ESG acronym not only dominates boardrooms. In a survey by Edelman (2020), more than half of the respondents agreed that 'capitalism as it exists today, does more harm than good in the world' (p. 17), which is also at the heart of the Sustainable Development Goals of the United Nations. Because of this pressing demand for change, organizations need to better understand their position in relation to ESG and prepare to meet the request for comprehensive ESG performance information (Mulholland, Barker, Williams, & Eccles, 2019). Moreover, this knowledge is required to take effective action. In response, legislation for non-financial performance measurement blossomed within the EU under the Corporate Sustainability Reporting Directive (CSRD), which enforces organizations to report on their efforts regarding ESG. One key indicator in the CSRD is scope 3 emissions, which are greenhouse gas emissions that result from activities in the value chain. However, meeting reporting requirements for scope 3 emissions can be challenging due to various complications surrounding the availability and quality of information, often related to the intricate web of business relationships, the value chain perspective of the involved information, and complexities around information exchange processes. Nonetheless, current research on reporting methodologies, quality, and quantity is minimal or even conflicting (Leong & Hazelton, 2019). Therefore, this research seeks to build a comprehensive understanding of inter-organizational information exchange for scope 3 emissions reporting. The study draws on an in-depth, multiple case study performed in conjunction with KPMG, and develops a causal loop model (Sterman, 2000) to analyze the dynamics of the exchange process. Initially, the study will examine the current state of inter-organizational information exchange for scope 3 emissions reporting, identifying critical drivers and barriers. Subsequently, potential ways to mitigate the challenges and come to an effective exchange process will be explored.

1.1 CSRD

Given the significance of the Corporate Sustainability Reporting Directive (CSRD) to this research, along with its underlying influential factors and the need for a comprehensive understanding of its specific context, this chapter delves into an examination of the CSRD.

In April 2021, the CSRD was introduced by the European Commission to enforce organizations to report on their efforts regarding ESG. This is seen as non-financial performance and an extension of the NFRD: Non-Financial Reporting Directive. The objective of publicly available sustainability reporting is to provide: relevant, faithful, comparable, and reliable information, where *sustainability* must be read in the context of both environment, society, and governance. The purpose of the information is twofold:

- It provides knowledge about the sustainability **impact** of the reporting entity on stakeholders, in which the environment is also a stakeholder, and it specifies sustainability risks and opportunities for the value creation of the reporting entity.
- The available information enables other entities to understand the reporting entity's objectives, position, and performance regarding sustainability, which could for example be convenient for investments.

The CSRD is part of the Sustainable Finance Package, together with the EU Taxonomy Climate Delegated Act and the Amending Delegated Acts on sustainability preferences. See Figure 1.1. The Commission strives to equalize sustainability and financial reporting in terms of significance, to create a future-proof European economy. Nevertheless, not every organization is directly affected. The NFRD already applied to all listed companies. The CSRD expands this to every organization that meets two out of the following three criteria: (1) more than 250 employees; (2) more than 40 million euros in turnover; and (3) more than 20 million in assets. Approximately 50.000 organizations are thereby included, covering 75 percent of the total turnover made in the EU (European Parliament, 2022).

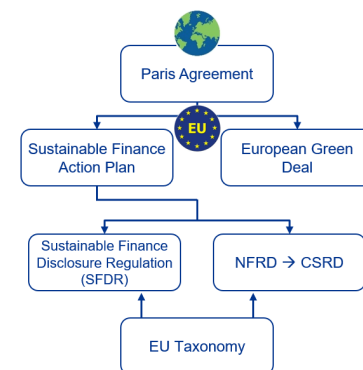


Figure 1.1: Overview EU Agenda

On November 11, 2022, the EU Parliament and Council gave final approval to the CSRD. The legislation has to be integrated into member states' national laws within 18 months, after which the application is expected to materialize in the following four stages:

1. First report due by 2025 for companies already subject to the NFRD.
2. First report due by 2026 for all companies subject to the CSRD as described above.
3. First report due by 2027 for all listed Small and Medium Enterprises (SMEs), except micro undertakings.
4. First report due by 2029 for non-EU undertakings with EU subsidiaries.

The center of reporting consists of the topical standards, which are again divided into environment, society, and governance. For every subject, a separation is made. For example, environment has a subject of *climate change* but also on *biodiversity*, while social has *own workforce* and *affected communities*. Furthermore, the cross-cutting standards apply to every topical standard, meaning that in the report, all cross-cutting standards are discussed for every topical standard. This leads to a total of 270 standards. See Figure 1.2 for clarification and Appendix F for an overview of all standards.

Cross-cutting standards	Topical standards		
	Environmental	Social	Governance
	Climate change (E1) Pollution (E2) Water & marine resources (E3) Biodiversity & ecosystems ((E4) Circular economy (E5)	Own workforce (S1, S2, S3, S4) Workers in the value chain (S5) Affected communities (S6) Consumers/End-users (S7)	Risk management and controls (G1) Products and services (G2) Responsible business practice (G3)
	Strategy and business model (ESRS 2)		
	Governance and organisation (ESRS 3)		
	Impacts, risks and opportunities (ESRS 4)		
	Policies, targets, actions, resources (ESRS 1)		
	Performance metrics		

Figure 1.2: CSRD Standards Overview

The reliability of reporting must be assured through third-party assurance. At first, only limited assurance is needed, and after the development of sustainability assurance standards by the market, reasonable assurance will become required. The difference between limited and reasonable assurance is found in the assurance engagement risk (the risk of a wrong conclusion), through the objective, procedures, and reporting (AUASB, 2022). For more detailed information about the difference, see the AUASB's Framework for Assurance Engagements in Appendix C.

Example: *The conclusion in a limited assurance engagement is accordingly framed in a negative sense: "Based on the procedures performed, nothing came to our attention to indicate that the management assertion on XYZ is materially misstated." In contrast with a reasonable assurance conclusion which would be formed in a positive sense, i.e.: "Based on the procedures performed, in our opinion, the management assertion on XYZ is reasonably stated" (Institute of Chartered Accountants in England and Wales, 2022).*

1.1.1 Double Materiality

With the CSRD, a double materiality concept was introduced, in which materiality relates to significance as described in the European Sustainability Reporting Standards (ESRS) papers. Double materiality must be seen as the union of both impact materiality and financial materiality. The concept provides the criteria that determine whether a matter should be included in CSRD reporting, and are defined as follows:

Impact Materiality: *“Impact materiality is a characteristic of a sustainability matter or information in relation to an undertaking. A sustainability matter is material from an impact perspective if it is connected to actual or potentially significant impacts by the undertaking on people or the environment over the short-, medium- or long-term. This includes impacts directly caused or contributed to by the undertaking in its own operations, products, or services and impacts which are otherwise directly linked to the undertaking’s upstream and downstream value chain, and not limited to contractual relationships.” (ENFRAG, 2022b)*

Financial Materiality: *“Financial materiality in the context of sustainability reporting is a characteristic of a sustainability matter or information in relation to the undertaking. For the purposes of preparing sustainability reporting, a sustainability matter is material from a financial perspective if it triggers or may trigger significant financial effects on undertakings, i.e., it generates or may generate significant risks or opportunities that influence or are likely to influence the future cash flows and therefore the enterprise value of the undertaking in the short-, medium- or long-term, but it is not captured or not yet fully captured by financial reporting at the reporting date.” (ENFRAG, 2022d)*

These definitions inherently entail that organizations simultaneously have to report on ESG matters affecting the company (upward value stream), and on the organizations’ own impact on society and environment (downward value stream). All related to the undertaking’s operations, products and/or services, in a financial or non-financial way.

1.1.2 CSRD Scope

The double materiality concept causes the CSRD to be very comprehensive, as the whole value chain must be considered. Therefore, this chapter will elaborate on the boundaries and time horizon. Additionally, a clarification on the value chain will be given.

1.1.2.1 Boundaries The reporting entity is obliged to integrate information on matters connected to the undertaking when it allows users of the sustainability reporting to understand how ESG related risks and opportunities affect the development, performance, and position of the entity. Or when it has impact on the characteristics of information quality (relevance, faithful representation, comparability, verifiability, and understandability). Further, the impact materiality, described above, is not constrained to matters that are within direct control: the whole value chain with impacts on the reporting entities operations is accountable. Reporting materiality in this case is dependent on the relative severity of the impact.

In some cases, gathering information about the downstream and upward value chain is troublesome, due to the entities position in the value chain and the associated influence it can assert. In such circumstances, the reporting entity is required to make every reasonable effort to collect supportable information under and beyond its operational influence, such as peer groups and sector data. Further, a disclosure about the reliability of data obtained and approximations made is necessary.

1.1.2.2 Time Horizon ESG matters must be considered over an appropriate short-, medium-, and long-term time horizon containing retrospective and forward-looking information. Undertakings are obliged to reflect on past trajectories and performance by means of achievements and results, bench marked by metrics/KPI's. Further, current performance must be supplemented with a forward looking perspective.

1.1.2.3 Value Chain As explained by the double materiality concept, the organizations' value chain has to be considered within the boundaries of the CSRD, as up to 80 percent of a company's footprint can be produced by its value chain (ENFRAG, 2022c; EcoChain, 2022). In terms of the upward value steam, the CSRD reflects on the impact caused by suppliers, that are essential to perform the operations of the reporting entity. The downward value stream is concerned with the impact from consumers and users; the usage of products or services.

Example upward value stream: *"If the undertaking uses cobalt mined using child labor in its products, the negative impact (i.e., child labor) is directly linked to its products through the tiers of business relationships in its supply chain (i.e., through the smelter and minerals trader, to the mining enterprise that uses child labor), even though the undertaking has not caused or contributed to the negative impact itself" (ENFRAG, 2022c).*

1.1.3 Scope 3 Emissions

Many organizations seek opportunities to reduce their greenhouse gas (GHG) emissions, as those are largely responsible for global warming and health risks via air pollution. In the environment pillar of the CSRD, the topic of climate change is connected with greenhouse gas emissions in multiple ways: in the *Climate Change* section of the environment pillar (see Appendix F), *scope 1, 2, and 3 emissions* can be found, which are commonly used as a terminology in GHG progress reporting. This distinction is important, as it adds to the understandability and measurability of emissions, and thereby its reduction. The scopes are derived from the Greenhouse Gas Protocol (GGP), which is the world's most used accounting standard for emissions. The GGP puts the essence as follows: 'Developing a full emissions inventory, incorporating scope 1, scope 2 and scope 3 emissions, enables companies to understand their full value chain emissions and focus their efforts on the greatest reduction opportunities' (Greenhouse Gas Protocol, 2020).

This research is specifically focused on scope 3 emission reporting, as obliged by the CSRD.

Scope 1 emissions are concerned with the organization's own actions and are a result of their own activities. Therefore, these emissions are under the direct control of the organization and include, for example, the emissions from company vehicles and the emissions from (production) facilities. Additionally, scope 2 emissions contain the emissions that are indirect, but still under the control of the organization, commonly associated with the purchase of heat, electricity, steam and cooling (Greenhouse Gas Protocol, 2020). Scope 3 emissions are indirect emissions that are the consequence of an organization's activities but occur from sources not controlled by it, such as from the wider value chain, both upstream and downstream (National Grid, 2022). Upstream emissions must be seen as emissions resulting from the production of goods and services that an organization acquires for its own operations. Downstream emissions are the result of the use and disposal of goods and services of the organization (Greenhouse Gas Protocol, 2020).

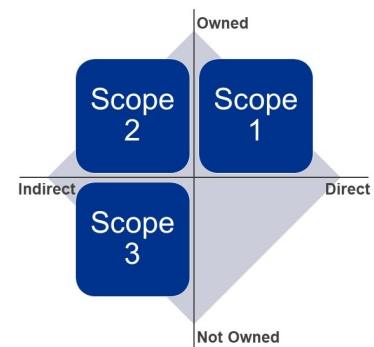


Figure 1.3: Axes of GHG Scopes

These definitions in conjunction entail that the scope 3 emissions of one organization are scope 1 or 2 emissions of the other. Additionally, although scope 3 emissions are not under the control of the organization, it is believed to be influenceable through buyer and supplier power. As mentioned in the Climate Change Exposure Draft (2022a), scope 3 emissions are 'the main component of the GHG inventory and an important driver of their transaction risk.' The reporting entities are obliged to break down their scope 3 emissions on the following categories in the CSRD: (1) Upstream Purchasing; (2) Downstream Sold Products; (3) Goods Transportation; (4) Travel; and (5) Financial Investments. However, the Greenhouse Gas Protocol distinguishes 15 categories, which can be found in Appendix E, and are graphically represented in Figure 1.4.

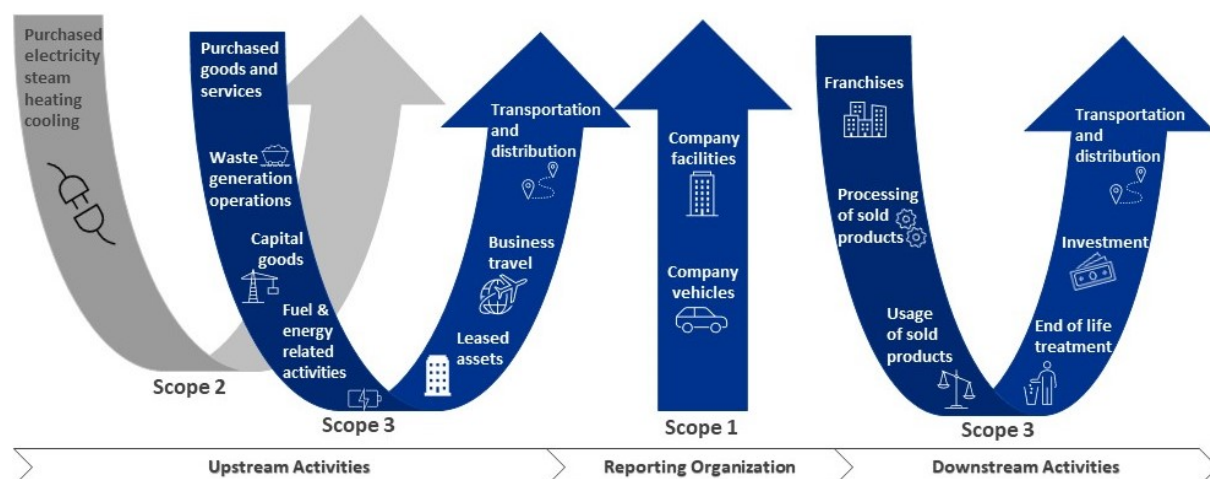


Figure 1.4: Emission Scopes, based on Greenhouse Gas Protocol (2020)

1.2 Problem Definition

One of the main services of KPMG is to provide external assurance on the contents of clients' annual reports. As non-financial information (among others about scope 3 emissions) is going to be integrated into these reports, clients have pressing questions related to how the right information can be obtained. To acquire insights into the situation and define the specific problem, two distinct interviews were held with KPMG employees, specializing in ESG and innovation. Further information about the interviews can be found in Section 3.2, and illustrative quotes for statements in the problem definition are presented in Appendix D, to which references are made in the text by means of quote numbers between brackets. Additionally, a visualization of the cause and effects regarding the problem definition can be found below in Figure 1.5. Thereafter, an extensive elaboration is provided, followed by the problem statement.

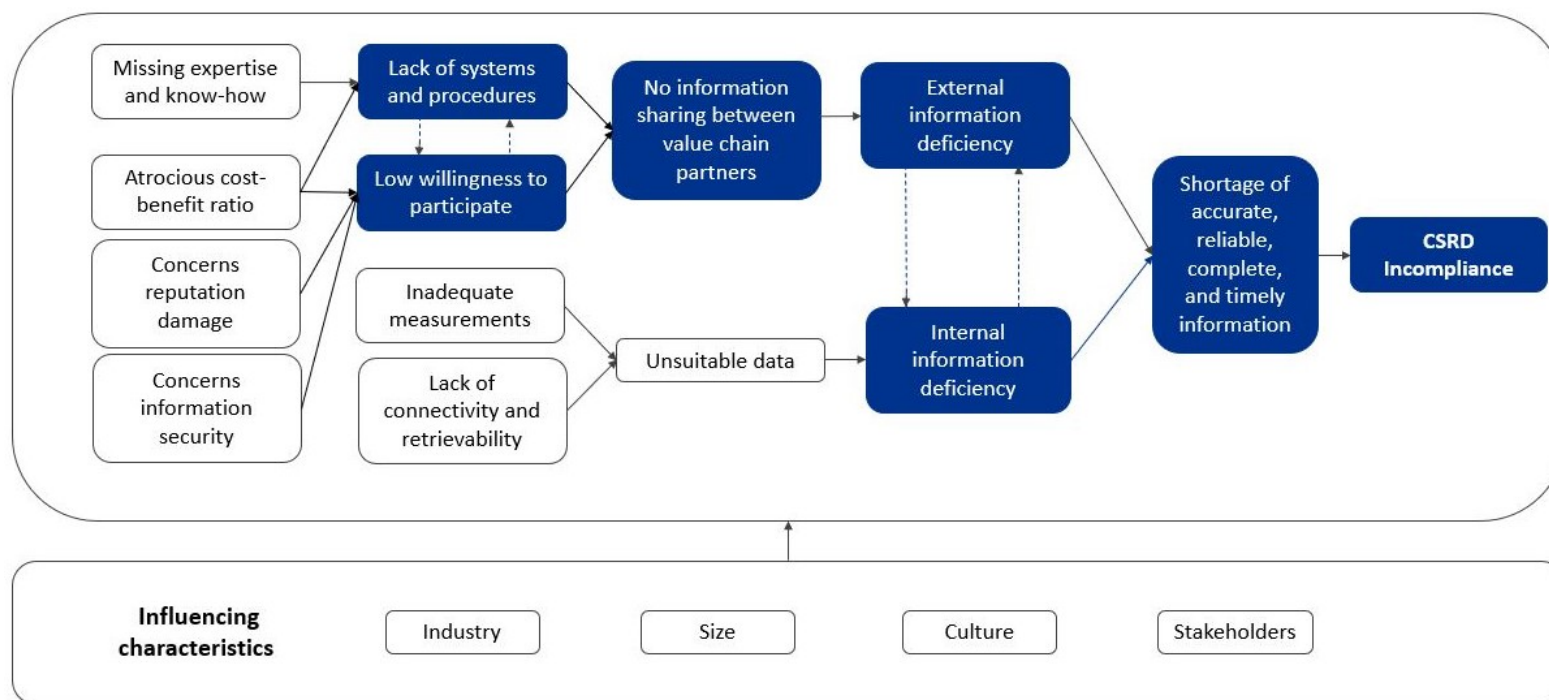


Figure 1.5: Cause and Effect Diagram

Generally, it is assumed that no organization currently satisfies CSRD regulations fully, as an investigation of KPMG (2022a) on fifty representative companies pointed out that none were qualified. Organizations are struggling to comply with the regulations concerning scope 3 reporting, primarily due to the lack of useful information [2.1]. More specifically, for information to be useful, it must meet the data principles of: (1) accuracy; (2) reliability; (3) completeness; and (4) timeliness [2.2]. The necessary information can be broadly categorized into originating from two sources: internal information pathway and external information pathway. To obtain information on GHG emissions, organizations first need to prepare measurements of their own activities. This internal information pathway is seen as an individual challenge for every organization. However, as explained in Chapter 1.1.3, scope 1 or 2 emissions of one organization are scope 3 emissions of the other. Therefore, in order to obtain information on one's full emission portfolio, organizations need to receive information from value chain partners as well, which is seen as the external information pathway. This also entails that these information pathways are intertwined, as denoted by the dotted line in Figure 1.5 [1.1, 2.3]. Thus, in order to obtain all information, both the internal and external pathways of information are applicable. Furthermore, both pathways must adhere to the data principles of accuracy, reliability, completeness, and timeliness for the information to be useful for CSRD reporting.

The success of the external information pathway relies on establishing and maintaining information exchange between various organizations within a value chain. However, this data-sharing practice is virtually non-existent [1.2, 2.4]. The reasons for this absence are twofold. First, there is a lack of centralized systems, procedures, or processes that facilitate and guide organizations in sharing information for scope 3 reporting [1.3]. Second, organizations must be willing to participate in the information exchange [2.5]. These two issues are believed to stem from four obstacles. Firstly, the absence of expertise in organizations presents a challenge in developing an information exchange system for scope 3 emissions, as it is often unclear what specific information should be shared and how to do so [1.4]. Secondly, the unfavorable cost-benefit ratio discourages investment in the development of information exchange systems for scope 3 emissions data, as organizations perceive limited monetary gains. This low financial incentive simultaneously contributes to the low willingness to participate [1.5]. Thirdly, organizations' low willingness to participate in scope 3 emission information exchange also stems from concerns about information security, as the act of sharing shifts the responsibility for securing the data from solely the data owner to both parties involved, thereby increasing the risk of data breaches. Lastly, worries about reputation damage lead to a low willingness to share, as organizations fear that disclosing sustainability information could negatively affect their reputation and investment climate, especially when compared to direct competitors [1.6, 2.6, 2.7]. In conclusion, the identified issues can be categorized into two main factors: a low willingness to participate and a lack of systems and procedures, both of which contribute to the deficiency of the external information pathway. This is believed to (partly) cause the shortage of accurate, reliable, complete, and timely information. More specifically, the low willingness to participate may undermine the quality characteristics of reliability and completeness, as it could result in selective or incomplete data sharing. Additionally, the absence of systems and procedures could compromise the quality characteristics of accuracy and timeliness, since organizations might face difficulties in consistently reporting, sharing, and updating their emission information without standardized guidance and systems.

In addition, certain influential characteristics can be determined that have an effect on both the internal and external information paths. First, the organization's size and industry. Various industries, such as for example the oil industry, generally have a harmful ESG reputation, which often lowers their willingness to commit to ESG reporting [1.6]. Further, a larger size often entails increased capacity, but simultaneously a higher amount of activities to report on [2.8]. Additionally, company culture can be of influence, as some increasingly focus on corporate social responsibility and thus are more inclined to meet reporting requirements. This also relates to the stakeholders that can be of influence: if shareholders are focused on profit, sustainability often becomes less important, while it can become essential if an organization's target group or customers demand it [2.9, 2.10].

In summary, two information pathways exist, that are inseparably intertwined. Organizations need to determine their own information and share it with partners. Information, also after sharing, must be accurate, reliable, complete, and timely. However, information exchange for scope 3 emissions is practically non-existent due to a low willingness to participate and the absence of systems and procedures. In addition, certain characteristics have an effect on this procedure as well. Concluding, the following problem statement applies to scope 3 reporting:

Reporting entities do not possess accurate, reliable, complete, and timely information about their value chain, which is needed to comply with CSRD regulations regarding Scope 3 emissions, and no accepted, standardized information sharing procedure is in place to obtain this information.

1.3 Research Questions

While considering the aforementioned problem statement, this chapter explains the main and sub-research questions that were used to research this phenomenon. The sub-questions are grouped into: (1) Scope 3 emissions; (2) Inter-organizational information exchange; and (3) Inter-organizational information exchange for scope 3 emissions.

Main Research Question

In what way can a reporting entity organize information exchange in its value chain, to facilitate CSRD reporting regarding scope 3 emissions in an accurate, reliable, complete, and timely manner?

The main research question focuses on the possibilities and actions of the individual reporting entity but simultaneously takes into account the value chain perspective. The main objective is to enable reporting entities with means to comply with CSRD regulations through information exchange, thereby facilitating accurate, reliable, complete, and timely information. Thus, first, the obstacles that hinder information exchange must be further defined and analyzed, after which a solution direction can be determined. In order to answer the main research question, the following sub-research questions were defined.

Sub Research Questions

Scope 3 Emissions

- 1.1 What methodologies are currently used to report on scope 3 emissions?
- 1.2 Which obstacles are being faced regarding the information exchange for scope 3 emission reporting?
- 1.3 How do these obstacles relate to each other and the sharing process holistically?

This set of questions adds to the understanding of scope 3 emissions and the challenges organizations experience with reporting. Question 1.1 focuses on what methodologies organizations are presently applying to obtain information for their scope 3 reporting, thereby also investigating if and how information is currently being shared. Subsequently, question 1.2 aims to identify the obstacles faced by organizations in this regard. Question 1.3 focuses on how the obstacles influence each other and the sharing process as a whole. This provides the necessary context for further investigating the problem and its complexity.

Inter-Organizational Information Exchange

- 2.1 What strategies and mechanisms are generally employed to establish, maintain, and facilitate effective information exchange within information partnerships?

This sub-question addresses the different aspects of how organizations generally encounter inter-organizational information exchange. It has a more general focus such that the applicability of information sharing practices from other fields (i.e., supply chain) can be explored. First, it aims to identify how inter-organizational information exchange can be established. Secondly, it explores the main determinants of (un)successful continuation of inter-organizational information exchange, and finally, it examines how information can be shared between entities specifically.

Inter-Organizational Information Exchange for Scope 3 Emissions

- 3.1 Which existing information exchange strategies and mechanisms are applicable to the case of scope 3 emissions, and how can they be applied?
- 3.2 How can the obstacles defined through research questions 1.2 and 1.3 be overcome?
- 3.3 What are the interdependencies between the identified obstacles and proposed solutions, and how can these interdependencies be managed to organize the information exchange process for scope 3 emissions reporting?

Lastly, these three questions are fixated on the development of a solution that can alleviate, if not solve, the obstacles that cause the deficiency of the external information pathway. First, question 3.1 investigates how the existing practices for information exchange, as determined by sub-question 2.1, can be applied to the case of scope 3 emissions. Additionally, question 3.2 researches how the earlier defined obstacles can be overcome, thereby enabling organizations to participate in and reap the benefits of inter-organizational information exchange for scope 3 emissions. Lastly, to become fully able to organize the information exchange, as is the focus of the main research question, it must be researched how all the different components, obstacles, and solutions relate to each other, which is the aim of research question 3.3.

1.4 Societal and Scientific Relevance

Societal Relevance

Cry if you see me. On the 11th of August 2022, the so-called 'hungersteine' (German for hunger stones) showed this message in dried-up parts of the Rhine and Elbe. Stones that only become visible with extremely low water levels, which in the past meant failed harvest and thus hunger. Also in 2018, extreme drought ravaged the northern part of the European continent. All food for thought on how care is taken of the planet and natural resources. Also, the war between Ukraine and Russia emphasizes concerns about the energy supply and the dependence of entire nations on specific value chains. Therefore, actions are necessary. But only informed decisions can be taken when knowledge is gathered via adequate measurement and subsequent procedures. Complying with the CSRD enables organizations to track and assess progress, encourage the participation of stakeholders, address problematic barriers, and communicate benefits and goals. But, at the start of all this knowledge is data gathering. This research will be an important step towards target solutions and innovations by adding to our understanding of knowledge gathering in the value chain. Furthermore, although this research is focused on scope 3 emissions, the findings can be (partly) applicable to other regulations within the CSRD. Moreover, the Securities and Exchange Commission (SEC), the American stock exchange surveillance agency, is also pressing for an all-agency approach to ESG. Thereby, 90 percent of all value chains worldwide are affected by the 2025 fiscal year.

Scientific Relevance

Collaboration in value chains is nothing new scientifically. Take for example partnerships in ecosystems, supply chains, and healthcare. However, the setting of the CSRD creates a completely new and rapidly changing field in which information exchange is under-addressed. Research examining quantity, quality, and performance in this field is minimal or even conflicting in its methodologies, focus, or even results (Xie, Nozawa, Yagi, Fujii, & Managi, 2019; Aureli, Del Baldo, Lombardi, & Nappo, 2020; Leong & Hazelton, 2019). Additionally, a knowledge gap exists in the effectiveness of different reporting and information sharing approaches. As mentioned in *Guidance on Scope 3 Accounting and Reporting* by Greenhouse Gas Protocol (2021); "consistency in the way that scope 3 emissions are calculated and reported is an ongoing challenge" and "methodologies for quantifying and reporting scope 3 emissions are still being developed and refined". Furthermore, the understanding of motivations, incentives, barriers, and challenges for organizations to engage in effective scope 3 reporting through information exchange is incomplete (Carvalho, de Sousa Jabbour, & de Oliveira Jabbour, 2020; Caruso, Marzucchi, & Zabini, 2019; Zinkin, Smith, & Dunwell, 2019). For example, when considering motivations and incentives, some organizations seem to be internally motivated because of sustainability goals, while others are stimulated by external factors. No consensus has been reached, while the relative importance of each may be an influencing factor in reporting behavior. Likewise, understanding barriers that hinder organizations in light of scope 3 reporting is essential to work towards a solution model.

1.5 Empirical Context: KPMG

The problem described previously will be researched in the company setting of KPMG, which is an international accounting and service firm in the fields of (financial) audit, tax, and advisory. As mentioned before, limited/reasonable assurance is required for CSRD reporting, which is why KPMG's clients request support. KPMG is the brand under which the member firms of KPMG International Limited ("KPMG International") operate and provide professional services. "KPMG" is used to refer to individual member firms within the KPMG organization or to one or more member firms collectively. In this research, 'KPMG' is used as an acronym for 'KPMG N.V.', the Dutch limited liability company and a member firm of the KPMG global organization.

KPMG International has a worldwide annual revenue of 34.6 billion and employs more than 265.000 partners and employees in 143 countries (KPMG, 2022b). This research is focused on the Dutch offices, which account for 530 million in revenue and more than 3500 employees. All practices are guided by the five KPMG values: Integrity, Excellence, Courage, Together, and For Better. These five come together in people-driven progress; progress only means growth when it constitutes improvement for people and society. The vision of delivering value to both clients and society as a whole translates into the desire of KPMG to find innovative solutions to the CSRD obstacles. Therefore, the research will be partly conducted in congruence with clients of KPMG, which will be explained in Chapter 3.2. Additionally, the research is conducted on behalf of the IT Assurance and Advisory department, in close collaboration with the Sustainability department.

The following sections will explain and present (the findings of) the research that was performed to come to an understanding of how organizations can organize their information exchange for high-quality scope 3 reporting. Chapter 2 comprises a comprehensive overview of the current literature on information exchange. Furthermore, the applied research method is clarified in Chapter 3, after which the main findings will be presented in Chapter 4. Additionally, Chapter 5 discusses the research in terms of theoretical and practical contributions.

2 Literature Review

This chapter provides an overview of the findings from the systematic literature review on inter-organizational information exchange, of which a detailed methodology description can be found in Appendix A1. As mentioned in Chapter 1, despite the importance of scope 3 emissions, current research on reporting methodologies, quality, and quantity is minimal or even conflicting (Leong & Hazelton, 2019). The Greenhouse Gas Protocol (2020) denotes the supplier-specific reporting method as the best method for scope 3 reporting, making it imperative for organizations to establish information exchange through partnering with their suppliers. However, these partnerships require effective communication and cooperation between organizations, which can be challenging to achieve. Consequently, the success of inter-organizational information exchange depends on several factors. Therefore, this literature review first aims to identify how information exchange can be established. Secondly, it explores the main determinants of (un)successful continuation of inter-organizational information exchange, and finally, the review examines how information can be shared between entities specifically. Thereby, a thorough understanding is created about (1) the development, and (2) the maintenance of the information exchange, as well as (3) the actual practice of sharing information, which is also the aim of research question 2.1 (see Chapter 1.3).

The first chapter (2.1) of the review develops a comprehensive understanding on what *information* actually entails in the field of scope 3 emissions. Furthermore, the second chapter (2.2) provides a primary knowledge base on the inter-organizational exchange of that information, and highlights the strategic paradox organizations face with sharing information. Furthermore, the third chapter (2.3) pays attention to the intra-organizational dimension of inter-organizational information exchange. Meaning that internal organizational factors that influence the inter-organizational information exchange, such as leadership, culture, and resource availability, are explored. Additionally, the review examines the relational aspect of information exchange in chapter four (2.4), discussing the factors that influence inter-organizational relationships, such as trust, power dynamics, and organizational compatibility. Finally, the environmental dimension of information exchange is addressed in chapter five (2.5), exploring how market, cultural, and country factors can affect the exchange of information between organizations. Overall, this systematic literature review is important as it seeks to provide a comprehensive understanding of the factors that influence inter-organizational information exchange, which is essential for organizations to better understand their position in relation to ESG and prepare to meet the request for comprehensive ESG performance information.

2.1 Data, Information, and Knowledge

To become able to share data, information, or knowledge regarding scope 3 emissions, one should first understand what those three concepts entail, as they are often used interchangeably, whereas a distinction is meaningful (Davenport, Prusak, et al., 1998). The concepts are closely related, and can be seen as existing on a continuum. Data are “record (captured and stored) symbols and signal readings”, which include words, numbers, and diagrams (p.1) (Liew, 2007). Ackoff (1989) defined information as a combination of usable data, inferences of data, or descriptions. Thereby, information is processed data, that is useful and understandable, and in essence, functions as a decision-making aid (Liew, 2007). To finish the continuum, knowledge is information that has been contextualized and interpreted through experience, expertise, and understanding, and can be reflected in: (1) cognition or recognition (know-what); (2) capacity to act (know-how); and (3) understanding (know-why) (Liew, 2007; Kogut & Zander, 1992). Furthermore, Grant (1996) distinguishes knowledge types as explicit and tacit knowledge, where explicit knowledge refers to concepts that can be specified and construed in procedures and rules. In contrast, tacit knowledge indicates insights and skills that are embedded in context, often accompanied by experience.

In light of this research, it is also meaningful to discuss sustainability data specifically. As described in Chapter 1, sustainability performance is generally measured on the topics of environment, social, and governance (ESG). Many frameworks and guidelines exist, that assist organizations in assessing their ESG conduct, such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and the Carbon Trust Standard (Global Reporting Initiative, 2021; Sustainability Accounting Standards Board, 2021; The Carbon Trust, 2023). GRI is an international framework that helps organizations to report on economic, environmental, and social impacts, whereas SASB is a non-profit organization that provides industry-specific sustainability accounting standards for publicly traded companies. The standards cover a wide range of topics, such as environmental management, social capital, and governance. Additionally, the Carbon Trust Standard is a certification program that helps organizations measure, manage and reduce their carbon emissions. It provides independent verification of carbon footprints, encouraging companies to take action to reduce their environmental impact. Each of these standards provides a different set of guidelines and criteria for organizations looking to improve their sustainability performance. While they have some similarities, they each have their own unique focus and approach to sustainability reporting and management.

With the use of these frameworks, sustainability data can be transformed in sustainability information, or even knowledge, following the logic of Liew (2007), as described above. Sustainability data, and the usage of frameworks and guidelines, comes with both challenges and opportunities. An increasing amount of stakeholders requires sustainability performance, which can be both harmful and beneficial to an organization in terms of reputation. Furthermore, it was found that a focus on sustainability can lead to cost savings and revenue growth (Whelan & Fink, 2016). In contrast, the complexity and variety concerned with sustainability data also provides challenges. The collection of specific data, both inside and outside the organization, can be troublesome, and a lack of consistency complicates analysis and hinders comparability (Searcy & Buslovich, 2014).

2.2 Defining the Inter-Organizational Exchange of Information

As stakeholder demand for sustainability performance reporting continues to increase, organizations are recognizing the importance of having access to relevant and reliable sustainability data. However, to create meaningful sustainability reports by effectively using the aforementioned frameworks, organizations must first obtain information from a variety of sources. Indeed, information must be seen as an essential resource. The knowledge-based view emphasizes the importance of knowledge as a critical resource that enables organizations to gain a competitive advantage, and is thereby an extension/specification of the resource-based view (De Carolis, 2002; Barney, 1991). In the context of this research, sustainability information can be seen as a form of knowledge that organizations need to acquire and leverage to gain an advantage and meet stakeholders' requests. The sources of which the information can be acquired, are considered either outside or inside the organization, resulting in a different way of processing (Gupta & Bose, 2019). The exchange follows the logic of a distributed system, constructed out of agents and the connections between them. Therefore, information flows through a pre-defined set of rules between organizations that are somehow connected or related, such as in the value chain (Barwise, Seligman, et al., 1997; Choe, 2008).

The outside and inside information sources are commonly appointed as inter-organizational and intra-organizational respectively. Inter-organizational information exchange is described as the activities through which organizational players, teams, or units share and use others' information within the organization (Van Wijk, Jansen, & Lyles, 2008). Additionally, the practice of inter-organizational information exchange, which is the most relevant form for this research, is defined by Appleyard (1996) as the 'transfer of useful information or know-how across company lines', in which the engagements can be of a temporal or more permanent type (Zimmermann & Ravishankar, 2014). The participation extends the vertical cooperation, in which customers and vendors participate in the supply chain, as horizontal collaboration between firms on the same level in an industry becomes more common, meaning that whole ecosystems participate in information exchange (Feller, Parhankangas, Smeds, & Jaatinen, 2013; Rollins, Pekkarinen, & Mehtälä, 2011). Furthermore, according to Loebbecke, Van Fenema, and Powell (2016), information exchange can be either unilateral or bilateral. Unilateral sharing takes the form of one-way traffic, in which one organization is sharing information with another organization without receiving anything back. This is often the case between a client and a vendor. Bilateral agreements take a reciprocal form and are collaboration focused, which often leads to complementary information and synergy (Loebbecke et al., 2016; Vlaar, van Fenema, & Tiwari, 2008). Lastly, as mentioned by Choe (2008), rapidly changing business environments, such as the case with new CSRD lawmaking, requires organizations to communicate information with trading partners across company borders to ensure control, which is also in line with the knowledge-based view.

In conclusion, information flows both from without and within the organizational boundaries and is facilitated by access to various sources, adding to the knowledgeability of the organization according to the knowledge-based view. Therefore, the acquisition of information via exchange is essential. The following sub-chapters, 3.2.1 to 3.2.4, provide a literature overview on the general practice of sharing information in an inter-organizational setting. First, inter-organizational governance mechanisms will be discussed, to gain a

better understanding of different types of relationships. Furthermore, it will be explained how the quality of information is defined and determined, also in relation to the flow of the information. Lastly, Chapter 3.2.4 poses the strategic paradox that comes with sharing information.

2.2.1 Inter-organizational Governance

To become able to understand information exchange in an inter-organizational setting, first, the governance mechanisms of such a relationship must be understood. According to Barthón and Jepsen (1997), within the theory of inter-organizational governance, three types apply: (1) market; (2) hierarchy; and (3) network. Market governance is based on competition and the forces of supply and demand, while hierarchy governance is based on a clear chain of command and decision-making authority concentrated at the top. This results in market governance being focused on efficiency, and hierarchy on the divisions of roles and responsibilities. Furthermore, where market and hierarchy governance are of an episodic form, network governance is a hybrid form that takes into account enduring inter-firm exchanges, based on the relational exchange theory. The network form of governance is believed to be best suited for sharing scope 3 information, as it facilitates collaboration and cooperation among multiple organizations involved in the value chain. This approach promotes innovation, trust-building, and a more comprehensive understanding of each other's organization, allowing for enduring information partnerships (?). In this case, a network must be seen as a set of nodes and the associations that connect them, with the nodes being teams, persons, organizations, regions, etcetera (Everett & Borgatti, 2013). The governance mechanisms within these networks can take a relational or contractual form, and refer to the rules of exchanges between partners (Vandaele, Rangarajan, Gemmel, & Lievens, 2007; Griffith & Myers, 2005). As specified by Vandaele et al. (2007), relational governance denotes social mechanisms and arrangements of an informal type, while contractual governance is focused on legally binding agreements that are formal, explicit, and written. Additionally, a third option is presented by literature in the form of 'relational contracts', which adopts characteristics of both forms. Given the inherently incomplete nature of formal contracts, relational contracts must be seen as more flexible and allowing for open-ended specifications and provisions. Thereby, adaption becomes possible, rather than fixating on obligations and penalties. (Roehrich, Selviaridis, Kalra, Van der Valk, & Fang, 2020; Williamson, 1985; Macneil, 1982).

These inter-firm mechanisms have a large impact on the network, as it not only affects the performance of participating firms, but possibly also that of suppliers, customers, and business partners (Carson, Madhok, & Wu, 2006). Within the inter-organizational governance contracts, businesses more and more recognize the need to adapt their activities with dynamic operating conditions, especially embracing digital capabilities that enable information exchange (Gupta & Bose, 2019). Lastly, according to Roehrich et al. (2020), a multitude of concepts, such as for example uncertainty, power dependency, and relational norms (culture), influence the governance of inter-organizational partnerships either positively and negatively. Therefore, Chapters 3.3 to 3.5 do not only take into account the effects of such concepts on the practice of information sharing, but also on the governance of the relations.

2.2.2 Information Quality and Flow

Not only the governance of relations or the practice of sharing information is critical for becoming able to report on scope 3 emissions. In order to create justified, usable reports, the quality of received information must be considered as well. The quality of information is determined by the extent to which information meets the need in terms of relevance, timeliness, accuracy, and completeness (J. V. Chen, Wang, & Yen, 2014). High-quality information allows organizations to make informed decisions and take appropriate actions, while poor-quality information can lead to sub-optimal decisions and inefficiency.

The information quality (IQ) is generally considered high when it is 'fit for use' (R. Y. Wang, 1998). This research follows the IQ framework suggested by Kahn, Strong, and Wang (2002), which characterizes information quality on two dimensions: information product and information service. This distinction is especially interesting when researching information exchange, as it distinguishes between the quality of information that is produced and stored by a party, and the quality that is processed and exchanged as information services among cooperating parties (Rasouli, Eshuis, Grefen, Trienekens, & Kusters, 2016). The concept of "information product" views information as tangible, and created through a production process, after which it is stored in a database. The quality of an information product is evaluated on factors such as: accuracy, completeness, consistency, and timeliness. On the other hand, "information service" focuses on the actions taken after the storage of the information, to make it available for use by its users. To be utilized by the intended audience, information products need to be transformed into information services, which can be achieved through automated or manual means. The quality of an information service is evaluated based on criteria such as relevance and understandability (Rasouli et al., 2016; Kahn et al., 2002).

Following the distinction of information product and information service, it is imperative to understand the dynamic business process of the information exchange, which is visualized in Figure 2.1 and based on the research by Batini, Cappiello, Francalanci, and Maurino (2009) & Rasouli et al. (2016). The concept of a "networked business process" implies that an organization (party) makes its process structure accessible to its partners with whom it collaborates. Therefore, the internal processes of the party have to align with the processes of the external party. Furthermore, it is highlighted that the information products produced by the organization needs to be converted to information services to be used within internal and external business processes. The conversion can be done through automated applications or manual procedures, and it can be carried out by the party providing the information or the party using it, depending on the structure of the business network. Creating the distinction allows for determining the quality of the information exchange on multiple levels and in multiple stages of the process.

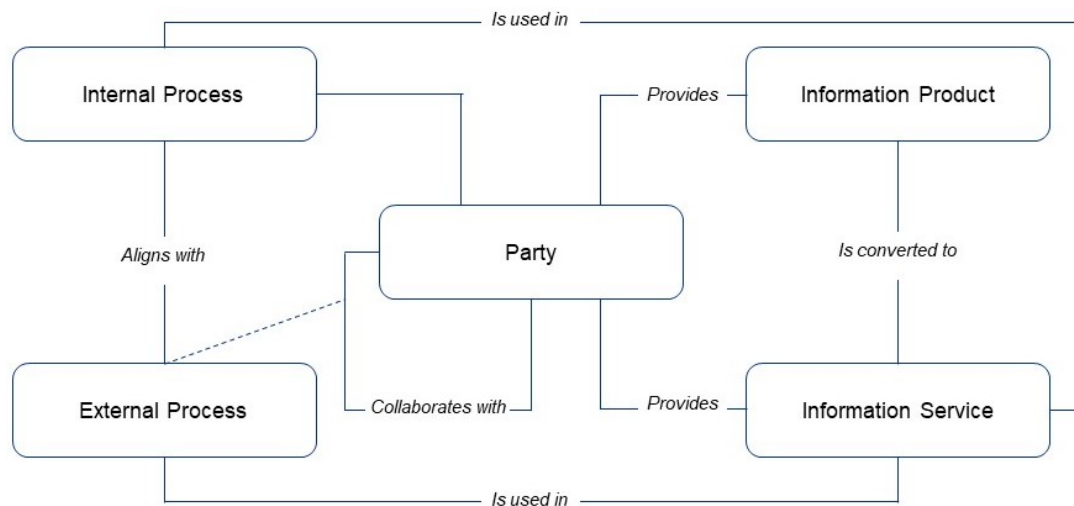


Figure 2.1: Dynamic process of Information Exchange

2.2.3 Strategic paradox of protecting versus sharing

Although the Greenhouse Gas Protocol (2020) stresses the importance of sharing scope 3 information between organizations, as explained in Chapter 1, firms generally encounter contradictory interests and results when participating in inter-organizational information exchange (Hamel, Doz, & Prahalad, 1989; Smith & Lewis, 2011; Van Fenema & Loebbecke, 2014). Therefore, it cannot be unconsciously assumed that the aforementioned governance mechanisms or information flow apply, as that presumes that organizations will indeed collaborate. This might not be the case, as an organization's knowledge repository may be affected in two ways with such a collaboration. On the one side, own unique or somehow protected information that delivers competitive advantage becomes available. In contrast, value-adding or scarcely available information from other organizations can be added to their own repository. Hence, a plausible conflict. Protecting own, sensitive information can be beneficial for an organization, as financial or strategic data enhances the competitive position, and proprietary information is protected. Furthermore, not sharing information can also be seen as risk aversion, as the unauthorized access, use, or disclosure of own information by others is then naturally averted (Yue, Zhang, & Zhang, 2022). However, disadvantages exist as well. It can limit collaboration opportunities with potential partners and reduces the amount of available information, which leads to a lack of innovation, hinders decision-making, or causes the failure of capitalizing opportunities (Kulangara, Jackson, & Prater, 2016).

To further discuss the paradox of protecting versus sharing, it is necessary to examine the different types of information sharing. As can be concluded from previous sections, information can take a tacit or explicit form. Furthermore, sharing can be either unilateral or bilateral, leading to the four options shown in Figure 2.2. For this research, the explicit, bilateral form of information exchange is interesting, as this resonates most with CSRD information sharing in the value chain, which is in line with the double materiality principle. Within such a collaboration, the exchange of complementary information can often be a reasonable strategy, among others convenient with regulatory requirements (Loebbecke et al., 2016). A *quid pro quo* principle applies in which the organizations have to share and receive information, that is often encompassed by comprehensive contracts

about the processes and contents of the transfer. Although these contracts stress the reciprocity of the collaboration, organizations in the partnership often try to behave unilaterally by gaining as much value without offering (Loebbecke, Powell, van Fenema, & Levy, 1999). This generally stresses the importance of trust and control mechanisms that enhance the coordination (Loebbecke et al., 2016). Additionally, the reciprocal character also stresses interdependence, which necessitates collaboration and performance meetings between the organizations. Lastly, human interaction in the knowledge-sharing processes can lead to reduced uniformity and thus emphasizes the importance of bureaucratic guidelines (Jaeger & Baliga, 1985).

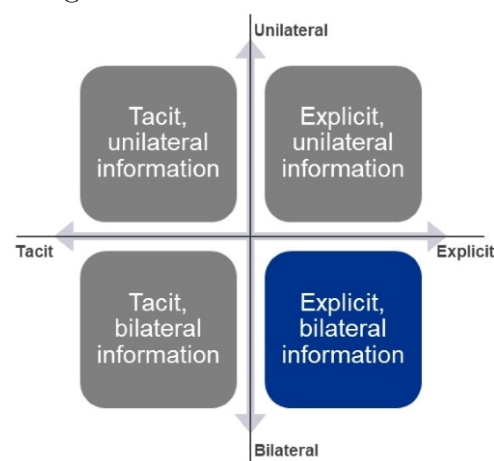


Figure 2.2: Types of Information Exchange

To conclude, organizations can have multiple reasons to share information among each other, but also to withdraw from sharing. This plays a role in the explicit, bilateral form of sharing scope 3 information as well, which is relevant to this research. Therefore, the following chapters will comprise an understanding of the various dimensions influencing information exchange.

2.3 Intra-organizational Dimension

This chapter explains the internal factors that influence information exchange between organizations. Thereby, it remarkably provides an intra-organizational focus on an inter-organizational phenomenon, which is fundamental to understand, as the performance of the collaboration is often dependent on these intra-organizational factors (Hart & Saunders, 1998). For example, organizational culture, leadership involvement, resource availability, and IT systems are all critical factors that can affect the ability of an organization to exchange information effectively. By understanding these factors, potential barriers to collaboration and information sharing can be identified. Furthermore, this understanding can lead to the development of more effective strategies for collaboration, ultimately leading to more successful partnerships and alliances. Therefore, this chapter will first address internal organizational concepts such as structures, leadership, and culture, after which a focus on specific processes within an organization is taken by researching project payoffs and information governance. Lastly, attention is given to information technology.

2.3.1 Organizational Structures and Boundaries

Both the organizational structure and boundaries of an organization can have an impact on inter-organizational information exchange. The organizational structure is defined as the informal and formal systems and processes that shape the organization, focused on the relations between individual components (Ahmady, Mehrpour, & Nikooravesh, 2016). In contrast, organizational boundaries are seen as physical and psychological barriers that separate the components of the organization, including the overall sphere of the organizational influence (F. M. Santos & Eisenhardt, 2005). Often, the structure is denoted in

terms of centralization, formalization, and hierarchical structure. In a centralized structure, authority is fixed at a single point, where in decentralized it is dispersed (Robbins, 1990). Furthermore, formalization is the degree to which an organization articulates policies, procedures, and job descriptions explicitly. Lastly, in a hierarchical structure, there are many levels of management and a clear chain of command, unlike a flat structure, which has only a few layers (Blau, 1968).

No clear consensus exists if a centralized or decentralized structure should be preferred in inter-organizational information exchange. The use of common standards and metrics within a centralized structure allows for faster information exchange, which results in higher efficiency. Furthermore, this structure provides a clear point of contact for outside parties (Kravets & Zimmermann, 2012). However, the lack of autonomy and flexibility in a centralized structure can hinder the communication of information if scenarios are subject to change, as no decisions can be taken immediately (M. Harris & Raviv, 2005). Therefore, in a decentralized structure, coordination is a key aspect to ensure benefit to the organizations' knowledge repository (Lunenburg, 2012). Additionally, a flat structure allows for more flexible and quick decision-making, where a hierarchical structure provides a greater level of control (Pardo, Gil-Garcia, & Burke, 2008). Lastly, the degree of formalization has a significant impact on (the quality of) information that is being shared, as it rationalizes (1) what information is being shared, and (2) the procedures that must be followed (Loebbecke et al., 2016). Ultimately, the best organizational structure will be dependent on the specific needs and goals of the exchange, and the nature of the information.

In terms of boundaries, research has shown that organizational boundaries can impede the flow of information, and, likewise, information can not be obtained without some degree of cooperation and coordination (Staber, 2004; Yang & Maxwell, 2011). Furthermore, research points out that because of existing organizational boundaries, organizations might be unaware of the possibilities that are available (Landsbergen Jr & Wolken Jr, 2001). Trust is often named as an important factor in avoiding the negative effects of strong organizational boundaries (Bouty, 2000; Yang & Maxwell, 2011). Furthermore, as mentioned by Hocevar, Jansen, and Thomas (2011), structural flexibility is required, that allows for adaption in moments of change, including the willingness to adjust procedures to facilitate coordination, and response to the requirements of other organizations. The use of (advanced) IT systems and the establishment of clear roles and responsibilities is believed to further reduce the negative effects of organizational boundaries on information exchange. More information on trust is provided in Chapter 2.4.4, roles and responsibilities in Chapter 2.4.1, and IT systems in Chapter 2.3.5.1

2.3.2 Leadership

Within different structures, the role of management and the active involvement thereof varies. Nonetheless, it can be concluded that the success of inter-organizational information exchange is highly dependent on the support of leadership and upper management, where failure is even associated with the lack thereof (Eglene, Dawes, & Schneider, 2007; S. Dawes & Pardo, 2002; Pardo, Gil-Garcia, & Burke, 2007; Zhang, Dawes, & Sarkis, 2005). Within this study, authority is treated as formal and objective, and focused on a particular person holding the position of authority (Eglene et al., 2007). Top man-

agement is involved in both initiating and sustaining inter-organizational information exchange through the provision of guidance, resources, and vision (Akbulut et al., 2009). According to Weber (1947), three types of authority exist, which are: (1) legal-rational authority or institutional power; (2) traditional authority based on customs or social norms; and (3) charismatic authority. However, for authority to be influential, it has to be accepted and suggested actions performed. Therefore, Peabody (1962) suggested four factors that determine the acceptance of authority: a) legitimacy, arising from a legally established order of rights and duties; (b) position, linked to the office a person occupies with its associated powers; (c) competence, resting on an individual's experience, skills, and knowledge of a domain; and (d) person, based on individual philosophy and style of working. This is all relevant to inter-organizational information exchange because each employee involved in the network is still accountable to their own organizational, bureaucratic environment (Eglene et al., 2007). Thereby, in the context of inter-organizational information exchange, three activities have to be performed by leaders: executive involvement, exercising of formal authority, and informal leadership (Sayogo, Gil-Garcia, & Pardo, 2016; Gil-Garcia, Pardo, & Burke, 2007).

Executive Involvement — The importance of executive involvement starts at the initial stages of the information exchange collaboration, as the authority figure provides legitimacy to the cooperation. This directly adheres to the concepts developed by Weber (1947) and Peabody (1962) on legitimacy, and is of crucial importance to the further development of the exchange, as later-on, (financial) resources have to be secured and traditional bureaucratic processes overcome (Yang & Maxwell, 2011; Eglene et al., 2007; S. S. Dawes, Cresswell, & Pardo, 2009). Furthermore, executive involvement is vital for the coordination of the cooperation in three ways: (1) encouraging participants to engage, (2) respecting the autonomy of participating organizations, and (3) supporting informal leaders (Yang & Maxwell, 2011; Sayogo et al., 2016).

Formal Authority — With formal authority, the role of leaders in executing their authority is addressed. Attentiveness in exercising this formal authority is required, as inconsistencies or perceived unfairness can also stimulate resistance (Landsbergen Jr & Wolken Jr, 2001). However, when done correctly, the willingness to participate among key actors is raised, shared understanding developed, and potential conflicts mitigated (Yang & Maxwell, 2011; S. S. Dawes et al., 2009; Sayogo et al., 2016). Furthermore, formal authority can assist in building trust relations, thereby providing the foundation for a collaborative environment (Pardo et al., 2008). Lastly, both the concept of executive involvement and informal leadership are coupled with formal authority, as formal authority is often used by executives to provide resources to the collaboration, and informal leaders are involved in the trust process (Pardo et al., 2007).

Informal Leadership — Informal leaders are seen as the operational leaders of the information exchange collaboration, and are no less crucial than executive leaders (Landsbergen Jr & Wolken Jr, 2001). Especially the trust building capacity of informal leaders is an essential trait, that, accompanied by their knowledge about participant interactions, enables them to provide localized solutions to complex problems (Yang & Maxwell, 2011; Gil-Garcia, Guler, Pardo, & Burke, 2010). Thereby, coordination can be sustained and conflicts mitigated.

To conclude, leaders in a broad sense use their resourcefulness, communication skills & conflict resolution, and boundary-spanning roles to make decisions and guide inter-organizational information exchange. In addition, leaders are often distinguished in charismatic and transactions type, addressing their style, focus, and communication (Waldman, Ramirez, House, & Puranam, 2001). Although one specific leadership style might not be fitting for every scenario in inter-organizational information exchange, Eglene et al. (2007) stress the idea that effective leaders are adaptive and fit their behaviors to varying events and goals. Lastly, leadership in collaborative environments must be seen as a fluid concept that is not only tied to people but also structures and processes, stressing the focus of the previous chapter (Huxham & Vangen, 2000).

2.3.3 Organizational Culture and Environment

Whereas leadership involvement is believed to have a top-down influence on inter-organizational information exchange, the bottom-up effects have to be determined through addressing organizational culture, which is defined as a consistent and usual way of organizations to perform specific activities, based on basic assumptions which a group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, including maintenance of human relations within an organization (Schein, 2001; Guerrazzi & Feldman, 2020; Wilson, 2019). Taking an inter-organizational perspective, participants of a collaboration are expected to behave according to their internal norms, values, and beliefs (Wenger, 1999). Therefore, when information sharing is not included in the working culture of an organization, it can not be expected of employees to participate in inter-organizational information exchange without proper change management to govern resistance. Yang and Maxwell (2011) even pointed to organizational culture as 'the outer layer', that, together with organizational structure, influences and forms all activities of the organization, including members' beliefs in inter-organizational information sharing.

Fairness, affiliation, and innovation are cultural traits that are positively associated with information sharing (Bock, Zmud, Kim, & Lee, 2005). Furthermore, cultures that can align in terms of solidarity, mutual interests, and shared goals, are more likely to embrace shared ownership of information, and thereby inter-organizational information sharing, according to Jarvenpaa and Staples (2001). Nonetheless, it is naive to conclude that an organization exists out of a single culture. Therefore, Huang, Newell, Galliers, and Pan (2003) suggests seeing organizational culture as a collection of subcultures, a concept that recognizes that there will always be a conflict of interest in an organization. Consequently, sub-cultural differences have to be overcome and values and beliefs internally aligned, or it will impede information sharing of the organization as a whole (Huang et al., 2003).

Information sharing in the context of sustainability data brings a new and interesting dimension to organizational culture. As mentioned in previous paragraphs, mutual interests and shared goals are of great importance to align cultures, and thereby information exchange. Sustainability can be a controversial topic, which stresses the need to foster a 'culture of sustainability' (p.2) within organizations (Galpin, Whittington, & Bell, 2015). Although a culture change is a large-scale, complex, and time-intensive undertaking, cultures can be changed through the diligent effort of the leadership team, again

stressing the three activities described in the previous chapter (Denning, 2011). Research by Schein (2010) has shown that organizations must focus on three levels to develop and maintain a culture: (1) visible artifacts and behavior; (2) rules and values about the internal and external presentation; and (3) shared basic assumptions that guide behavior. By translating these three rules, Galpin et al. (2015) developed a comprehensive model that serves as a blueprint for implementing sustainability in the organizational culture. Relevant aspects are clarified in the following two paragraphs, and Figure 2.3 provides an overview of the blueprint.

The proposed model first emphasizes the significance of integrating sustainability into an organization's mission statement. Thereby not only the role of the organization to the market but also to the society and environment is portrayed, leading to an alignment of internal and external stakeholders. The values articulated in the mission statement represent the beliefs, goals, and behavior pursued by the organizational members, playing a crucial role in decision-making alignment (Hargett & Williams, 2009). To formalize this alignment, goal setting and strategy definition are necessary, leading to long-term value for the company, society, and environment (Galbreath, 2010).

Regarding organizational culture, management should leverage the predefined strategic intent and core values to develop human resources. This can be achieved by establishing a fit between organizational values and employees, resulting in a commitment to the firm (Galpin et al., 2015). Beyond recruitment, continuous reinforcement, and retention of employees, incentives and rewards, along with empowerment and engagement, are critical for advancing culture (Lacy, Arnott, & Lowitt, 2009). Although partially interrelated, management must strive to empower employees in their efforts toward sustainability while engaging them in the topic. A fitting incentives and rewards system, based on goal setting, performance assessments, and feedback systems, should be established, which is further discussed in Chapter 2.4.1.

In the long run, the combination of these practices leads to the incorporation of sustainability-based decisions into the day-to-day job routines of employees and managers, with the highest rewards being achieved when sustainability is viewed as a normal job performance (Galpin et al., 2015). This incorporation is believed to influence inter-organizational information exchange regarding scope 3 emissions, providing a bottom-up and top-down stimulus through culture and leadership, respectively.

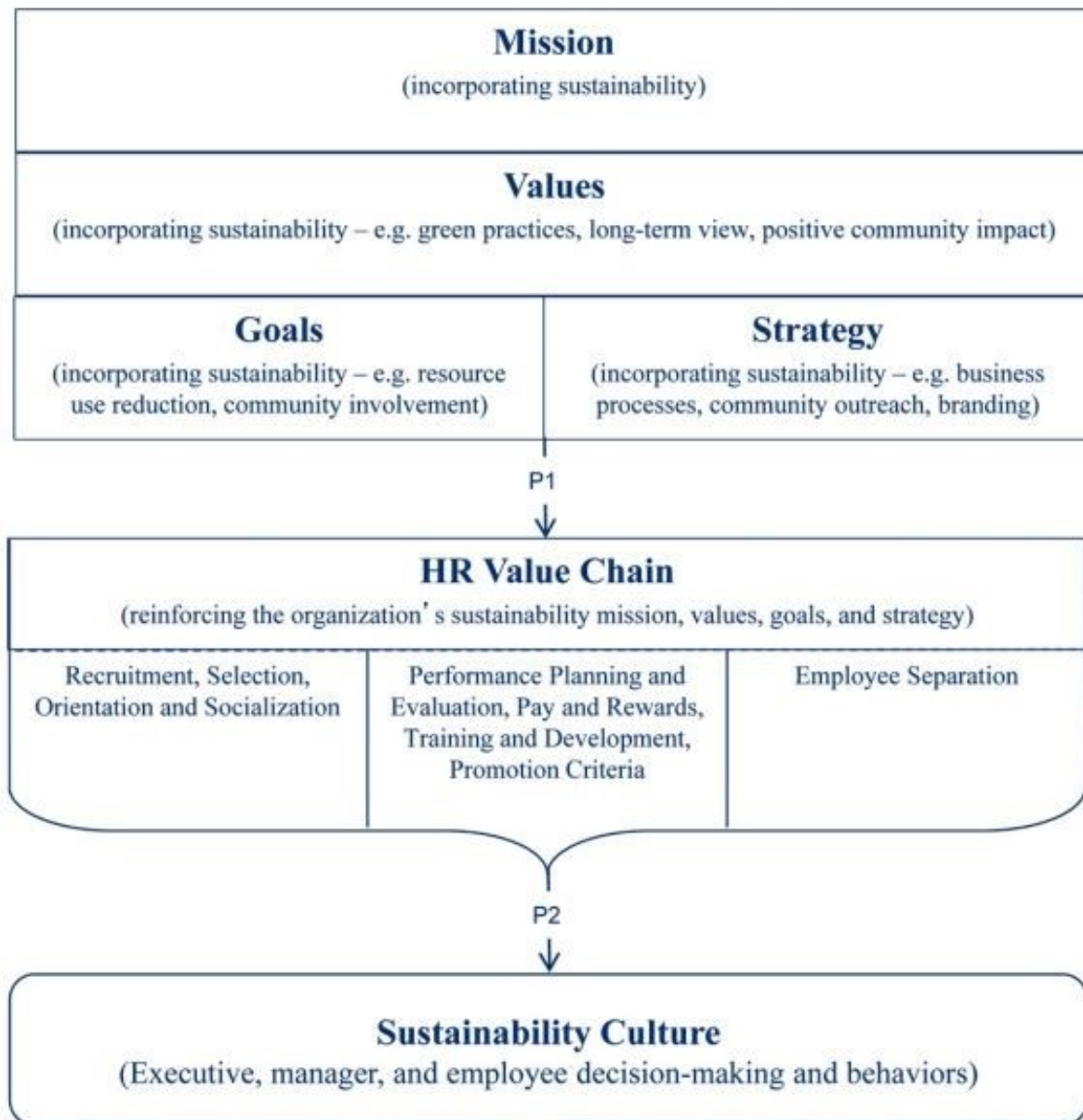


Figure 2.3: Sustainability Culture Change Model by Galpin et al. (2015)

2.3.4 Resources & Project Payoff

Although the different organizational structures, including the position of leadership and culture, are detrimental to understanding the establishment and maintenance of inter-organizational information exchange, the limited availability of resources is believed to be one of the main determinants of failure for inter-organizational information exchange (Yang & Maxwell, 2011; Gil-Garcia & Sayogo, 2016; Gharawi & Dawes, 2010). Resources in this context can be seen as financial, staff, network, time, or technical related, and are needed substantially to initiate and sustain the relationship (Pardo & Tayi, 2007; Yang & Maxwell, 2011). The availability of resources is in close relationship with the topic of leadership, discussed in chapter 2.3.2, as resources have to be made available by management. Understanding the need and compatibility of resources is vital in understanding the complexity of inter-organizational information exchange (Gharawi & Dawes, 2010). Incompatibility between the technical resources of different firms can hinder the collaboration, and the technical expertise of participants is needed to perform in the network (Zhang & Dawes, 2006; Landsbergen Jr & Wolken Jr, 2001). Additionally, jointly spending resources over a longer period of time, accompanied with building trust, is regarded as a strong approach to relationship building (Levinthal & Fichman, 1988). Lastly, organizations have often spent their resources on acquiring the right information, but without appropriate compensation, they might be hesitant with sharing information (Pardo & Tayi, 2007; Gharawi & Dawes, 2010). Likewise, when resources, in general, are lacking in the organization, a focus towards more 'urgent' matters is likely to be taken, as the immediate benefits of sharing cannot be foreseen (Landsbergen Jr & Wolken Jr, 2001; Zhang & Dawes, 2006).

2.3.5 Information Governance

As described in Chapter 2.2.3, an equilibrium must be found between the willingness to share and having control over information assets. Where data and information are still often seen as a strategic resource, the benefits of inter-organizational information exchange begin to gain more traction. Thereby, a revision of information governance towards more sophisticated methods that support inter-organizational information exchange is needed, especially because dynamics are more diverse and complicated (De Prieëlle, De Reuver, & Rezaei, 2020; Otto & Jarke, 2019). Information governance in that setting is regarded as both a tactical and a strategic component in managing data, and is a company-wide process involving decision-making to encourage rightful treatment of information as a corporate asset, that evolves around sharing (Jagals & Karger, 2021; Otto, 2011; De Prieëlle et al., 2020). On a higher level, information governance is the alignment of resources (information) provided by different parties to support the expected outcomes (Rasouli et al., 2016). As mentioned in Chapter 2.2.2, information quality is regarded high when it is fit for use. Thereby, governance, and thus alignment, is focused on the provision of high-quality data in the exchange. In order to reach high quality via governance, Rasouli et al. (2016) defined four focus areas: (1) Information Product Quality Governance, which aligns information production processes among the different parties in the network, focusing on the information requirements; (2) Information Service Quality Governance, which aligns the transformation of information products to information services, such that is usable in the network; (3) Metadata Governance, which is concerned with the governance that enhances the understandability and usability of the information service, focused mainly on the semantics of information; and (4) Information Security Governance, which

is focused on the confidentiality, integrity, and availability of the information, further explained in Chapter 2.3.5.2. Thereby, information governance provides a holistic approach, consisting of different mechanisms, all supporting the quality of information. The following sub-chapters, 2.3.5.1 and 2.3.5.2, highlight two important aspects of information governance in the inter-organizational setting: Information Technology and Information Security.

2.3.5.1 IT Systems

Progress in Information and Communication Technologies (ICT) greatly impacted the collaborations and decision-making of organizations, by providing capabilities for coordination, continued engagement, access to data, and sharing of information, which are vital for addressing complexities and uncertainties. ICT also serves as an enabler in terms of collective capabilities through organizing, interacting, and governing, to overcome complex social challenges (Johnston & Hansen, 2011; Scholl & Scholl, 2014). Furthermore, in the domain of inter-organizational information exchange, one of the key determinants of success is the availability of technical infrastructure, interoperable standards, and technological compatibility. Incompatibility between the technical resources of participating organizations remains a challenge, as it can significantly impact the performance of inter-organizational information sharing initiatives (Sanderson, Banks, Deakin, & Udagawa, 2015; Pardo, Nam, & Burke, 2012). To address this challenge, literature suggests developing standards, ensuring platform and application interoperability, using metadata, and applying algorithms (Rasouli et al., 2016; Bekkers, 2009; Gil-Garcia & Sayogo, 2016; P. McDermott, 2010). Nonetheless, even if all inherent IT problems are addressed, employees of the partnering organization still have to use the systems properly.

The Technology Acceptance Model (TAM) by Davis (1989) posits that perceived usefulness and perceived ease of use are key factors influencing organizational members' acceptance of new information systems. Harmonious is the statement by Venkatesh, Morris, Davis, and Davis (2003), that proposes that effort and performance expectations are strong determinants of adoption intention. Thereby, both acceptance and adaption are dependent on how the employees perceive the usefulness and ease of use of the system by which information can be exchanged between organizations. Furthermore, it takes time and effort for organizational members to learn to use IT systems effectively, to eventually be able to share information (Goodman & Darr, 1998).

In conclusion, ICT greatly impacted inter-organizational information sharing. However, the successful implementation of these technologies is dependent on the availability of technical infrastructure, interoperable standards, and technological compatibility. Furthermore, the usage by employees is dependent on perceived ease of use and usefulness. Therefore, organizations should strive to make their information systems intuitive and efficient to use, in order to enhance information sharing activities.

2.3.5.2 Information Security

The concepts of confidentiality, integrity, and availability mark the protection that forms the information security domain (Bishop, 2003). Information should be available to authorized users in an accessible, reliable, and timely manner. Therefore, data availability

is seen as the ability of a system to provide data in such a way. Additionally, data integrity refers to the assurance that data has not been tampered or modified unauthorizedly. Lastly, data confidentiality is focused on the protection of data from unapproved access or disclosure by individuals, organizations or systems. Guaranteeing these concepts can only be done effectively by means of risk analysis and prevention, especially in the dynamic setting of inter-organizational information exchange (Rasouli et al., 2016). Security procedures have to be developed at both the party and network level, which can cause harmful interference, as the individual organization will focus on maintaining confidentiality, integrity, and availability at the party level, while the network will have a security policy outside of single organizational boundaries. Therefore, network security should align with each individual party security (Rasouli et al., 2016). Furthermore, the unavoidable trade-off between security and utility exists, which has to be taken into account when setting up security protocols, and have to be aligned with the objectives of the exchange (Sanderson et al., 2015). In conclusion, each participating party has to agree and align, as information security is one of the strong determinants of information sharing success (Yang, Wu, et al., 2013; Gil-Garcia & Sayogo, 2016). It could be argued that a significant advancement would be to establish a unified, technical standard for sharing data securely. However, due to the varied nature of data and its uses, this may prove to be challenging (Sanderson et al., 2015).

2.4 Relational Dimension

Where the previous section paid attention to the organization itself, this chapter will discuss the factors influencing inter-organizational relationships. Although physical infrastructure can be dominating in research regarding inter-organizational information exchange, the willingness to share is equally important (Maskey, Fei, & Nguyen, 2020). Therefore, this chapter highlights multiple characteristics that are often associated with organizational relationships regarding information exchange, such as trust, commitment, power, guanxi, and organizational compatibility.

2.4.1 Incentives & Stakeholder Engagement

Following the principal-agent theory, a theoretical foundation can be built on several aspects regarding buyer-vendor relationships (Müller, 2005). The theory focuses on the transactional relationship between a client (principal) and a contractor (agent), such as in inter-organizational information exchange, which can be interpreted as a sequence of bilateral client-contractor relationships. Advancing on the theory, an asymmetrical distribution of information occurs between the client and the contractor, with an informational advantage for the contractor, as it can deny the principal full access (Müller & Gaudig, 2011). Meaning in the context of this research; the agent can withhold information regarding scope 3 emissions when it deems this necessary. Three types of information asymmetry within the principal-agent theory exist: (1) hidden characteristic situations; (2) hidden action situations; and (3) hidden intention situations. With the characteristic situation is meant that the principal does not know if the agent will meet obligations. Following the paper by Arrow (1986), reputation building is of key importance in overcoming this type of asymmetry. Further, action situations imply that the principal lacks expertise to evaluate the agent's efforts, which is the case in information exchange regarding scope 3 emissions, as it can hardly be observed if the data meets quality standards. According

to Holmström (1979), the agent should therefore be incentivized to behave accordingly. Lastly, the intention situations refer to a lack of knowledge of the agent's motives or intentions, which should be opposed with contracts and sanctions (Klein, Crawford, & Alchian, 1978).

One aspect relevant to this research is the provision of incentives, rewards, or premiums to control behavior, in which incentives are offered based on behavior shown or output delivered by the agent (Britton & Ball, 1999). These can be either financial rewards, non-financial rewards, or specific premiums (Müller & Gaudig, 2011), and are found to be positively related to inter-organizational information exchange (Maskey et al., 2020; Yang & Maxwell, 2011). However, incentives are only found to be effective when combined with control mechanisms (Wathne & Heide, 2000). Furthermore, successful incentivization is based on two assumptions: (1) the agent recognizes the relation between its behavior and remuneration, and (2) the agent is able to influence the factors affecting the remuneration. It should be noted that incentives are not a guarantee for success. Where Maskey et al. (2020) found a positive, significant relationship between incentives and information sharing, Müller and Gaudig (2011) did not. As stated by Maskey et al. (2020), this probably had to do with the resourcefulness of the organizations used in the study, in which more resourceful organizations are less affected by incentives. Lastly, Yang and Maxwell (2011) point out that incentives for information sharing should be specifically designed, or competition for rewards can turn the impact negatively. The role of competition for incentives has to be taken into account in the context of this research as well, as incentives have to be specifically designed to reward the **quality** of the information, and not the content. Within the field of carbon emissions, it is often seen that rewards are given based on the height/reduction of the emissions itself, not on the quality of the information shared about the emissions, which is a crucial difference in light of this research.

Moreover, as mentioned earlier, to overcome the other types of asymmetry, relationship building is essential. Engagement in relations is researched extensively within multiple fields, such as psychology, organizational science, marketing, and ecosystems. Based on this previous work on actor engagement within service ecosystems, Jonas, Boha, Sörhammar, and Moeslein (2018) define stakeholder engagement as: “a psychological state that occurs by virtue of stakeholder experiences throughout an interactive process within a specific service ecosystem.” (p.402). Nonetheless, engaging stakeholders in an inter-organizational setting proved to be highly challenging (Derakhshan, Mancini, & Turner, 2019). To do so, stakeholder engagement must be seen as an ongoing problem-solving process, in which engagement is constantly measured, verified and improved (Hummels, 1998). Therefore, Lehtinen and Aaltonen (2020) identified three directions to facilitate engagement in inter-organizational relationships: governance-based, value-based, and dynamism-based. Governance-based engagement is focused on creating engagement by addressing task division and allocation, whereas value-based engagement is related to the provision of rewards. Lastly, dynamism-based engagement is facilitated through maintenance of relationships and day-to-day flexibility in operations.

2.4.2 Organizational Compatibility

Organizational compatibility, of which various parts have been (indirectly) discussed in previous chapters, is defined by Bucklin and Sengupta (1993) as the similarity of organizations and partners in their goals, objectives, and business philosophy. However, this definition seems to be incomplete, as it only focuses on the strategic and cultural aspects. Literature suggests that a technological component should be added, that incorporates also routine and information compatibility (Qi, Wang, Li, Zhang, & Jin, 2021; Rajaguru & Matanda, 2013). Therefore, compatibility has to be seen as a three-dimensional construct, focused on (1) similar technological infrastructure (technical compatibility); (2) comparable goals and objectives (strategic compatibility), and (3) a cultural fit (cultural compatibility) (Rajaguru & Matanda, 2013; Claycomb, Iyer, & Germain, 2005; Li & Williams, 1999; Schraeder & Self, 2003). The technical dimension relates to the partnering organizations' network commonality, business-oriented technology towards operations and information systems (Rajaguru & Matanda, 2013). The essence and relation to inter-organizational information exchange for scope 3 emissions, is described in Chapter 2.3.5.1, which focuses on IT systems. Additionally, cultural compatibility focuses on norms, traditions, and values. Besides that these concepts can substantiate a common identity and thereby commitment to the goal, they also directly stimulate information exchange (Dyer & Nobeoka, 2000). As described in Chapter 2.3.3, a culture has to embrace both information sharing and sustainability practices to become aligned internally. However, cultural alignment with partnering organizations is also needed for inter-organizational information exchange (Leischnig, Geigenmueller, & Lohmann, 2014). Lastly, strategic alignment refers to having shared objectives and comparable goals, which facilitates coordination and partnering activities (Rajaguru & Matanda, 2013). Thereby, goal setting and defining strategy, as mentioned in the model by Galpin et al. (2015) described in Chapter 2.3.3, must not only be focused on incorporating sustainability practices, but also on alignment with partnering organizations.

2.4.3 Social Capital and Guanxi

Nahapiet and Ghoshal (1998) defined social capital as the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. This definition is in close relationship to the concept of Guanxi, which originates from Chinese culture and refers to connections in personal relations. "It forms an intricate, pervasive relational network which the Chinese cultivate energetically, subtly, and imaginatively. It contains implicit mutual obligations, assurances, and understanding and governs attitudes toward long-term social and business relationships" (Luo, 2007) (p.2). Thereby, it can broadly be interpreted as continued, interpersonal linkages. Often, guanxi plays a role in situations in which a structural relationship is absent (Westrup & Liu, 2008). Furthermore, guanxi has different effects on inter-organizational information exchange in different settings. For example, Cheng (2011b) found that it improves the negative effect between risk and information exchange. Furthermore, it was also found that these relationships play an important role in reinforcing the connectedness between partners and mitigating dysfunctional conflicts (Cheng, 2011a). Therefore, it is expected that personal relations between organizations in the value chain will have a positive effect on (setting up) inter-organizational information exchange.

2.4.4 Trust

With the increasing need for the adoption of information sharing systems, literature is recognizing the critical importance of trust in the establishment, development, and maintenance of inter-organizational relationships (Mihok & Frank, 2007; Pardo & Tayi, 2007; Rousseau, Sitkin, Burt, & Camerer, 1998). Besides the positive effects on joint problem-solving, trust stimulates for example the development of consensus, facilitates the resolution of conflicts, and resolves information asymmetries by open and honest conversation, thereby significantly enabling inter-organizational information exchange (Mayer, Davis, & Schoorman, 1995; Y.-H. Chen, Lin, & Yen, 2014; Guo, Lu, Hao, & Gao, 2021). Inter-organizational trust is defined by Pavlou (2002) (p. 218) as: “the subjective belief with which organizational members collectively assess that a population of organizations will perform potential transactions according to their confident expectations, irrespective of their ability to fully monitor them”, thereby capturing three fundamental attributes of trust: (1) recognition that trust is subjective and not an objective anticipation; (2) trust is a collectively held cognitive belief of well-informed individuals; and (3) the possibility of beneficial outcomes in the presence of risk. This definition encompasses the economic approach to trust as predicting opportunism and simultaneously recognizes the sociopsychological expectation of reciprocity (Guo et al., 2021).

In the inter-organizational setting, trust can be segmented into three categories: contractual trust, competence trust, and goodwill trust (Sako, 2006). Contractual trust addresses the moral norm of honesty and promise-keeping, focusing on to what extent an organization will carry out its contractual agreements. Furthermore, competence trust expresses the belief that an organization is capable of carrying out the assigned tasks, and requires a shared understanding of professional and technical conduct. Lastly, goodwill trust addresses the question if a party will handle in good faith, striving for mutual benefit and refraining from unfair advantage-taking. On a high level, contractual and competence can thus be grouped in behavioral trust (Pavlou, 2002).

Inter-organizational trust was found to be of direct influence on multiple economic outcomes, such as lowered transaction costs, increased return on investment, or improved project management performance, which all have a relation to inter-organizational information exchange (J. Harris & Zaheer, 2006; Dyer & Chu, 2003). Furthermore, in terms of relational outcomes, trust adds to a lower perceived risk, increased strategic alliance and is directly, positively related to information sharing (J. Harris & Zaheer, 2006; Khan, Hussain, Papastathopoulos, & Manikas, 2018). Moreover, a loss of trust will cause a downward spiral that eventually leads to the dissolution of the partnership (Zaheer, Lofstrom, & George, 2002). Lastly, trust has significant, indirect effects on inter-organizational relationships that foster information exchange, such as a moderation between contractual safeguards and sharing performance, the minimization of the negative effects of opportunism, and mitigating the negative effect of historic social controls (J. Harris & Zaheer, 2006).

However, trust building is a process that spans over a long period of time, and is built on joint resource acquisition (Landsbergen Jr & Wolken Jr, 2001). Therefore, Lewicki, Bunker, et al. (1996) identified three steps in the development of trust: calculus-based trust, knowledge-based trust, and identification-based trust. These concepts simultaneously relate to the categories of trust as described earlier. Calculus-based trust resembles

a conditional bond that is formed through mutual benefit (Y.-H. Chen et al., 2014). This is mainly focused on the contractual and competence categories, in which it is important that the trustor has the ability to assess the trustworthiness of the trustee (Yang & Maxwell, 2011). Second, knowledge-based trust addresses the understanding of shared goals and emphasizes the emotional connection. Thereby, the first forms of goodwill trust are incorporated, and the need for assessment is lessened. Third, identification-based trust is focused on value-added information exchange in an unconditional form. This is strongly related to the maturity of organizational relationships and adheres to all three categories of trust (Panteli & Sockalingam, 2005). Lastly, an overarching form of trust can be found in the institution-based form of trust, by which trustworthiness is formed through institutional structures, cultures, societal norms, and legal systems (Yang & Maxwell, 2011).

2.4.5 Power Dynamics

Literature provides various views on power, with for example a focus on potential power, perceived power, or behavioral power (Huo, Tian, Tian, & Zhang, 2019). As argued by J. Chen, Zhao, Lewis, and Squire (2016), behavioral power is most relevant in the setting of exchange partners, as it determines a partner's choice to exert its power to influence behavior, in this case sharing information. Power is the ability of an actor to influence or control another actor's actions, in which an actor in this context can be seen as an organization or person (Hunt & Nevin, 1974).

Following the social exchange theory, in combination with the resource dependence theory, firms create interdependence through their reciprocal exchange of resources. Meaning that organizations interact with other organizations in the value chain to obtain resources, which can have multiple forms. However, thereby, those firms often become partially dependent on other organizations for their resource provision. Hence, a power relationship develops (Emerson, 1962). As argued before, information must also be seen as a resource, and therefore, power dynamics are of importance in inter-organizational information exchange. In studies regarding the use of power in relationships, it was found that organizations must avoid the use of coercive power to develop and maintain long-term relationships. Furthermore, the use of coercive power leads to opportunism, in which one organization tries to take advantage when possible (Huo et al., 2019).

2.5 Environmental Dimension

Whereas the previous chapters mainly focused on how information exchange is influenced by the individual organization or by the relationship, the following sections provide an environmental viewpoint. Often, the general environment is outside the influential sphere of a particular organization, nor in control by the relationship or value chain. However, relationships are expected to be heavily affected by the environment, which is the least studied antecedent of information sharing compared to the other dimensions (Maskey, Fei, & Nguyen, 2015). Therefore, forces by market, culture, and country will be discussed.

2.5.1 Uncertainty

The natural environment in which an organization operates is of crucial importance to its business. However, the uncertainty that this environment can create is often ne-

glected (López-Gamero, Molina-Azorin, & Claver-Cortés, 2011). Environmental uncertainty arises when stakeholders in the organization perceive the environment as unpredictable, and is caused by a shortage of information about events to facilitate decision-making (Milliken, 1987; Duncan, 1972). According to J. V. Chen et al. (2014), supplier uncertainty, customer uncertainty, and technological uncertainty are relevant when researching information exchange in the value chain, and together form environmental uncertainty. Results of studies regarding the effect of environmental uncertainty on information exchange are inconclusive. Where L. Wang, Yeung, and Zhang (2011) found that organizational relationships strengthen in high uncertainty environments, to improve flexibility, Long, Li, and You (2014) found a decrease in information exchange due to the fear of opportunistic behavior. Therefore, environmental uncertainty has different effects in varying situations.

2.5.2 Regulatory Compliance

Generally, when discussing inter-organizational interaction, a voluntary perspective is taken. However, interaction can also have its basis in a legal mandate (Humphreys, Lai, & Sculli, 2001). Similarly, in the framework by Oliver (1990), six contingencies are defined, of which the first one is directed towards necessity. Besides a possible resource dependence, as explained in Chapter 2.4.5, necessity can also be developed through legal or regulatory requirements. Thereby, compliance becomes an important factor influencing the information exchange, as it dictates the types of information that organizations must obtain and share, affecting the formation of relations. Furthermore, relationship building can also be facilitated by legislation through risk reduction and trust development when guidance on the utilization of information is provided (Ramon Gil-Garcia, Chengalur-Smith, & Duchessi, 2007). Though legislation and policies can have indirect, positive effects through alleviating concerns and providing funding or resources, negative effects can also be found through the strengthening of boundaries, to ensure security, that hinders information sharing (Yang et al., 2013). Therefore, the specific type and goal of the legislation is fundamental to determine the effect on information exchange. Lastly, regulatory requirements often encourage the formation of frameworks, such as the GRI and SASB explained in Chapter 2.1, thereby adding to the standardization of information.

2.5.3 National Culture

In the globalized world, professionals are facing different cultures that interact freely, influencing information management of organizations (Magnier-Watanabe & Senoo, 2010). Hofstede (1984) defined culture as mental programming, which are learned patterns of thinking, feeling, and potential acting. Furthermore, Hofstede (1993) identified a total of five dimensions of national culture: individualism versus collectivism; masculinity versus femininity; power distance (low to high); uncertainty avoidance (low to high); and long-term versus short-term orientation. Individualism/collectivism refers to the degree to which people act as group members and show concern for the well-being of others (Lucas, 2006). Individualism does not have a negative, nor positive effect on information sharing, while collectivism is positively related (Goswami, Agrawal, & Goswami, 2021). Furthermore, masculinity is focused on values like assertiveness and performance, whereas femininity values quality of life, personal goals and a friendly environment (Siau,

Erickson, & Nah, 2010). Masculine cultures are believed to negatively impact information sharing (Ford & Chan, 2003). Power distance is the perception about inequality, and the degree to which this is considered normal (Lucas, 2006). In a high power distance culture, superiors are followed without question, whereas inequity is minimized in low-power distance cultures (King, 2007). Although a high power distance can have a positive effect on system acceptance (Rollins et al., 2011), information transfer is negatively affected (Qin, Ramburuth, & Wang, 2011). Uncertainty avoidance is the extent to which individuals in a culture feel uncomfortable with uncertainty and ambiguity (Siau et al., 2010). Uncertainty avoidant cultures create formal rules and reject deviant behavior, where low uncertainty avoidance cultures take risks and accept ambiguity (King, 2007). High uncertainty avoidance is found to have a significant, positive impact on information exchange (Ray, 2014). Lastly, long-term orientation cultures place a focus on the future, whereas short-term orientation cultures focus on the present and past (Siau et al., 2010). Having a long-term orientation is believed to have a positive effect on information sharing (Jin, 2012).

2.6 Conclusions on Literature Review

The literature review offers valuable insights into strategies and mechanisms employed to establish, maintain, and facilitate effective inter-organizational information exchange, thereby particularly addressing research question 2.1. The review first provides a general, but fundamental, understanding about information, including its quality and flow, exchange relations and governance. It was learned that sharing and receiving information is often accompanied with comprehensive contracts. Nevertheless, certain aspects may not be captured in contracts due to the complex and diverse nature of the subject. Hence, network governance is crucial, which takes into account the enduring inter-firm exchanges based on the relational exchange theory. Therefore, the remainder of the study mainly covered the three key dimensions of inter-organizational information exchange: individual (intra-organizational) dimension, relational (inter-organizational) dimension, and environmental dimension.

First, for the individual dimension, it was observed that organizations need to invest in capacity building and develop the necessary skills to engage in information exchange, striving for structural flexibility in those capacities and skills. Furthermore, literature emphasizes the importance of leadership in fostering an environment that promotes information exchange. Leaders play a vital role in setting the tone and establishing a culture that values openness and collaboration. By promoting information exchange, demonstrating commitment to the cause, and encouraging employees to share, leaders can foster trust, cooperation, and a shared sense of purpose. Besides, leadership was found able to sustain the information exchange through the provision of resources, which is believed to be one of the main determinants of success. Additionally, the need for organizations to develop the necessary IT infrastructure, systems, and processes to facilitate information exchange was highlighted. This includes the implementation of adequate security measures to safeguard sensitive data and the adoption of standardized tooling to streamline information exchange across different organizations.

Secondly, the relational dimension highlights the significance of robust inter-organizational relationships, built on trust, mutual benefits, and shared values. These relationships can be fostered through joint planning, problem-solving, clear communication channels, and goal alignment. Moreover, collaboration and information exchange can be enhanced by developing a shared understanding of risks and opportunities, while engaging in joint decision-making. Thereby, the governance-based, value-based, and dynamism-based forms of engagement are addressed. In addition, trust was found to be a complex mechanism in relationships, that builds over time, but is essential in inter-organizational information exchange, as it stimulates the development of consensus, facilitates the resolution of conflicts, and resolves information asymmetries by open and honest conversation. By cultivating trust and fostering a shared understanding, organizations can create an environment that encourages partnerships, leading to information exchange. Thirdly, the environmental dimension highlights the need for organizations to be aware of the external factors that can impact their information exchange practices, such as regulatory compliance, national culture, and market forces. Organizations should be proactive in adapting to these factors and navigating the complexities of the environment. For example, they should ensure compliance with laws and regulations, which may dictate the types of information that must be obtained and shared, thereby influencing the formation of relationships. Additionally, organizations should be mindful of national/cultural differences and their effects on information exchange, adapting the previously mentioned communication and collaboration strategies accordingly. By being proactive and adaptive to environmental factors, organizations can better navigate the complexities of information exchange and foster stronger inter-organizational relationships.

The literature review addressed research question 2.1 by exploring the strategies and mechanisms employed to establish, maintain, and facilitate effective information exchange within inter-organizational information exchange. Additionally, it marks the interconnectedness of the three dimensions, as they collectively shape the dynamics of information exchange. To further investigate the applicability of these findings to scope 3 emissions reporting and understand how existing practices can facilitate the inter-organizational information exchange for scope 3 emissions, a multiple case study is performed. This case study will delve into the practical aspects of information exchange practices in the context of scope 3 emissions reporting and explore potential combinations and adaptations that might be required. The methodology for this multiple case study will be presented in the next chapter.

3 Research Method

The primary objective of this research was to develop a comprehensive understanding of the challenges, opportunities, and dynamics related to inter-organizational information exchange for scope 3 emissions. Given the emergent and exploratory nature of the CSRD, scope 3 emissions, and sustainability in general, studying inter-organizational information exchange involves a complex and dynamic web of interrelations. To research this complexity, the research employed a qualitative and process-focused approach, centered on 'how' and 'why' questions. A process-focused approach was chosen as it enables a deeper examination of the underlying mechanisms and interactions driving inter-organizational information exchange, instead of just focusing on the outcomes. Accordingly, also qualitative data collection from various sources was required to analyze these processes and come to the right conclusions (Bryman, Becker, & Sempik, 2008; Eisenhardt, 1989). Moreover, the focus on Scope 3 emissions and information exchange created a function-specific and bounded system, as described by Stake (2008). Therefore, an in-depth meaning of analysis, encompassing detail, richness, completeness, and variety, that considered the relation to the environment, was required, which is achievable through a case study approach (Denzin & Lincoln, 2011; Yin, 2018). Building on this foundation, the research utilized an inductive, multiple case study design, allowing for open-ended research, fostering pattern identification, and building concepts and theories (Yin, 2018). The inductive approach by Gioia, Corley, and Hamilton (2013) was used to explore the various facets of inter-organizational information exchange and facilitated the identification of the surrounding dynamics.

3.1 Case Selection

Case selection for the multiple case study was done based on theoretical sampling (Eisenhardt & Graebner, 2007), as it allows for a context-sensitive exploration of the complex and evolving dynamics of inter-organizational information exchange for scope 3 emissions, ultimately contributing to a comprehensive understanding of the phenomenon. Five cases were selected for the study, based on information obtained from internal KPMG interviews, introduction meetings, publicly available information such as annual reports, newspapers, and sustainability analyses, thereby maximizing the utility of information (Yin, 2009). To best address the research question, cases were selected that are applicable to the CSRD, meaning that they have to meet two out of the three criteria: (1) more than 250 employees; (2) more than 40 million euros in turnover; and (3) more than 20 million in assets (see Chapter 1.1). Furthermore, as the CSRD applies to organizations that are EU-based, only EU-based organizations were considered. Additionally, to ensure information availability and access, thereby maximizing the potential to contribute to answering the research question, cases were selected on their relation to KPMG, as this research is conducted in congruence with KPMG Netherlands.

During the case selection process, possible case organizations were identified, and for each of them, a meeting was set up to discuss their suitability further. These meetings, along with the information sources mentioned earlier, were used to assess the potential of each case to contribute to developing a comprehensive understanding of inter-organizational information exchange for scope 3 emissions. Every possible case was also discussed with either one of the KPMG supervisors or the department partner to ensure their relevance

and appropriateness for the study. To provide insight into how the selected cases compare in relation to this research, Figure 3.1 provides an overview of the organizations on Environmental Progressiveness (X-axes) and Data-sharing Proficiency (Y-axes). Environmental Progressiveness is seen as the degree to which organizations strive to embrace sustainable business practices, and Reporting Proficiency as the organizations' expertise, ability, and mastery in providing a written account of their activities.

Company A is a retail organization that is very environmentally progressive but lacks data-sharing proficiency. Company B, a chemical company, scores high on both environmental progressiveness and data sharing proficiency. Company C, a production and trading company in the food industry, is just below company B with regard to data sharing proficiency, but scores lower on environmental progressiveness. Company D, a global distributor of off-grid energy, scores low on both environmental progressiveness, and neutral data-sharing proficiency. Lastly, company E, a financial and industrial holding company, scores high on data sharing proficiency, and neutral on environmental progressiveness. All included cases were attractive because of their approach toward scope 3 reporting. Furthermore, there was a high willingness to participate in the research, accompanied by high data availability. Because of the sensitivity of the information, all organizations, and participants of the research are anonymized.

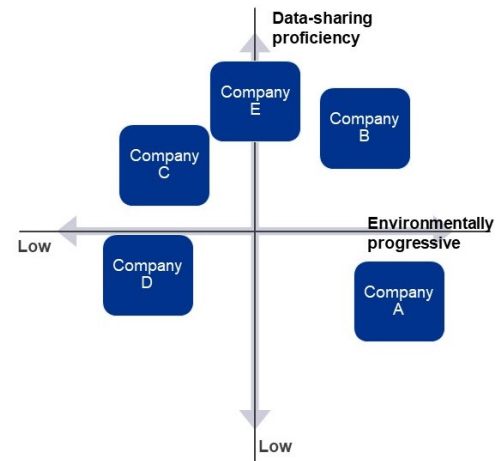


Figure 3.1: Case Companies

3.2 Data & Data Collection

The data for the multiple case study were collected via interview set 1, external interviews, and interview set 2, conducted between December 2022 and March 2023 (see interview sets in the paragraphs below). Additionally, two semi-structured interviews took place prior to this collection period to define the problem and scope the research (Interview Set 0). In total, 21 semi-structured, in-depth interviews were executed, divided over two time periods. Previous to every interview, an introduction session with the interviewee was organized to discuss the objective of the interview and confirm information availability. Interview set 1 and the external interviews were conducted in December 2022 and focused on data gathering for the analysis. Through the interviews, it could be determined how organizations are currently encountering scope 3 reporting and which obstacles are being faced (research questions 1.1 and 1.2). Furthermore, it provided information on how strategies and mechanisms determined by the systematic literature review could be applied, among others, to overcome the earlier defined obstacles (research questions 3.1 and 3.2). Lastly, it already provided preliminary insights into the interrelations of the different obstacles and solution directions (research questions 1.3 and 3.3). Interview set 2 was performed in March 2023 and served as an evaluation and improvement opportunity. Thereby, the solution directions could be verified and interrelations further investigated (research questions 3.2 and 3.3).

All interviews were recorded and transcribed verbatim. Furthermore, the interviews were triangulated with archival data and bi-weekly, internal KPMG meetings (Nightingale, 2009; Yin, 2009). Lastly, multiple informal conversations about ESG and Scope 3 reporting with KPMG employees were held, which helped to scope and define the research. Besides, one KPMG-wide ESG information event and three departmental quarterly meetings were attended. Below, a description of the processes followed per interview set will be given. Furthermore, an overview of all interview sets, including interviewee identifiers, can be found in Table 3.1.

Interview set 0 Two interviews were conducted in order to formulate the problem definition. These exploratory, semi-structured interviews were focused on obtaining initial insights into which obstacles the organizations are facing and validate if the CSRD/Scope 3 legislation learned from desk research was understood correctly by the researcher. The interviews were held with a senior KPMG consultant that is knowledgeable about ESG, and an Innovation Leader of KPMG Global.

Interview set 1 During interview set 1, a total of 10 semi-structured, in-depth interviews were conducted, divided equally over the five cases. This type of interview was chosen because it allowed the researcher to deduct in-depth information about the experience of individuals, while simultaneously keeping an open view to new insights (DiCicco-Bloom & Crabtree, 2006). Since the interviews were semi-structured, key topics and open-ended questions were predefined, with the possibility to ask further questions based on the answers given (Fossey, Harvey, McDermott, & Davidson, 2002). To ensure quality and uniformity, and increase reliability and validity, the four phase process for Interview Protocol Refinement (IRP) by Castillo-Montoya (2016) was followed, which consists of:

1. Research question alignment
2. Constructing inquiry-based conversation
3. Receiving feedback on interview protocols
4. Piloting interview protocol

The development of the protocol was based on the initial interview set 0 and the literature review, taking into account the research questions. Additionally, the initial interview protocol was discussed with both university and company supervisors during two individual meetings. Thereafter, the protocol was piloted once to determine duration and ambiguities. Lastly, the protocol was iterated throughout the collection period to enhance the sequence and clarity of questions. See Appendix B1 for the full interview protocol.

Two interviewees per case were selected based on previous experience with scope 3 emissions, knowledge about reporting practices on the organization, and advice from KPMG. For most cases, not more than two people in the organization knew enough about these processes to sufficiently answer the questions. Therefore, two interviewees per case were selected, to obtain as much information as feasible. Furthermore, with two cases, cross-validation was still possible. The purpose of interview set 1 was to acquire information on (the quality of) the current way of reporting, the motivations, risks & obstacles to scope 3 information sharing, and the possible future information flow and information

system. The interviews took around 75 minutes each. More information on the purpose of different sections of the interview protocol can be found in the overview of the interview protocol in Appendix B1.

External Interviews Semi-structured, in-depth interviews were held with three different experts to validate the applicability of information exchange for scope 3 emissions and to establish a non-biased view to scope 3 reporting and its acquainted obstacles. To determine the viewpoint from outside an organization, the same interview protocol as for interview set 1 was used. Therefore, interviews also occupied around 75 minutes. First, an ESG expert in the financial sector was interviewed. The financial sector, consisting of for instance; banks, investors, and asset managers, is believed to have one of the biggest scope 3 impacts as a sector. Secondly, a sustainability manager at KPMG was interviewed to get a holistic view of current methodologies and shortcomings when it comes to assurance. This specific interview had no connection to either one of the cases specifically. Lastly, a decarbonization expert was interviewed, as decarbonizing the value chain is increasingly becoming part of the reduction strategy, for which information from partners is also essential.

Interview set 2 Interview set 2 was used as a validation opportunity for the implications of the findings of this research, focused on the different relations in the model. Again, the four steps of the Interview Protocol Refinement (IRP) by Castillo-Montoya (2016) were followed to constitute an interview protocol, which can be found in Appendix B2. The questions were formulated in a way that did not influence the answer of the respondent, to guarantee the validity of the validation. Five participants from different organizations were found available to evaluate the findings. Furthermore, in order to avoid biases, the findings were also discussed with one of the external experts.

Interviewee Identifier	Case	Organizational Role
<i>Interview Set 0</i>		<i>Duration: approx. 30 minutes</i>
PD1	KPMG	Senior Consultant ESG at KPMG
PD2	KPMG	Global Innovation Lead at KPMG
<i>Interview Set 1</i>		<i>Duration: approx. 75 minutes</i>
A1	Organization A	Sustainability Assurance Manager
A2	Organization A	Senior Consultant Sustainability
B1	Organization B	Senior Consultant Sustainability
B2	Organization B	Senior Consultant Sustainability
C1	Organization C	Supplier Sustainability Manager
C2	Organization C	Environmental Engineer & LCA Specialist
D1	Organization D	Group Sustainability Manager & Lean Six Sigma Black Belt
D2	Organization D	ESG Project Manager
E1	Organization E	Climate Risk and Decarbonization Expert
E2	Organization E	Manager Decarbonization Strategy
<i>External Interviews</i>		<i>Duration: approx. 75 minutes</i>
EI1	KPMG	Senior Manager ESG
EI2	KPMG	Manager Sustainability
EI3	KPMG	Environmental Engineer Decarbonization Strategies
<i>Interview Set 2</i>		<i>Duration: approx. 45 minutes</i>
A1-2	Organization A	Senior Consultant Sustainability
B1-2	Organization B	Senior Consultant Sustainability
C1-2	Organization C	Supplier Sustainability Manager
D1-2	Organization D	Group Sustainability Manager & Lean Six Sigma Black Belt
E2-2	Organization E	Manager Decarbonization Strategy
EI2-2	KPMG	Manager Sustainability

Table 3.1: Interviewee data for semi structured interviews

3.3 Data Analysis

The interviews provided the researcher with a substantial amount of rich, unstructured data. To analyze this qualitative data, the inductive approach by Gioia et al. (2013) was used, after which a dynamic perspective was taken through causal loop modeling (Sterman, 2000), as this best suits the underlying complexity and interrelatedness of obstacles for scope 3 reporting. Open coding was already applied during the data collection phase, to enable the researcher to make iterations on the interview guide, as this is the best way to uncover and develop new concepts (Gioia et al., 2013). Additionally, as stated before, the data was triangulated with archival data and bi-weekly, internal KPMG meetings.

The researcher started the open coding process by thoroughly reading all data, to grow a vast understanding, after which the initial coding was performed. As mentioned by Gioia et al. (2013), the first-order concepts found through open coding must adhere faithfully to the informant's terms, which generally results in a high number of categories, as was also the case in this study. The goal of defining the first-order concepts was to break data in discrete parts, open up the mind to new theoretical possibilities, and continuously compare and contrast events (Delve & Limpaecher, 2022). By finding similarities and differences, eventually, the amount of categories could be reduced to a manageable number: the definitive first-order concepts. By making use of axial coding, the first-order concepts were classified and arranged into second-order themes, and the earlier-developed codes were thus organized. Besides, iterations of the interview guide were still made where necessary, based on these learnings (see Chapter 3.2). Out of the second-order themes, the aggregate dimensions were derived by selective coding (Delve & Limpaecher, 2022). This provided the foundation for the data structure; a visual aid through a graphical representation of the steps that were followed from raw data to terms and themes, thereby providing rigor in the qualitative research (Tracy, 2010; Pratt, 2008). See Figure 3.2.

However, the data structure was still a static representation of a dynamic phenomenon. Therefore, understanding the data as a whole is required to see the causal relationships between them. Subsequently, a system thinking approach, as described by Sterman (2000), was adopted, incorporating temporal feedback loops and delays into the analyses. This transformed the data structure into a causal loop model, whereby the second-order themes became the variables, and the aggregate dimensions the feedback loops. Finally, harmonious with data gathering and analysis, relevant literature was used to steer the development of the causal loop model (Gioia et al., 2013).

To conclude, the following steps were followed, based on Delve and Limpaecher (2022), Gioia et al. (2013), and Sterman (2000):

- Establishing a vast understanding of the data
- Creating first set of first-order concepts with open coding
- Reevaluating first-order concepts
- Classify and arrange the first-order concepts in second-order themes by axial coding
- Create aggregate dimensions, based on second-order themes with selective coding
- Construct visual data structure out of the concepts, themes, and dimensions
- Use the second-order themes to formulate dynamic relationships among each other
- Transform the static structures into a dynamic model
- Steer development with existing literature

This mode of analysis was deemed most appropriate to conduct this exploratory research, as it adheres to the objective of generating new concepts (Delve & Limpaecher, 2022). Furthermore, it was an iterative process in which the steps happened simultaneously and recursively. The result section, Chapter 4, shows and elaborates on the causal loop model and its relations.

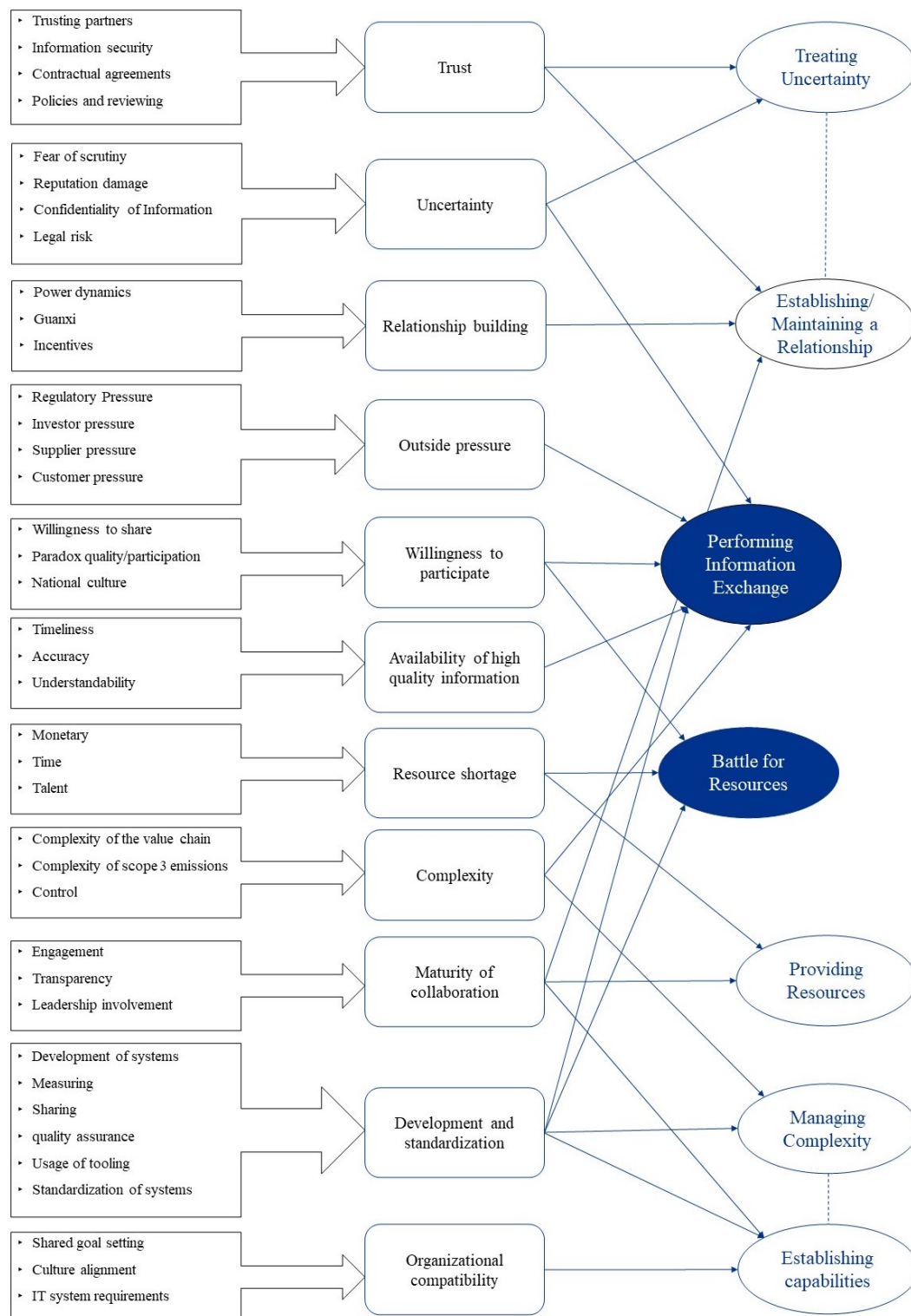


Figure 3.2: Visualization of Data Structure

3.4 Validity and Reliability

Research can only be valid when the results are generated in a justified and reproducible way (Van Aken & Berends, 2018). Therefore, internal validity, external validity, and reliability will be discussed.

Internal Validity Internal validity relates to the relationship between a phenomenon and logical reasoning, as it is expressed as the extent to which research establishes a credible cause-effect relation (R. McDermott, 2011). The results are deemed internally valid when conclusions are complete and justified (Van Aken & Berends, 2018). This research used triangulation between multiple sources, such as company interviews, external interviews, internal KPMG knowledge and reports, academic literature, and external information from desk research to enhance internal validity (Yin, 2009; Carter, 1969). Case selection was done based on relevant variables and circumstances (X and Y-axes described in Chapter 3.1). Both the case and participant selection was done in congruence with KPMG supervision, and based on information availability, which was determined via introduction meetings. Furthermore, an interview protocol was drawn up to ensure uniformity among the different interviews, and at least two interviews were conducted per case to cross-verify the answers given. Additionally, evaluation interviews provided the opportunity to verify if the model was a good representation of the statements given during interview set 1. Nonetheless, since this research is explorative and conducted in a heavily changing environment, it is hard to state with certainty that uncontrollable variables or influences from outside the research do not affect the phenomena under study.

External Validity External validity relates to the generalizability of the research and its results, and focuses on the transferability among different organizations or other geographical areas (Van Aken & Berends, 2018). This research contained five different organizations, which all take a different place on the previously mentioned X and Y-axes, which can be seen as exclusion and inclusion criteria that enhance external validity (Yin, 2009). However, selection bias might be problematic, as only clients of KPMG Netherlands could become part of the research. Furthermore, this research only considered five large organizations. Although these factors could not be avoided in this research, because presently only large organizations have the resources to invest in ESG reporting, it is important to take into account the effect on external validity.

Reliability According to Yin (2009), reliability demonstrates that the operations of a study, such as data gathering procedures and analyses, can be repeated with the same results, in which the potential biases of the researcher or respondents should be avoided. Researcher bias happens when the researcher skews the entire process towards a specific research outcome. This was avoided using an interview protocol, that is based on a systematic literature review with transparent inclusion and exclusion criteria. Further, by strictly following the Gioia et al. (2013) method, researcher bias was minimized. Respondent bias is seen as a general term for a range of tendencies by which respondents answer inaccurately. Especially because of the sensitivity of ESG data, with accompanied greenwashing, respondent bias was critical to avoid. The semi-structured, in-depth interviews provided means to collect extra information, and cross-referencing provided extra accuracy. Furthermore, data triangulation was used (Yin, 2009). However, it would have been valuable to use method triangulation (Yin, 2009), for example through a focus group, which was regrettably not possible due to the anonymity of the research. Other qualitative methods were deemed not appropriate because of the lack to substantiate answers.

4 Findings

This chapter demonstrates the main findings of the research by presenting a causal loop model, based on the data structure provided in Chapter 3.3. The arrows in the model indicate the causal relations between the variables, which can take a positive or negative form, as denoted by the plus or minus symbols. These relations collectively form reinforcing (R) or balancing (B) feedback loops. Furthermore, a substantial delay is indicated by two lines through the causal link.

The model, as depicted in Figure 4.1, distinguishes between the operational state, represented in black, and the prospective state, denoted in blue. The operational state refers to the present condition of the system, and thus explains the current situation of information exchange for scope 3 emissions. The prospective state refers to the desired, future state of the system, suggesting additions and improvements to the operational state. It should be noted that the model is primarily focused on the perspective of a single organization, even though it acknowledges continuous interactions with other organizations. For instance, uncertainty is examined in terms of the uncertainty of a single organization, while relationship building is viewed as this same organization establishing a relation with another organization. The model comprises six feedback loops, consisting of three reinforcing loops and three balancing loops. Taken together, the model provides insight in the various interactions involved in establishing and maintaining inter-organizational information exchange relations for scope 3 emissions.

In section 4.1, the operational state will be explained, consisting of: (1) *R1 - Igniting the Sharing Process*, which denotes how organizations currently gather information for scope 3 reporting; (2) *B1 - Battle for Resources*, addressing the resource shortage that withholds organizations from developing sophisticated systems and processes; and (3) the exogenous effects of uncertainty and complexity. Additionally, in section 4.2, the prospective state will be discussed, which consists out of four additional feedback loops: (1) *B2 - Fueling the Engine*, focusing on how the earlier resource shortage can be resolved; (2) *R3 - Catalyzing Capabilities*, which targets how organizations can develop and exploit capabilities to become able to exchange high-quality information; and lastly, *B2 - Managing Complexity & B3 - Treating Uncertainty*, addressing the goal seeking behaviors for uncertainty and complexity, respectively. A visual representation in the form of a causal loop diagram can be found in Figure 4.1. Thereafter, the leading forces will be explained one by one, supported by illustrative quotes derived from various interviews. Quotes are anonymized, and interviewee identifiers can be found in Table 3.1.

Additionally, Chapter 4.3 provides a comprehensive understanding of the current state of relationship building components: engagement, contracts & trust relations, and leadership involvement. The description of the prospective state in Chapter 4.2 outlined the desired state of these newly introduced components (in comparison to the operational state), but does not cover the current state. To effectively identify the necessary steps for achieving the desired outcome, it is imperative to assess the current status of the relationship building components. Therefore, this section evaluates the gaps between the current state of these elements and the findings of the prospective state.

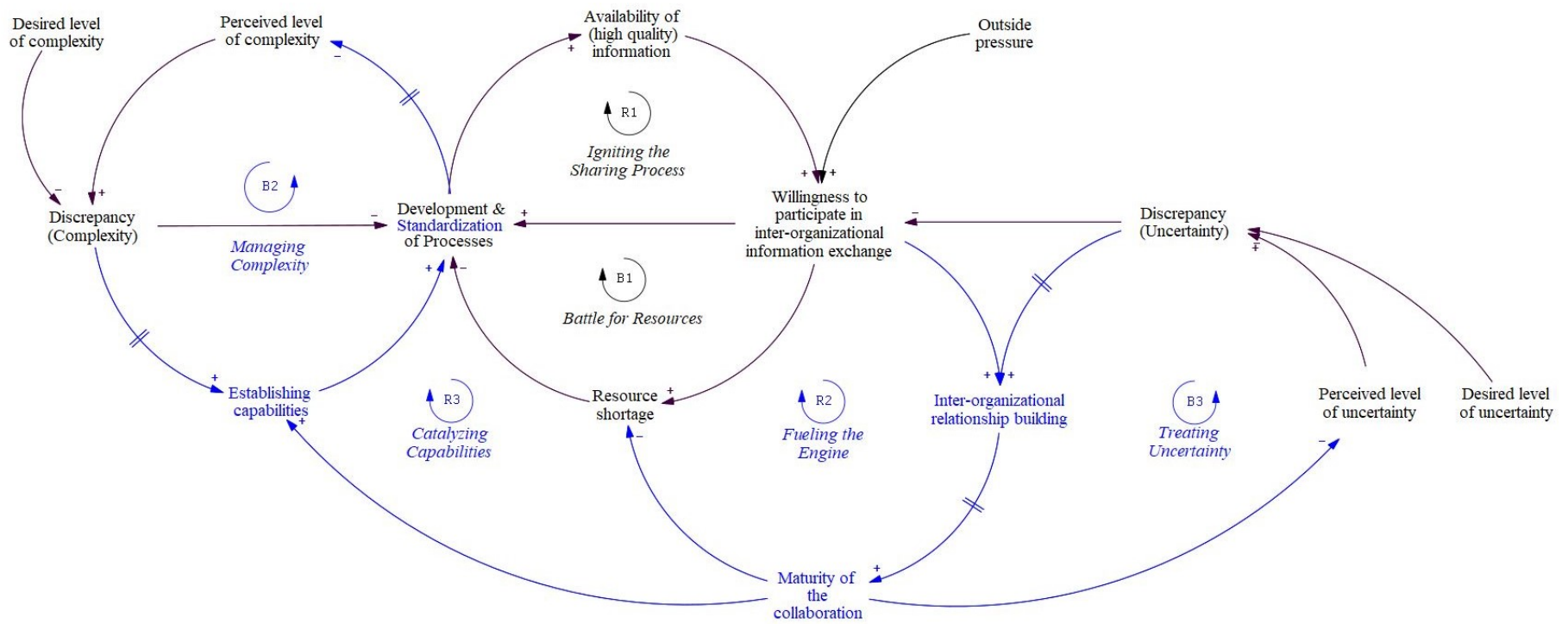


Figure 4.1: Causal Loop Model of Inter-Organizational Information Exchange for Scope 3 Emissions

4.1 Operational State

This chapter addresses the current, operational state of inter-organizational exchange regarding scope 3 emissions. Thereby, it provides an understanding of how organizations are presently encountering information exchange and established a holistic view of the obstacles hindering the process.

4.1.1 Igniting the Sharing Process

As explained in Chapter 1.1, the European Commission enforces organizations to report on their scope 3 emissions with the CSRD. Although the first organizations are required to report as of 2025, this already generates pressure to obtain information that enables scope 3 reporting presently: *“It is not yet mandatory. But it will come in the medium term. So you could say that they [organizations] mainly do it [start reporting] to do good or to be transparent, but actually they just want to be prepared.”* (A1). Furthermore, pressure to obtain this information not only comes from a regulatory perspective, as investors, financial institutions, and customers are increasingly demanding insights in the emission portfolio of organizations as well: *“They [financial institutions] also have a certain position of power. Suppose you work with a bank and you depend on them for your continuity. Then they could say: we want you to be more transparent [about emissions]. [...] You will become subject to minimum requirements for lending and investments”* (E1); *The buyer is always king. [Customer] simply buys the services, thereby also demanding that it [scope 3 information] will be delivered.* (A1). Additionally, since scope 3 emissions inherently come from the wider value chain, as explained in Section 1.1.3, organizations recognize that they should cooperate with their partners to obtain the right information: *“I think that there’s enough pressure out there that everyone wants to join. It’s expected. So I don’t think that anyone doesn’t see the need to work together.”* (E2).

The combination of these pressures form the variable **Outside pressure**, which is seen as the initiating, leading force: the starting point of the CLD in figure 4.1, and the ignition of the sharing process.

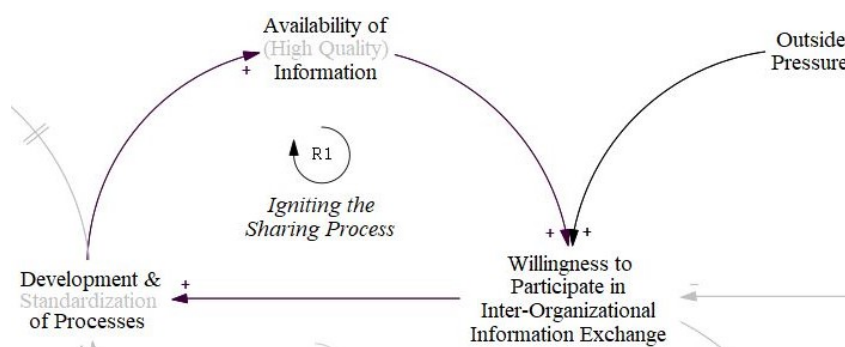


Figure 4.2: Feedback Loop R1: Igniting the Sharing Process

Upon realizing the importance of obtaining information from partners and acknowledging the significance of sharing own information as an integral aspect of business transactions, organizations embark on establishing procedures that (1) enables them to measure own emissions and (2) facilitate information exchange, which is denoted by the variable **Development & Standardization of Processes**. In these initial stages, the exchange

can be considered basic and employs channels such as email or phone calls, coupled with the utilization of Excel spreadsheets, as mentioned by interviewee E1: *“It mostly is Excel sheets that we collect and ask for internally, but some [partners] didn’t even have Excel sheets like I mentioned; they didn’t have their own emission inventories. In many cases it had to be collected manually without a really consistent database.”* Typically, estimations, extrapolations, and global averages are used for information processing. The establishment of these processes and the use of these methodologies are needed because data availability is seen as one of the biggest obstacles currently. *“The first challenge is that often the data is not even available. They don’t calculate the emissions. Many suppliers don’t do that. [...] SCOPE 3 by nature is not directly measurable and companies tend to try to estimate based on what they have.”* (E1). Despite its simplicity, the implementation of these processes is crucial for equipping organizations with the preliminary information necessary for reporting. As these procedures and methods develop, the availability of information, represented by the variable **Availability of Information**, will increase. However, it is important to note that this information is not yet of high quality in terms of accuracy, reliability, completeness and timeliness, as the procedures and methods remain in their early, basic stages.

Nonetheless, the availability of information is expected to have a positive effect on the participation of other organizations due to the demonstration of feasibility and added value, evidenced by the following quotations: *“[...] because the field is still emerging and people will need to wait for other people to take the initiative. And once they do that, most likely big companies, small players will follow.”* (E1); *“It will not be an easy task in the beginning, at least until it rolls out a bit and when it becomes a more regular process.”* (EI3); *“Before, sustainability was very high level, and you could not really do anything about it. But now it is possible to put facts behind it and point at reduction opportunities. [...] This is interesting for business cases that were more fuzzy before, but with these facts behind it, it becomes more tangible [speaking about costs, innovation, carbon tax].”* (C2). Thereby, this first feedback loop illustrates the reinforcing effect between the **Willingness to Participate**, **Development of Processes**, and the **Availability of Information**, which is ignited by exogenous variable **Outside Pressure**.

4.1.2 Battle for Resources

The ambition of information exchange is not without difficulties, as it is confronted with restraints that limit the growth of the first reinforcing loop. The primary obstacle, frequently regarded as the main impediment, refers to resource availability, encompassing monetary resources, time, and talent. EI2: *“For a lot of companies, if it becomes complex, they might not have the resources. Not only talking about money or time, it can very well be the capabilities and skills needed to measure this. There is a real knowledge hunt for talent in companies, to get people that can do this. A lot of companies want to, but they cannot.”* Therefore, it can be concluded that a shortage of resources appears, which is indicated by the variable **Resource Shortage** in Figure 4.3. Monetary resources are often restrained due to the absence of directly noticeable benefits and the lack of financial returns: *“The reason [for not developing more sophisticated methods] is very simple: it costs money and effort, while there is no money in return in the short term.”* (B1). Additionally, time is often not sufficiently available because employees are typically burdened with additional scope 3 reporting responsibilities beyond their regular duties: *“They also*

have a lot of other different, primary roles, so if they have the data every quarter or every month, that's great, but that usually means they are not doing anything with it." (E2). In turn, this shortage of financial resources, time, and talent hinders the development of measuring and sharing processes, as denoted again by variable **Development of Processes**: "So, this is one of the obstacles that you need to overcome; the right resources to be doing the data collection and data estimation and validation." (EI3). Taken together, the balancing loop *B1: Battle for Resources* is formed, as highlighted in Figure 4.3.

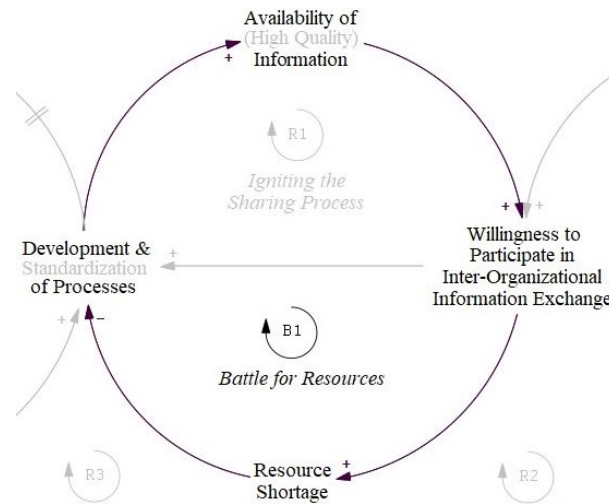


Figure 4.3: Feedback Loop B1: Battle for Resources

4.1.3 The Role of Uncertainty & Complexity

When examining the overall operational state illustrated in Figure 4.4, it is essential to consider two exogenous variables that have adverse impacts: (1) uncertainty and (2) complexity. Uncertainty is represented in the causal loop diagram by a **Discrepancy** variable that is formed between the variables **Desired Level of Uncertainty** and **Perceived Level of Uncertainty**, in which $\text{Desired Level} < \text{Perceived Level}$. The perceived level of uncertainty constitutes on the one hand from the fear of being scrutinized based on shared emission information, which can result in losing business: "I think that some companies believe that if they share the specific data in their own value chain, it might be harmful to their own business relations. If, for example, a company thought that I was more green than I am, and I disclose to them that we are not as green as we want to be, they might find an alternative solution and I lose business." (EI2). Additionally, a fear of general reputation harm exists: "I can imagine that the front runners [organizations that start with sharing emission information] are more at risk. They are the first to say what it [their emissions] really is, and they [the general public] just don't know about [the emissions of] the rest [organizations that do not share]." (B1). The combination of both fears forms the variable **Perceived Level of Uncertainty**. The variable **Desired Level of Uncertainty** is seen as the level of uncertainty that organizations deem acceptable. Once the discrepancy between the perceived level and the desired level exists, a negative effect on the willingness to participate is noticed: "On the one hand, as a company you want to take the leap and put yourself out there and be vulnerable. Show what you are doing. But on the other hand, if you are a big company, and you put yourself out there while making a step in the wrong direction, people are definitely going to pick that up. It can backfire, even if you have good intentions." (EI2); and: "When we ask for the data

of some products, we always get data that is better than the global average. But when we ask for data of products for which we did not receive specific data, they always say that they do not have it yet. I'm pretty sure that's because it's above average. That's cherry picking." (C1). Therefore, a negative effect exists between **Discrepancy (Uncertainty)** and **Willingness to Participate**, as illustrated in Figure 4.4.

Additionally, exogenous variable complexity is represented in the causal loop diagram by a **Discrepancy** variable that is formed between the variables **Desired Level of Complexity** and **Perceived Level of Complexity**, in which again the Desired Level < Perceived Level. The perceived level of complexity consists out of two topics. First, organizations encounter difficulties understanding what scope 3 emissions actually are, and how they have to be measured and accounted for: "There is a huge range of topics, information, and assessment methodologies that you need. So, how to calculate something and judge whether to take it in [reporting] or not? How accurately do you have to do it? I think there is a scope 3 calculation for almost every sector. It's all just very complex.". Secondly, as value chains expand in size, obtaining the necessary information becomes more challenging: "We have some data [...], so we can calculate it [part of the scope 3 inventory], but we don't have for instance anything related to 25,000 suppliers. [...] But if we will really go into collecting that information: understanding the part of the work that they do for us and asking what is the part of carbon that is linked to our operations, that it would be a gigantic work." (D2). Once the discrepancy between the perceived level and desired level exists, a negative effect on the development and standardization of processes is noticed, as it is unclear to a certain degree what should be performed, and how that should be done: "Ideally, in collaboration with suppliers and customers, you want to understand the factors influencing emissions, also the ones of the production processes outside your company. If not, there are ways of finding default emission factors as well, but ideally to calculate the most correct and most precise scope you must understand it." (E2). Therefore, a negative effect exists between **Discrepancy (Complexity)** and **Development of Systems**, as illustrated in Figure 4.4.

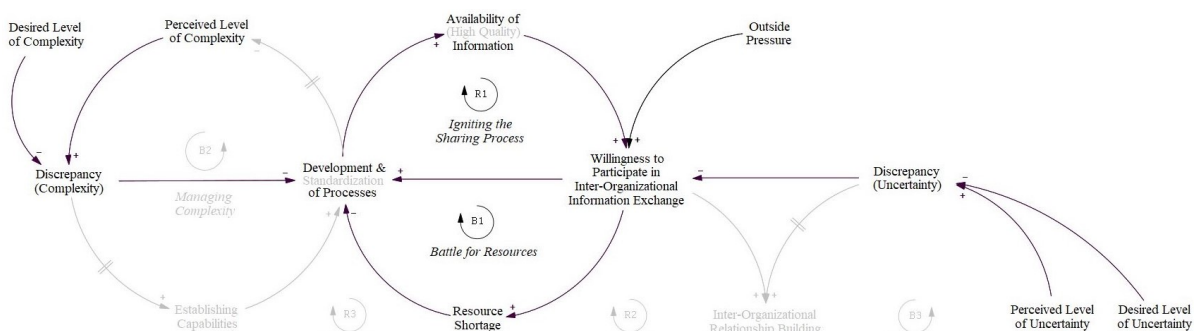


Figure 4.4: Operational state, including exogenous variables Uncertainty & Complexity

Concluding on the present, operational state; organizations start to develop processes to share information because of outside pressure, which is successful to a certain degree. This in turn encourages other organizations to participate as well (R1). However, a resource shortage (B1) and the two exogenous effects of uncertainty and complexity hinder the further development of more advanced methods, systems, and processes. Therefore, oscillating behavior is seen and the state of the system is thus not lifting off.

4.2 Prospective State

This chapter will address the desired, prospective state of inter-organizational exchange regarding scope 3 emissions. Thereby, it provides a dynamic overview of how organizations can effectively manage the challenges delineated in the previous section.

4.2.1 Cultivating a Mature Collaboration

Organizations are increasingly realizing that their efforts in developing methods and procedures have been inadequate in yielding the desired effect of timely availability of high-quality information (see Chapter 1.2). Thus, despite the willingness to participate being present, alternative approaches must be found to address the hindrances of the previous chapters. Many believe that establishing a strong relationship with partners (i.e., suppliers) that fosters transparency is a pivotal, initial step towards acquiring superior quality information, as this approach relies on learning, engagement, and creating bonds beyond financial transactions: *“What I see as the biggest advancement, is really starting the conversation. Make sure you know each other. That will make you have a better relationship. Then you also get a better business relationship. Business is always about give and take, and this way you can build a bond that is invaluable.”* (C1); *“[...] being transparent and honest about the reporting, yeah, it is key. It’s key, and it will be the start[ing] point for building relationships.”* (IE3); *“To really make adjustments, you need to work really close together and need to know the suppliers better. We are very interested in which suppliers cooperate more. [...] That is the transparency that you need.”* (C2).

Consequently, organizations must build their relationship beyond the transactional nature of financial exchange, denoted by variable **Inter-Organizational Relationship Building**. Over time, as indicated by the delay sign in Figure 4.5, building this relationship leads to a high maturity level of the collaboration, represented by the variable **Maturity of Collaboration**. The process of relationship building encompasses two key aspects: fostering engagement and establishing trust. Furthermore, a mature collaboration is characterized by one additional aspect: leadership involvement. All three are believed to be crucial for achieving a mature collaboration regarding information exchange for scope 3 emissions. Therefore, these components are discussed separately in Chapters 4.2.1.1, 4.2.1.2, and 4.2.1.3. **Maturity of Collaboration**, as illustrated in Figure 4.5, is thus the synthesis of the presence of three components: engagement, trust, and involved leadership, whereas **Relationship Building** is the creation of engagement and the establishment of trust. To preserve a clear perspective, these are not individually mentioned in the CLD.



Figure 4.5: Cultivating a Mature Collaboration

4.2.1.1 Engagement Stream

To come to a mature collaboration with regard to information exchange, organizations must create engagement among partners: *“Everyone must be aligned. So yes, supplier engagement is very important, not only to explain how to reduce their emissions but also to measure now.”* (E1). Moreover, not only do organizations want to create engagement, it can reasonably be assumed that engagement will be expected: *“If your ambition is to work towards improvement, then obviously you would expect your value chain to do the same.”* (A2). However, fostering engagement to the goal of information exchange is not self-evident: *“No one is going to just do it [sharing information] for free. But if they have to for some reason: yes, they do. Otherwise, it won’t happen.”* (A1).

Various strategies can be considered for the purpose of engaging partners. First, the utilization of incentive schemes may serve as both initiation for engagement as well as maintaining the involvement of partners within the collaborative process: *“I think incentivizing them through the ways we’ve just mentioned [monetary rewards], would be a very good trigger for them to start doing that [sharing information].”* (E1); *“You create incentives for the ones that are on the journey with you. And then if there are certain partners that are no longer taking the journey with you, then you discontinue completely.”* (D2). Secondly, it is believed that compatibility plays a crucial role in nurturing engagement, distinguishing between technical compatibility and organizational compatibility. Technical compatibility, as further detailed in Chapter 4.2.2, refers to the degree of congruence between the technological infrastructure of an organization. In contrast, organizational compatibility pertains to the extent to which a shared vision, mission, values, and culture are established between organizations, ultimately leading to a harmonious work environment, collective purpose and a mature collaboration. Therefore, shared goal setting with partners can be considered relevant for engagement: *“It is important to share the same ambitions to the same goals. You want everybody that’s more connected to your organization to grow in the same way, [...] and you are dependent on whoever is in your value chain to realize your goals as well. So I think it is good to have the transparent open conversation with each other and make sure that you align on this. That’s unprecedented, but it is something we’ll need to work towards to.”* (A2). Additionally, or perhaps rather in line with, the alignment of culture is expected to have an influence as well: *“Work culture plays a big role. You already see some easy collaborating [for sharing scope 3 information]. That is the work culture [open, proactive] behind it.”* (C2).

In conclusion, creating engagement is an essential part of **Relationship Building**, and the presence of engagement pertains to **Maturity of Collaboration**. Furthermore, from the validation interviews it was learned that engagement programs are already being deployed, which seem to have positive effects: *“We have supplier engagement targets and customer engagement targets available [about sharing scope 3 information] for precisely the reason that some companies just aren’t as advanced as we want. [...] So the best possible thing would be to get them on board. Get their emission quantification mature, and then work on decarbonization.”* (E2-2). Furthermore, incentivization does not only have to be monetary, as the validation interviews also pointed out that relational value can be an equally important incentive: *“An improved relationship with your supplier cannot really be expressed in monetary terms. Many people in the circular economy say that it is of great value if you know your partners better and what they want. Long-term relationships and therefore a more constant flow of income, sales, or costs.”* (B1-2).

4.2.1.2 Trust Stream

Besides engagement, another integral component of **Relationship Building** is establishing a foundation of trust, where trust is seen as the belief in the reliability, truth, or ability of the partner organization. With regard to information exchange for scope 3 emissions, it can be heavily debated if there should be a focus on contractual trust or relational trust, i.e., whether the emphasis should be on legally binding contracts or whether the partner should be trusted to honor agreements based on the relationship. On the one hand, contracts are part of all business relationships: *“The companies that I work with have completely watertight contracts. In the corporate business world, hardly anything is left to chance.”* (B1). However, in the heavily changing field of information exchange for scope 3 emissions, contracts might not be fitting: *Things are also continuously developing, which is very hard to capture in a contract. I do not know how things will develop from a legal perspective, but from a trust perspective it is important to realize that not every company can transition at the same pace.* (EI2). Therefore, a trusting relationship will be needed to sustain the collaboration: *“I think that for good sustainable business, it will always be good to have trust, where companies share information because ultimately the whole value chain wants to improve. I think that the spirit for change is in the end much more valuable and sustainable. And then I don’t mean sustainable from a green perspective, but that it can continue. That’s much more important than to put things in black and white and enforce to do it. It does go hand in hand, however.”* (EI2). Hence, written contracts must definitely be used, but should not be considered indispensable or undoubtedly applicable. Besides, in the context of contracts, one should also have confidence in the partner organization’s ability to effectively fulfill the responsibilities mandated by the agreement, particularly when monitoring is challenging, as is with data quality: *“Maybe it has to be both. You need to start off with a contract and need to be clear on that you are going to share this data and that it’s expected that they will do so too. But you also probably need the role of trust to have reliable data, complete data, and accurate data.”* (D2). Therefore, trust, contracts, and the reputation regarding the two will be an integral part of relationship building, as indicated by interviewee A1: *“If you do something that harms trust, you’ll go to the end of the relationship very quickly. [...] Trust is therefore one thing, but a track record of the past says more.”*

In conclusion, relational trust and contractual trust will both be needed for the information exchange. Contracts will provide the legal basis for the exchange, whereas relational trust will guarantee compliance. Furthermore, trust will add to the safekeeping and delivery of high-quality information. Therefore, creating trust and establishing contracts is an essential part of **Relationship Building**, whereas having both contractual and relational trust pertains to **Maturity of Collaboration**.

4.2.1.3 Leadership Stream & Fueling the Engine

Involved leadership constitutes the third and final aspect of the variable **Maturity of Collaboration**. In particular, the strategic direction established by management is believed to be an initiating force of the collaboration: *“Strategy is the starting point, and that is usually a top-down approach. You have a 5-year plan, 10-year plan [...] and that’s where it starts.”* (A2). Furthermore, strategy has to be put into practice, which addresses the operational influence of management in a mature collaboration. In the first place, this is about providing operational guidance: *“So, definitely operations and management are interrelated. Operations I would say is more the actual work and management would more be about how to execute the plan. Operations is active in all the different layers of a*

company, but the tone is set at the top.” (EI2). Secondly, management is able to provide the much-needed resources to actually execute the strategy: *“In that sense, it [what information to share] is always driven by management and above. How many resources and time you have for this also depends on the management.”* (A1). Thus, for a collaboration to be successful and mature, leadership must be involved.

Therefore, also concluding on the previous chapters, it can be stated that **Maturity of Collaboration** is the synthesis of engagement, trust and leadership involvement, stressing the interrelatedness of these concepts. For example, it was found that incentivizing partners, shared goal setting, and establishing mutual culture are interesting strategies for engagement, whereas management has to be involved to actually perform these tasks. Additionally, trust and engagement seem to go hand in hand as well, as interviewee EI2 mentioned that you have to trust the *spirit for change* (engagement) of partners. Or, that it was found that a balance must be found between contractual and relational trust, which is often a strategic decision set by management. Through the combination and interrelation of these components, **Maturity of Collaboration** is believed to be able to address the **Resource Shortage** highlighted in Section 4.3. This results in the formation of reinforcing loop *R2: Fueling the Engine*, as illustrated in Figure 4.6. Nonetheless, it should be acknowledged that it is unlikely that resource scarcity will fully disappear, as new processes for information exchange will consistently require additional resources in terms of money, time, and talent, especially because new requirements are expected in the long term: *“You need a lot of resources to invest to set it up. But you also need resources to maintain and improve your reporting. Every time, additional requirements come on top.”* (C2).

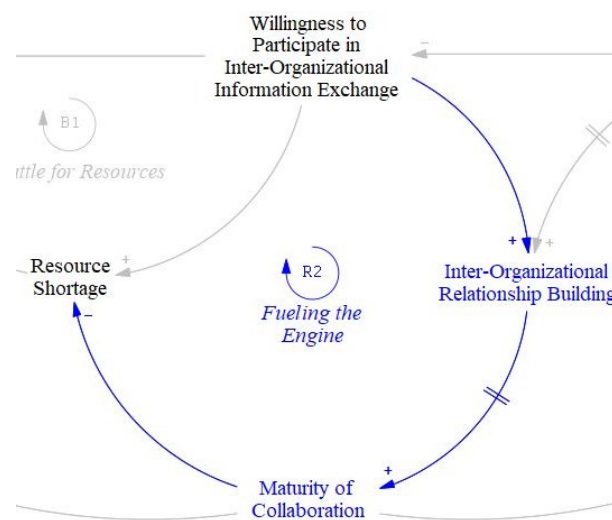


Figure 4.6: Feedback Loop R2: Fueling the Engine

Additionally, it was learned from the validation interviews that the strategic direction established by management should be effectively communicated to the employees tasked with facilitating the sharing process. This communication serves a dual purpose; firstly, providing explicit guidance on what information should be shared offers clarity for employees. Secondly, the effective transmission of goals and motivations is expected to add to a shared understanding and alignment among employees towards the collaborative effort: *“I think it generally starts negatively with the employees themselves. It is unclear*

whether they can share it [information regarding scope 3]. Then management has a positive influence that says: 'We're just going to share this.' But this only happens if that is also communicated very clearly, that we have this data and can share it. [...] Then that has a very positive flow and people dare to share it too." (C1-2).

4.2.2 Catalyzing Capabilities

Reaching a mature collaboration also represents a key milestone for the further development of processes that provide high-quality information, which is much needed, as indicated in Chapter 4.2. The present, rudimentary processes for measurement and sharing practices are believed to evolve into sophisticated, standardized systems through the establishment of specific capabilities, which can only be developed in a mature collaboration. This is represented in Figure 4.7 by the variables: **Maturity of Collaboration**, **Establishing Capabilities**, and **Development & Standardization of Processes**.

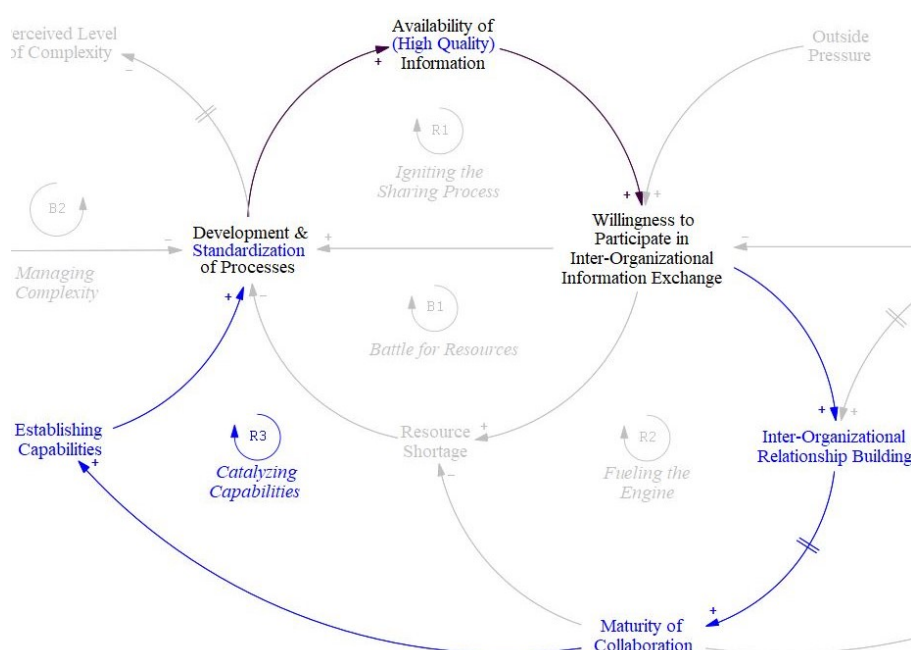


Figure 4.7: Feedback Loop R3: Catalyzing Capabilities

First, capability building regarding the alignment of functions and obligations results in the increased consistency of gathering, calculation, and exchange processes: “We should be clear on roles and responsibilities: who’s going to gather the data and how it’s going to be calculated?” (E1). Nonetheless, as denoted by interviewee EI3, this alignment will require comprehensive collaboration: “[...] for each supplier you need to do some capacity building, to explain to them what data you need and in which form and on which terms.” This will become especially important since it was noticed that numerous organizations have developed their own techniques for measuring and calculating scope 3 emissions: “They will do it in their own way, another way [than ours]. It’s hard to compare the one to the other. You don’t have enough information on the method [or] the way they have calculated or quantified their scope 3 [emissions].” (A2). The maturity of collaboration is expected to enable an understanding about each other’s methodologies, while simultaneously allowing the organizations to agree upon and refine their joint methods, contributing to the continued development and standardization of processes via these

established capabilities: *“So I hope that in time there will come a homogeneous way of measurement and reporting. [...] You need standards. Then you have a more measurable and reliable band of expectations.”* (EI2). Thus, in the first place, **Establishing Capabilities** primarily focuses on (1) the alignment of roles and responsibilities, and (2) a thorough understanding of each other’s methodologies regarding the measurement and calculation of emissions. Furthermore, an advanced understanding of each other’s methodology, embedded in a mature collaboration in which partners are engaged and can be trusted, enables the partnership to focus on technical compatibility, as indicated by interviewee E1: *“Digitization is very important here. [...] Set up a platform with everything in it for the GHG missions. Upload it into the cloud so they [partners] can just access this; that it can go to any relevant company. [...] You will need a process to set the flow of data to feed into this platform, basically.”* Therefore, understanding each other’s abilities and needs regarding technological infrastructure and information technology is seen as the third essential **capability**.

Ultimately, these capabilities are closely linked to the harmonization and standardization of systems and processes, which is deemed essential for scaling up reporting efforts in terms of quantity, quality, and timeliness: *“It is about actually getting the data right and showing the exact progress instead of just some punky punky numbers.”* (E1); *“Quality will only go up if the way of working, and reporting, has been listed and there is a proved way. So to copy is easier. There is a higher probability that companies will jump on the bandwagon if there is a way how it should be done, and that it can be done.”* (EI2). To be more specific, the development and standardization of systems and processes through the established capabilities will lead to a higher level of quality in terms of improved accuracy, completeness, and timeliness. This is denoted in Figure 4.7 by the variables **Establishing Capabilities**, **Development & Standardization of Process**, and **Availability of (High Quality) Information**. As interviewee B2 points out, proper measurement is the foundation of quality: *“It’s the old ‘trash in, trash out’ saying: you need them all to be measuring their emissions consistently.”* Moreover, interviewee A1 highlights the role of standardization and tooling in ensuring information quality: *“With certain tooling that simply works on the basis of APIs [application programming interfaces], yes then you have much better accuracy and the timeliness also improves. That is the solution.”* (A1). Finally, interviewee EI3 discusses the importance of partner collaboration in achieving completeness: *“In most cases you need to contact the supplier and explain to him what do you need specifically and then verify again when you get the data. [...] That secures your completeness.”* (EI3).

In conclusion, within a mature collaboration, organizations are expected to make agreements on roles and responsibilities within the process. Furthermore, they become knowledgeable about each other’s methodologies, which increases understandability. Both can be accompanied with technical compatibility, enabling the development and standardization of sophisticated processes. This in turn increases the availability of the information, in which the information is also of higher quality. Thereby, *R3: Catalyzing Capabilities* is formed, and, in comparison to R1, the **standardization** of processes and the **high quality** of information enabled.

Additionally, the validation interviews yielded two significant insights. Firstly, if each organization is going to create its own scope 3 information sharing systems, the result may be sub-optimal due to potential incompatibilities. Therefore, the emphasis should be on homogeneous measurement standards and the understandability of methods, and not on sharing systems specifically, as it is expected that global organizational management systems or ERP extensions from firms such as SAP, Oracle, or Salesforce are going to offer sharing capabilities through their tools, which have already been integrated into the majority of organizations: *“In terms of tools, a lot of the traditional reporting companies such as SAP, Salesforce and Oracle are all developing new software packages within their existing tools to eventually help organizations comply.”* (EI2-2). Furthermore, it was learned that it might be beneficial to embrace a certain degree of uncertainty in the data, focused on the accuracy level that is expected, especially because of the limited availability of resources: *“There is just a lot of uncertainty in that data. I think we should also embrace that a little more together. What degree of specificity should we aim for? It might save a lot of time and effort if you do it a little less specific.”* (B1-2).

4.2.3 Managing Complexity

Where the previous chapter discussed how a mature collaboration empowers organizations to build essential capabilities, thereby facilitating the development of sophisticated systems and processes, it did not explain the rationale behind taking such action. As highlighted in Chapter 4.1.3, complexity negatively affects the development and standardization of processes. Organizations are increasingly acknowledging the need for specialized capabilities in order to effectively navigate and mitigate these adverse effects: *“If you look at the value chain of certain companies, that can be very complex, [...] that holds back their development. So, you would say that you need some kind of capability building with your customers so that you can tweak your own models or your own development, so that you have the right information.”* (EI2-2). Therefore, it can be concluded that the focus on capabilities must be seen as a corrective action to overcome complexity. This is denoted in Figure 4.8 by the positive relation between the variable **Discrepancy (Complexity)** and **Establishing Capabilities**, which in turn positively relates to the **Development & Standardization of Processes**.

Although Scope 3 emissions remain intrinsically complex, the perceived complexity is anticipated to be reduced through the development and standardization of processes, particularly in the long term. This reduction can be attributed to a learning effect that occurs over time: *Understanding the full scope of our emissions profile is quite difficult, and it takes time, and you can’t necessarily do it in a couple of months. [...] Scope 3 quantification is such that maybe you take a first run one year, but then you continue making it better and refining it over a couple of years when you understand it better.* (E2). Additionally, the specific tooling that will become available through the development of these processes by other organizations, will create a more user-friendly way of dealing with scope 3 emissions, which also reduces the perceived level of complexity: *I think more tooling will become available. You would think that people would start building models in which it really becomes plug-and-play. For example, [a different model] per industry. Steps are now being taken in that direction. So I expect it to become simpler in time.* (A1). Thus, over time, the **Development & Standardization of Processes** results in a lower **Perceived Level of Complexity**. Thereby, the last feedback loop is

formed; *B2: Managing Complexity*. The goal-seeking behavior performed in this loop is able to minimize the negative effects of complexity on the development of systems and processes. Furthermore, this loop also shows that organizations that perceive high levels of complexity should increasingly focus on establishing specific capabilities (see Chapter 4.2.2).

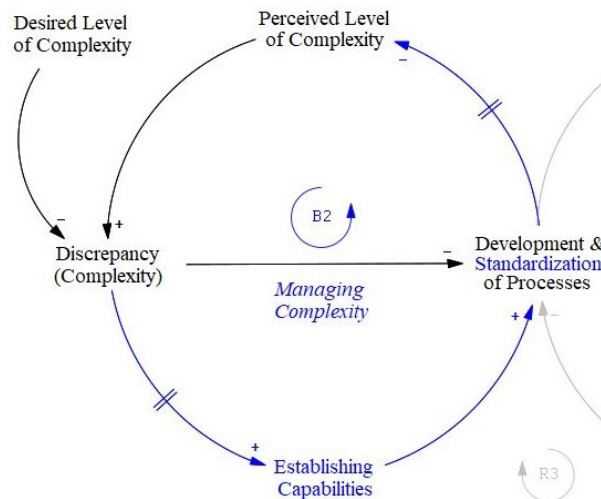


Figure 4.8: Feedback Loop B2: Managing Complexity

4.2.4 Treating Uncertainty

Uncertainty, comprised out of the fear of being scrutinized and concerns about general reputation harm, negatively influences the willingness of organizations to participate in information sharing, as described in section 4.1.3. Despite this, it is believed that cultivating relationships can mitigate the perceived uncertainty, particularly by establishing trust and fostering engagement from both parties in the collaboration. Concerning supplier scrutiny, organizations recognize that information exchange for scope 3 emissions is a continuously improving area, requiring partners to collaborate and afford each other the opportunity to progress. As such, perceived uncertainty may be reduced through committed relationship-building efforts: *“Often we are working in a very competitive field, but sustainability should be a different mindset: we are sitting in the same boat. We know it is not easy. But we need to start somewhere. Even if it is bad now, we need to look ahead to a point where it is better in the future.”* (C2); *“When the definitions are still not mature and things like supply chains, scopes, and materiality are not completely harmonized. Then we will be comparing different things, so I think it’s really important to clarify concepts and not immediately punish, or that a lot of these actors don’t jump the gun in taking conclusions when you know we still don’t have a full harmonization.”* (D2). Furthermore, the mature, trusting relationship enables organizations to discuss their partnership and collaborative strategies without experiencing undue uncertainty: *“I also think that if you set your boundaries clear and have internal controls in place, a proper governance structure, checks and balances, you can lower the risk.”* (EI2).

Therefore, goal-seeking behavior regarding the minimization of uncertainty can be identified. As is seen in Figure 4.9, a **Discrepancy** between the **Perceived Level of Uncertainty** and the **Desired level of Uncertainty** results over time in a corrective action: **Relationship Building**. In turn, the eventual **Maturity of Collaboration**

leads to lower levels of perceived uncertainty. In conjunction, feedback loop *B3: Treating Uncertainty* is formed, by which the negative effects of uncertainty on the willingness to participate can be minimized. Furthermore, from this feedback loop, it can also be learned that organizations with higher levels of perceived uncertainty, and thus likely also a higher discrepancy, require more relationship building to overcome this uncertainty.

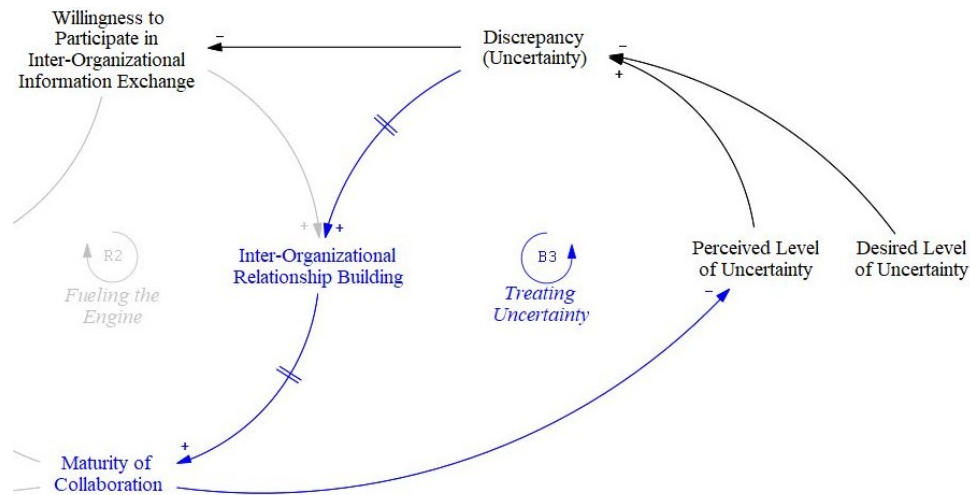


Figure 4.9: Feedback Loop B3: Treating Uncertainty

4.3 Status of Progression

The operational and prospective state can be seen as current and desired states. As such, the prospective state fully delineates the desired outcome for each topic. Nevertheless, the current state is only known for the variables discussed in the operational state. Thus, to develop a comprehensive understanding of what should be done, it is imperative to determine the present status of the desired components, which are the collaboration-components: engagement, including incentives; the interplay between contractual and trust-based relations; and leadership involvement. This section provides an overview of the current state of these aspects, accompanied with an examination of the gaps between this current state and the findings of the prospective state.

Engagement

Engagement of actors in the information exchange process, including the measurement of own information and the development and standardization of sharing processes, is considered an essential and integral part among all stakeholders, as can be concluded from Chapter 4.2.1.1. Currently, it is often explored by organizations if engagement among partners is present, or if it can possibly be created. Alternatively, other steps have to be considered: *“I think in general, engagement is the first step. And then if engagement is not as much as you want, then you will tend to look to change up suppliers.”* (B2). However, this is not the preferred method, as explained by interviewee C2: *“Even if it is bad now, we need to look ahead to a point where it is better in the future. We want to send that message. We also don’t want to limit our suppliers to a small amount.”* Therefore, to reach the desired situation of involvement and engagement, Chapter 4.2.1.1 described several strategies for fostering engagement, such as: (monetary) incentivization, shared goal setting, and establishing a sustainability culture.

To come to the desired level of engagement through incentivization, three methods can be considered. Incentivization can first be executed in the relational way, as enduring relationships are invaluable, especially looking ahead to rougher times economically: *“Customer and supplier relations. That also helps you more in times when things get worse. So you could say that you become more resilient as a company towards the future.”* (B1). Furthermore, a combination of relational and monetary incentives is possible: *“For example, you can look at awarding [a tender] based on price. But you can also think of a performance ladder based on [sharing] emissions. If you are high on that ladder, you will receive an advantage, a discount on your offer.”* (D1-2). Lastly, incentivization can be purely financial, as some organizations might not want to spend **or** have the amount of resources needed to perform the information exchange. With a premium or discount, it can become feasible: *“Is the extra, let’s say, €50,000 and determining your emissions data and stuff worth the business that you’re gonna get from the company. I don’t know. There’s obviously calculations that happen on that end.”* (E2-2); *“Of course, the multinational has resources [available] that can help [to] improve others, to achieve their own [of the multinational] objectives. So let’s see together how that can be done.”* (B1).

Additionally, it was learned from Chapter 4.2.1.1 that shared goal setting, compatible values, and eventually a culture of sustainability are positively associated with engagement. Currently, specific, shared goal setting is not being applied. However, general goals or values are agreed upon through, for example, the Sustainable Development Goals (SDGs) of the United Nations or the Paris Agreement: *“A large part of the goals are kind of pre-determined by the SDGs or Paris Agreement.”* (EI2-2). Therefore, in terms of coming to shared values and sustainability culture, it is suggested that organizations have a conversation about how they want to align on for example the SDG’s or give meaning to the Paris Agreement: *“I think a lot of companies, especially those that signed the Paris Agreement, they already have a central goal. It’s more how you get to that goal that they should be aligned on.”* (EI2-2). Furthermore, specific goal setting, and thus alignment, can become part of the negotiation process for newly formed business relations, according to interviewee A1-2: *“Perhaps as part of negotiations [...] but then mainly for new business relations. Yes, then I see a negotiable situation.”*

In conclusion, organizations are currently already recognizing the importance of engagement among partners. Nonetheless, detailed strategies are not being implemented yet. As such, a variety of techniques for incentivizing and negotiating goals can be employed to achieve this desired outcome.

Contracts & Trust Relations

Chapter 4.2.1.2 emphasized the importance of trust and contracts in setting up enduring relationships. It also recognized that both contracts and a trusting relationship are needed to establish and maintain the information exchange. Currently, organizations mostly cooperate based on the trusting relation they have, especially because of the dynamic nature of scope 3 emissions, as mentioned by interviewee (C1-2) *“In the beginning it is trust. You sit down together, and you say: ‘This is what we want. These are our requirements. Can you work on this?’ You make a plan. There is no other way.”* However, it is expected that over time contracts will obtain a dominant role in setting up these exchanges: *“When things become clear, I can imagine that you want to make it*

watertight. In the beginning, that is hard, especially with a new party you are working with. Still, I do think that you are still trying to contractually agree with each other." (D1-2). Thus, it can be concluded that indeed both contractual trust and relational trust are needed. However, the dynamics between the two change dependent on the stage of the collaboration and the development of scope 3 reporting. Out of necessity, most organizations start off with mainly trusting relations, accompanied with contracts such as NDAs to protect their information. However, as the characteristics and dynamics of the exchanges become clear, more contracts are expected to be signed. Nonetheless, as also explained in chapter 4.2.1.2, even when a desired state is reached in which contracts seem fitting, one must still be able to trust the partner organization to actually perform the duties of the contract. Therefore, trust will remain a part of every exchange.

Obtaining external assurance, such as from audit companies like KPMG, can be a crucial, initial step toward building trust, as it offers a means to evaluate the reliability of the partner organization: *"Basically what you have is that the supplier has to have an external audit on their data in order to provide it. So for instance, we could say: we want to know your emissions for this product, and we also need some kind of external validation assurance report that says that we can rely on it. And I think ultimately that's the direction it's gotta go."* (B2). Moreover, also in relation to engagement, trust can be strengthened through shared goal setting, which then requires living up to those collective agreements: *"I think it's nicer to share information with a company that has a similar vision, the same goals. [...] You expect them to deliver. Trust plays a major role in this."* (C1). Finally, in a mature stage of the relationship, surpassing expectations in areas such as information quality or delivery frequency can further enhance the trusting relationship: *"So for instance, before you start, you set up your minimum requirements. [...] And then as it goes you keep raising the ambitions. And then the suppliers will understand and also keep building up the process. That will be appreciated."* (EI3).

Leadership Involvement

From the results of section 4.2.1.3, it was learned that leadership involvement will be required on both a strategic as well as operational level. Strategically, management is already involved in multiple sustainability processes, including reporting: *"They have like a brainstorming group or a sparring group where you will see sustainability managers from different companies or maybe the head of sustainability. They will have some discussions."* (EI2). However, as was also learned from section 4.1.2, resources are not yet being provided. Therefore, operationally, not much participation is seen: *I don't think top management is really involved, right. It's more the sustainability department and procurement departments. They can provide direction, but top management will rarely be involved in the details of how to set up this process."* (E2). Therefore, it can be concluded that the strategic intent of leadership still should be made operational by providing resources and guidance on operations to bridge the gap with the prospective state.

Attention should be paid specifically to using resources for the right purposes, not just limited to monetary funds, but also encompassing time and talent, as it was learned from section 4.1.2 that these three are currently missing. To address this issue operationally, training programs that equip employees with skills and knowledge for effective measurement and information exchange can be considered, or hiring new personnel or external consultants: *"In terms of knowledge, I guess it's going to be either getting more skilled*

people or hiring an external consultant, which all require investment, right?” (E2-2). Additionally, it is crucial to ensure that responsible individuals have adequate time allocated to fulfill their responsibilities, rather than treating it as an additional duty, which was also learned from Chapter 4.1.2. Furthermore, as mentioned earlier, management should provide guidance to what information can be shared. This way, employees have a clear task, which stimulates the effective exchange of the right information. All three actions are seen as the operational responsibility of management. Strategically, it is essential that management keeps engaging partners, as it is believed that they have the most power to do so: “Maybe even the CEO will have conversations with the CEO of other companies. I can imagine that we enter into that conversation with the large suppliers that we have. They will then make agreements directly from CEO to CEO. If those two can make an agreement, then it will happen.” (C1-2).

5 Discussion and Conclusion

This study was performed to investigate how organizations can deal with the pressing demand for comprehensive sustainability reporting regarding scope 3 emissions, in which the availability of high-quality data through the development of sharing practices was the main objective. In this highly explorative field, an inductive, multiple case study approach was used to research multiple phenomena that influence the inter-organizational information exchange of that much-needed information. The model developed through causal loop modeling (Figure 4.1) firstly provides insights into the present, operational state of information exchange for scope 3 emissions. Thereby, it also delineated the current obstacles and illustrates the osculating behavior of the system. Furthermore, a future, prospective state is suggested to overcome the obstacles of the operational state, in which special attention is given to the role of engagement, trust, and leadership involvement. These findings provide valuable insights into both theory and practice, which will be explained in Chapters 5.1 and 5.2 respectively.

5.1 Theoretical Implications

Many topics related to information exchange addressed in this research have been profoundly investigated by other scholars in varying fields, including for example the role of trust (Sayogo, Gil-Garcia, Cronemberger, & Widagdo, 2017; Y.-H. Chen et al., 2014; Mihok & Frank, 2007; Gil-Garcia & Sayogo, 2016), resources and rewards (Cheng, 2011b; Gharawi & Dawes, 2010; Pardo et al., 2007; Zhang & Dawes, 2006), and organizational compatibility (Sarkar, Echambadi, Cavusgil, & Aulakh, 2001; Dyer & Nobeoka, 2000; Qi et al., 2021). Nonetheless, according to Park (2021), the exchange of sustainability information for reporting purposes is relatively new and not much put into practice. Even when it is researched, it is mostly focused on the contents of the reports, i.e., by Krivačić (2017), or the effect on environmental performance, i.e., by Meacham, Toms, Green, and Bhadauria (2013), and not the establishment and maintenance of the sharing process. More specifically, the term scope 3 emissions, as part of sustainability information, was first introduced in 2004 by the Greenhouse Gas Protocol. However, widespread adoption and recognition pended, and it only became more widely known from the Paris Agreement of 2015. To the best of the researcher's knowledge, inter-organizational information exchange in relation to scope 3 emissions has not been researched before. This is simultaneously surprising and interesting, since information exchange is a vital aspect of acquiring the right information on one's scope 3 portfolio. Furthermore, this particular instance of information exchange is highly complex, as it touches on some delicate subjects that have to do with information exchange in general, such as the sensitivity of data, willingness to share, and compatibility to perform the exchange. Additionally, by using a systems thinking approach (Sterman, 2000), this research not only contributes to theory by addressing the empirical context of scope 3 emissions, but also provides a comprehensive framework, and thereby a holistic view, of the interdependencies in inter-organizational collaboration for scope 3 emissions reporting. To summarize, this research holistically studies the interrelations between well-known concepts related to information exchange in the new empirical setting of scope 3 emissions. Thereby, interesting insights were found that add to existing literature. Therefore, the following sections discuss (1) the holistic view of obstacles for scope 3 information exchange, (2) the essence of cultivating a mature collaboration, and (3) the effects of regulatory frameworks.

5.1.1 Establishing a Holistic View of Obstacles

As mentioned, causal loop modeling was first used to come to an understanding of the current state of information exchange regarding scope 3 emissions. More specifically, and in relation to the research questions, it had to be understood what was currently preventing the development of systems and processes to share information and thus obtain high-quality information. First, as denoted in the results by feedback loop *B1: Battle for Resources*, a resource shortage is obstructing the development of processes, and is even mentioned as the main impediment. Resources in that sense have to be seen not only as financial resources but in terms of available time and talent as well. This is in line with findings by Yang and Maxwell (2011), Gil-Garcia and Sayogo (2016), and Gharawi and Dawes (2010) who argue that the limited availability of resources, covering technical expertise and financial resources, is one of the main determinants of failure for information exchange. However, they do not explicitly address time as a resource. Consequently, it is worth considering the inclusion of time as an additional resource that can impact the success of information exchange, particularly in the context of scope 3 reporting. Secondly, complexity in terms of value chain complexity and inherent complexity of scope 3 emissions reporting was found to have a negative effect on the establishment of information exchange, especially because it hinders the development of systems and processes to perform the exchange. This finding answers the call of Gharawi and Dawes (2010) to incorporate complexity in an integrated network for information exchange. Additionally, Bharosa, Lee, and Janssen (2010) found that complexity results in skepticism among stakeholders and that it therefore forms a major obstacle to the sharing process. The research by Bharosa et al. (2010) was performed in the empirical setting of disaster response management, which has striking similarities with the case of scope 3 emissions, as both are believed to happen in a dynamic environment in which transparency of multiple parties is required. Although both researches find a negative effect of complexity on information exchange, the underlying mechanisms seem to be different, to Bharosa et al. (2010) focus on skepticism among stakeholders, while this research is focused on understandability among stakeholders, and thereby the development of systems and procedures. The third and final obstacle that was found in relation to information exchange for scope 3 emissions is uncertainty. In this context, uncertainty is comprised of the fear of being scrutinized as a partner or suffering general reputation harm to the public. The reluctance to share information because of potential harm to the organization has been a well-observed phenomenon in supply chain literature for over two decades (i.e. Mason-Jones and Towill (1997)). Thus, it is consistent with previous research that uncertainty negatively impacts the willingness to share. Additionally, since sustainability information is often considered highly sensitive (Zimon, Arianpoor, & Salehi, 2022), perceived uncertainty is expected to have exerted an even greater influence in the context of this study.

Although these obstacles were all previously identified as having a negative impact on information exchange by other studies, it is noteworthy to observe their effects on scope 3 emissions as well. Moreover, this research offers insights into how resource availability, complexity, and uncertainty collectively influence information exchange, whereas most other studies primarily focus on a single aspect, of which Gharawi and Dawes (2010) and Yang and Maxwell (2011) are notable exceptions. Yet, no study has yet addressed all three factors concurrently. This adds to our understanding of their potential compound-

ing effects or interdependencies. For instance, resource scarcity and complexity may both individually and collectively hinder the development of information exchange processes. As a result, addressing one obstacle might not necessarily lead to the development of processes: if an organization continues to invest in resources but fails to manage high levels of complexity, the development of information exchange processes could still be impeded. A holistic perspective therefore facilitates the evaluation of trade-offs among these factors. When organizations need to address these obstacles but face (resource) limitations, understanding their interdependencies becomes crucial. Therefore, these findings provide an interesting foundation for studying decision-making behavior of organizations, considering the potential synergies or conflicts between different factors. This is also highlighted by the fact this research demonstrates that a mature collaboration serves as the foundation for all three obstacles, thereby directing decision-making behavior in organizations and considering the potential synergies or conflicts between different factors. The theoretical implications of this mature collaboration as the focal point of the proposed solution will be further explored in the next chapter (5.1.2).

Additionally, literature identifies numerous other potential barriers to information exchange, such as for example organizational boundaries (Staber, 2004), lack of IT systems (Sanderson et al., 2015), and culture (Yang & Maxwell, 2011). Nevertheless, this research's holistic perspective reveals that in the context of scope 3 emissions, resource scarcity, complexity, and uncertainty should be regarded as the primary obstacles, as other issues can be considered consequences of these barriers, or part thereof.

5.1.2 The Essence of Cultivating a Mature Collaboration

By incorporating the prospective state into the model, this research was able to provide a solution to the aforementioned obstacles. Feedback loop *R2: Fueling the Engine* addresses the resource shortage, *B3: Treating Uncertainty*, treats the perceived uncertainty by organizations, and *R3: Catalyzing Capabilities & B2: Managing complexity* focus on perceived complexity. Interestingly, all these solutions start with cultivating a mature collaboration with information partners, which entails the stimulus of engagement, building of trust, and the involvement of leadership. Therefore, this research adds to literature by providing a comprehensive understanding of the three different components of a mature collaboration and shows its joint, positive effects. This could have meaningful implications for other industries, contexts, or literature streams that face similar challenges, such as supply chain management, health care, and innovation/R&D. I.e; Whipple and Russell (2007); Korst, Aydin, Signer, and Fink (2011); V. R. Santos, Soares, and Carvalho (2012). Additionally, not only conjointly this research on mature collaborations has its implications. Separately, engagement, trust, and leadership involvement have been researched extensively. This research shows that in the new empirical setting of scope 3 emissions reporting, previous findings by literature can be underscored:

Following the principal-agent theory (Jensen & Meckling, 1976), an asymmetrical information distribution occurs for scope 3 emissions, for which engagement is needed to overcome problems caused by this asymmetry. Furthermore, Lehtinen and Aaltonen (2020) advocate for dynamism-based engagement as the preferred approach, which entails primarily the maintenance of relationships. This is thus in line with the emphasis of this research on partner engagement and relationship building. Secondly, the research

emphasizes the importance of trust in inter-organizational collaboration. Trust has long been recognized as a critical factor in successful alliances and partnerships, as it enables parties to share sensitive information and make joint decisions (Özer & Zheng, 2017). Therefore, our findings align with the relational view of information exchange. Additionally, our results show the interplay between the complementary roles of contractual and relational governance mechanisms, which underscores the findings by Vandaele et al. (2007). Third, the research found that the involvement of leadership is essential because of its ability to create strategy, provide much-needed resources, and give guidance on the sharing process. This relates to the existing concepts of executive involvement, formal authority, and informal leadership (Gil-Garcia et al., 2007; Sayogo et al., 2016).

Lastly, the whole concept of coming to a mature collaboration for scope 3 information exchange seems to relate heavily to the theory of social capital. However, as mentioned by Bizzi (2015), scholars have converging opinions about what the concept captures. Does it reflect the social relations, their value, or the resources? Therefore, three conceptualizations are currently used (Bizzi, 2015). This research understates the conceptualization by Nahapiet and Ghoshal (1998) who see the social capital as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships”, in which resources in the context of this research have to be seen as high-quality information about the scope 3 portfolio.

5.1.3 Regulatory Frameworks as an Incentive for Information Exchange

Chapter 4.2 highlights the initiation of the sharing processes, which originates from the external pressure of multiple stakeholders. As the root cause of these pressures can be traced back to the CSRD, this legislative framework can be seen as the driving force for information exchange related to scope 3 emissions. Traditionally, according to the knowledge-based view, organizations engage in information exchange to obtain scarce resources and gain a competitive advantage (De Carolis, 2002). Additionally, supply chain literature shows organizations engaging in information exchange to lower costs or improve efficiency (Ramayah & Omar, 2010). Thus, organizations typically participate in information exchange for their own (financial) gain. However, regulatory frameworks are now successfully stimulating organizations to participate in information exchange from an environmental perspective. Therefore, regulatory pressure must be added to literature as a driving force for information exchange, besides the traditional motives of gaining competitive advantage: obtaining scarce resources, reducing costs, and improving efficiency.

Nonetheless, it is important to recognize that regulatory pressure alone cannot address the obstacles to successful information exchange. A mature collaboration is required to overcome these challenges, as detailed in previous chapters. While regulatory pressure can act as a key incentive for organizations to engage in information exchange, it is essential for the organization’s behavior to change holistically to ensure successful information exchange. Therefore, regulatory frameworks must solely be seen as an incentive, and not as an enabler, as the research highlights that organizations are more likely to collaborate with other actors in their value chain to gather and share information on scope 3 emissions under regulatory pressure. This insight, while specifically relevant to scope 3 emission reporting, may also be applicable to other environmental issues. By emphasizing the crucial role of regulatory pressure in driving information exchange, it contributes

to the theoretical understanding of organizational behavior and decision-making in the context of environmental sustainability. Furthermore, it underscores the importance of policy interventions and regulatory frameworks in shaping organizational responses to environmental challenges.

5.2 Practical Contributions & Managerial Implications

The findings have important implications for those already involved and those who will become involved in inter-organizational information exchange for scope 3 emissions in the (near) future. By adopting a dynamic perspective on information exchange, the study offers understanding and valuable insights into the challenges organizations currently face and provides guidance on specific actions to address them. The research demonstrates that the existing system is not evolving toward a sophisticated state that would facilitate the availability of high-quality information. Therefore, these findings also serve as a wake-up call for managers, urging them to acknowledge the issues they encounter concerning information availability. As illustrated in Chapter 4.2, current processes may provide some information on the scope 3 portfolio, but the quality is often unsatisfactory in terms of accuracy, completeness, and timeliness. Moreover, the study highlights the inherent complexity of scope 3 emission reporting and its dependence on the value chain. This emphasizes the need for organizations to recognize that tailored solutions are essential for addressing these challenges. Therefore, the key takeaways will be focused on solution directions that practitioners can tailor to their specific case and organizations, to overcome the main obstacles: uncertainty, complexity, and resource scarcity. As was learned from Chapters 4.2.1 and 4.3, organizations should primarily and most importantly emphasize the establishment of a mature collaboration through relationship building. More specifically, and following the results of Chapters 4.2.1.1, 4.2.1.2, and 4.2.1.3, organizations should come to this desired, mature collaboration by focusing on engagement, trust and leadership involvement, after which capabilities can be developed.

Engagement is crucial from all perspectives, as both measurement and sharing processes are necessary. Therefore, various strategies can be employed to engage partners. First, the provision of incentive schemes, rewards, or premiums provides a meaningful way to engage partners (Müller & Gaudig, 2011). Three forms related to this research can be considered: (1) relational incentives, which prioritize strengthening future relationships; (2) financial incentives, such as providing resources; or (3) a combination of relational and financial incentives, through, for example, rewarding tenders. Furthermore, according to Holmström (1979), incentives play a significant role in overcoming information asymmetry in the principal-agent theory (see Chapter 2.4.1), thereby enhancing information quality. Secondly, a shared vision, mission, values, and culture regarding sustainability should be established between organizations, ultimately leading to a harmonious work environment, collective purpose, and a mature collaboration. Many organizations adhere to the SDG of the UN or the Paris Agreement, which provides a starting point for the conversation. Following the findings of Chapter 4.2.1.1, organizations should try to align on how they want to give meaning to these agreements and translate that to more specific goals. These goals and strategies not only foster engagement but also establish a culture of sustainability within the collaboration (Galpin et al., 2015) (see Chapter 2.3.3).

Trust in a relation extends beyond the typical financial interaction, encompassing not only the reliability but also the ability of the partner. This research shows the necessity of both contracts and relational trust, as contracts are an integral part of any business relationship but are hard to maintain in the highly dynamic and developing environment of scope 3 emissions reporting. Additionally, regarding ability, organizations must also be trusted to possess the necessary skills to perform the required tasks. Nonetheless, the distribution between contractual and relational value is expected to change over time. In the beginning, when clarity is lacking, relational trust is crucial. Contracts can be introduced as the situation becomes clearer. Furthermore, it is worth noting that the confidentiality of information can be addressed in contracts from the outset.

In conclusion, contracts will provide the legal basis for the exchange, whereas trust will guarantee compliance, safekeeping, and the delivery of high-quality information. Thereby, the three important components of trust in an inter-organizational setting are addressed: contractual trust, competence trust, and goodwill trust (Sako, 2006) (See Chapter 2.4.4). Furthermore, Lewicki et al. (1996) identified three steps in the development of trust: calculus-based trust, knowledge-based trust, and identification-based trust. Calculus-based trust involves a conditional bond formed through mutual benefit, in which it is important to be able to assess the trustworthiness of a partner. As was learned from chapter 4.3, external assurance can offer a means to evaluate the reliability of the partner organization, and thereby form calculus-based trust. Furthermore, knowledge-based trust emphasizes shared goals and emotional connection. Within the context of this research, mutual goal setting and a compatible culture that strives for sustainability were found to be interesting for maintaining the information exchange. Therefore, these are recommended as the next step in building a trusting relationship. Lastly, identification-based trust centers on unconditional, value-added information exchange, reflecting the maturity of an organizational relationship. Therefore, it is believed that surpassing expectations in areas such as information quality or delivery frequency can further enhance the trusting relationship.

Eventually, this trusting relation, as part of the mature collaboration, will reduce the perceived uncertainty that organizations might experience (J. Harris & Zaheer, 2006), thereby increasing their willingness to share. Within the relation, it is important to recognize that partner organizations might have a fear of being scrutinized, worrying about losing business due to sharing scope 3 information. Additionally, the fear of general reputation harm should be prevented. One approach to alleviate these fears is by aggregating results in reports in a non-identifiable manner, safeguarding the reputation of the organizations involved.

Leadership Involvement is deemed essential from both a strategic as well as an operational perspective. Strategically, management is expected to define the goals of the exchange and support the relational engagement processes mentioned earlier. Furthermore, it is the task of management to make resources available and alleviate the resource shortage, addressing financial resources, time, and talent. Lastly, operational guidance should be provided regarding what is allowed to be shared specifically, as unclarity in that regard will undermine the sharing process. Thereby, management performs all three essential tasks regarding inter-organizational information exchange: Executive involvement, formal authority, and informal leadership (Sayogo et al., 2016; Gil-Garcia et al., 2007), as explained in chapter 2.3.2.

Capabilities that enable organizations to develop and standardize measuring and sharing processes have to be established as well. Organizations tend to start with this at the very start of their scope 3 journey. However, initiating these efforts at the beginning may prove inefficient or even impossible, as the development of such capabilities requires specific knowledge and should be carried out in congruence with partners. Therefore, building these capabilities should be done after, or partly simultaneous with, relationship building. As was learned from Chapter 4.2.2, organizations should first align on specific roles and responsibilities regarding the measurement and exchange processes. This is believed to mitigate the negative effect of organizational boundaries and enhance engagement among partners as well (see Chapter 2.3.1). Furthermore, according to Hocevar et al. (2011), structural flexibility is required, that allows for adaption in moments of change, including the willingness to adjust procedures to facilitate coordination, and response to the requirements of the other organizations. Secondly, understanding the diverse measuring and calculation methodologies used by partner organizations is essential, as these differences hinder comparison, aggregation, and accurate reporting. This understanding paves the way for the eventual adoption of joint methodologies. Furthermore, establishing these capabilities is believed to enable the development and standardization of processes for the measurement and exchange of scope 3 information. Nonetheless, prioritizing homogeneous measurement standards and methodological clarity is of greater importance than concentrating solely on exchange systems. The reason behind this is the anticipated availability of sharing capabilities offered by global organizational management systems or ERP extensions from companies like SAP, Oracle, or Salesforce. These tools eliminate the need for organizations to create their own scope 3 information sharing systems, allowing them to focus on establishing compatible and understandable methods. In addition, the enhanced insight and understanding stemming from this development are believed to reduce the perceived complexity, which was previously identified as one of the main obstacles. Therefore, organizations that perceive a (very) high level of complexity, are increasingly required to focus on capability building. Lastly, it may be beneficial to embrace a certain degree of uncertainty in the information, focusing on the expected accuracy level, particularly due to limited resource availability.

5.3 Limitations & Future Research

Besides the significant contribution to both theory and practice, the thesis has its limits that must be acknowledged, which will be explained in this chapter. Furthermore, directions for future research will be presented.

The data for this research were collected from five individual cases, for which participation was voluntary. Given the relatively upcoming nature of scope 3 emission reporting, it's reasonable to assume that the organizations involved had a higher-than-average level of interest. Additionally, since the research was conducted in congruence with KPMG, the cases had to be selected based on their relationship with KPMG. This combination might have caused a selection bias. Moreover, the limited timeline of the research prevented the researcher from following the organizations for an extended period. Therefore, the prospective state, as discussed in section 4.2, is based on answers to hypothetical questions. Given the exploratory nature of the research and the early stages of scope 3 reporting for organizations, where information exchange is considered very basic, a spe-

cific within-case and between-case analysis was not deemed feasible or applicable. As the situation of scope 3 reporting develops and matures, future researchers are encouraged to reevaluate or succeed the findings with a variety of organizations and explore differences based on factors such as, for example, industry and size. Furthermore, a future, longitudinal case study approach, following organizations over time, would provide valuable insights into the dynamics of scope 3 emission reporting and the evolution of information exchange, instead of focusing solely on hypothetical questions. Additionally, testing the proposed model in other empirical settings, including organizations headquartered outside the Netherlands, would be valuable. Different countries and cultures may have varying approaches to information sharing, as outlined in chapter 2.5.3, which could influence the findings. Therefore, by testing the model in different settings and at different times, the generalizability can be enhanced. Furthermore, a sensitivity bias might have occurred within the answers of the interviewees, especially because sustainability is such a delicate topic. Although it was communicated clearly that the research would be anonymized, it is still expected that in some instances socially desirable answers were given. This was mitigated by triangulation through interviews with external experts, internal documentation, and KPMG supervision.

Additionally, the causal loop model may be subject to simplification or categorization to make it understandable and insightful, as the complexity and evolution of scope 3 emission reporting made it challenging to be fully captured in a model. Therefore, once again, researchers are kindly invited to use other methodologies to research the phenomenon of inter-organizational information exchange for scope 3 emission reporting. For example, as a more far-reaching future work, a game-theoretical approach to information exchange for scope 3 emissions could be considered, as demonstrated by Demirezen, Kumar, and Sen (2016) in the healthcare sector, as this could provide deeper insights into the complex interactions and considerations of organizations when sharing or withholding information for potential rewards.

Lastly, this study highlights the role of policy interventions and regulatory frameworks in shaping organizational responses to environmental challenges. However, this also serves as a call for further examination of regulatory pressure's impact on transparency, accountability, and collaboration in addressing scope 3 emissions and other pressing environmental concerns.

5.4 Concluding Remarks

In conclusion, this study really ventured *beyond the buzzword* by taking a deep dive into the world of scope 3 emissions reporting under the CSRD. While scope 3 emission reporting remains a notoriously hard operation to execute for organizations, this research set out to take an initial step towards providing a solution through information exchange. By adopting a dynamic perspective, insight could be provided into the complexities and interdependencies characterizing inter-organizational information exchange for scope 3 emissions. An operational state that reflects the current state of the system was established, illustrating the present-day reality of information exchange for scope 3 emissions, including its acquainted obstacles. Furthermore, a prospective state was introduced, outlining the desired future state of the system, thereby suggesting additions and improvements to the operational state. By establishing this holistic view of information exchange for scope 3 emissions, this research aimed to find an answer to the following research question: *In what way can a reporting entity organize information exchange in its value chain, to facilitate CSRD reporting regarding scope 3 emissions in an accurate, reliable, complete, and timely manner?*

Initially, it was found crucial to recognize the (interdependencies of) obstacles to information exchange for scope 3 emissions: resource scarcity, complexity, and uncertainty. These obstacles impede the development of effective processes for measuring and sharing information, limit organizations' ability to collaborate, and restrain their willingness to participate in the collaborative process. Acknowledging these challenges is essential for organizations to develop sophisticated systems and processes that facilitate the measurement and sharing of information — a vital second step. This development relies heavily on building specific capabilities with partners, both in a technological and organizational sense. Nonetheless, these capabilities can only be established in a mature collaboration. Therefore, this research has demonstrated that the success of information exchange is not solely dependent on the exchange of information itself or the processes involved. Instead, success largely hinges on establishing and maintaining a mature, trusting, engaged collaboration, in which leadership involvement plays a key role. Simultaneously addressing these factors allows organizations to tackle the multidimensional nature of the challenges, ensuring that their collaborative efforts are cohesive and effective. Ultimately, this will lead to overcoming obstacles and developing systems and processes for measurement and sharing purposes, which together are believed to enable reporting entities to obtain high-quality information.

On a concluding note, it was learned that in the quest for solutions that tackle the complex, dynamic, and diverse problems of information exchange, it is often forgotten that cooperation and conversation can alleviate, if not solve, most of our problems. As the research has demonstrated, such cooperation is an indispensable first step. By providing these initial insights, the researcher hopes to lay the groundwork for more in-depth research that will further refine and expand upon the strategies and tools necessary for effective scope 3 emissions reporting. Ultimately, this study emphasizes the importance of fostering a cooperative spirit and transparent dialogue among organizations. By working together, we can collectively surmount the barriers to high-quality scope 3 emissions reporting, and contribute to the global effort towards a more sustainable future.

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Appendix A: Systematic Literature Review Protocol

This chapter explains the methodology that was used and the protocol that was followed to conduct the systematic literature review.

Characteristics of Review

The review was conducted systematically, meaning that the aim was to provide a complete overview of all studies and findings addressing the research topic (Nightingale, 2009). Furthermore, the three principles of clarity, validity, and auditability were considered during the review by strictly following the three phases of this protocol: (1) explorative reading; (2) the systematic review; and (3) the synthesis, of which the methodology is individually and thoroughly explained in Chapters 2.2-2.4. Thereby, objectivity and reproducibility were enhanced (Kitchenham & Charters, 2007).

Furthermore, this protocol addresses the applicability of the research questions and distinguishes between search strategies and selection strategies within the systematic literature review. Therefore, the following phases can be determined:

1. Phase 1: Explorative Reading
2. Phase 2: Systematic Literature Review
 - (a) Phase 2.1 Search Strategies
 - (b) Phase 2.2 Selection Strategies
3. Phase 3: Synthesis of Results

Taking into account the newness and complexity of ESG reporting standards, explorative reading (phase 1) was necessary before the actual systematic review could take place, to get a clearer understanding of the subject, the scope, and search terms. Multiple fields provided an interesting perspective on the subject, such as for example network governance literature, information exchange literature and supply chain literature. Explorative reading added to the knowledge regarding search terms and strategies that were necessary in phase 2: the systematic literature review. During the review, an analysis of a large body of literature took place, to gain insights in the research outcomes, methods and (un)successful practices. Moreover, this enabled the researcher to address the research questions. Lastly, the results were synthesized in phase 3. A graphical overview of the process can be seen in Figure 5.1

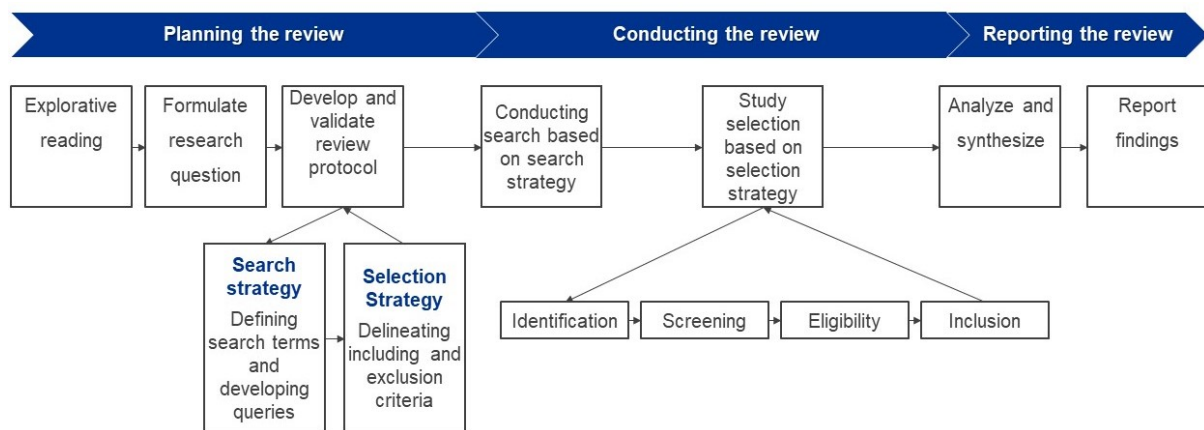


Figure 5.1: Overview of Systematic Literature Review

Phase 1: Explorative Reading

Explorative reading was necessary to get a thorough understanding on a multitude of topics that were relevant to this research, which were:

- Sustainability agenda of the EU
- Exposure drafts regarding the new CSRD implementation
- Information sharing in the value chain
- Supporting mechanisms of information sharing between organizations

The sustainability agenda of the EU and exposure drafts of CSRD were researched by means of official EU documents that are published on their website. Information sharing in the value chain and supporting mechanisms were searched on Google Scholar, and snowballing was used to get a more thorough understanding of the topic and associated themes. Search terms that were used are: ‘network governance’, ‘information exchange value chain’, ‘information partnering supply chain’, and ‘information alliances’. Relevant articles were summarized and information obtained was used as input for the (search terms of the) systematic review.

Phase 2: Systematic Literature Review

In the second phase, the systematic literature review itself was conducted, to answer the research questions and as a background piece for the further study (thesis). The review consisted out of three major stages: (1) planning the review; (2) conducting the review; and (3) reporting the review (see Figure 5.1) (Kitchenham & Charters, 2007; Brereton, Kitchenham, Budgen, Turner, & Khalil, 2007). Furthermore, the detailed outline by Xiao and Watson (2019) was used as a basis for this review, that includes the following topics: the purpose of the study; research questions; inclusion criteria; search strategies; quality assessment criteria and screening procedures; strategies for data extraction; synthesis; and reporting. The planning stage of the review consisted of explorative reading, research question development and the establishment of the review protocol, which combined both a search- and selection strategy. Based on the guide by Xiao and Watson (2019), the search strategy included: the channels for literature search; keywords; sampling strategy; additional restrictions; and a stopping rule. Furthermore, the selection strategy included: identification; screening; eligibility; and inclusion. Both strategies are elaborated upon in Chapter 2.3.1 and 2.3.2 respectively.

Search Strategy

The search strategy is the result of the combination of keyword selection and appropriate search channels.

Keywords In order to formulate the appropriate search query for the research, synonyms and variants of the keywords were identified. This was done partly by existing literature, and additional synonyms and variants were created using Thesaurus. An overview of the keywords, the synonyms, and variants can be found in Table 5.1. While selecting keywords, it was important to find balance between the degree of precision and exhaustiveness. However, at this early stage of the review, being exhaustive was more important than being precise (Wanden-Berghe & Sanz-Valero, 2012). Therefore, a wider variety of keywords was chosen. The selection strategy, discussed in Chapter 2.3.2, specified the research.

Type 1	Type 2	Type 3	Type 4	Type 5
Inter	Organization Business Firm	Information Knowledge	Transfer Sharing Exchange Partnering Governance	Value Chain Supply Chain

Table 5.1: Keywords Search Query

Based on the above-mentioned keywords, the following query was drawn up:

*(“Inter”) AND ((“Organization”) OR (“Business”) OR (“Firm”)) AND
((“Knowledge”) OR (“Information”)) AND ((“Transfer”) OR (“Sharing”) OR
 (“Exchange”) OR (“Partnering”) OR (“Governance”)) AND ((“Value Chain”) OR
 (“Supply Chain”))*

Total amount of queries: 60

Search Channels As no database includes a complete set of all published materials, different databases that are available to TU Eindhoven students were checked for eligibility, which were: ScienceDirect, Scopus, ProQuest, WebofScience, Scholar, JSTOR, CORE and LibrarySearch. Eventually, two electronic databases, Scopus and WebofScience, were chosen. The combination of these databases provided the researcher with an adequate view of existing knowledge about the topic. A trade-off was made between ScienceDirect and Scopus, in which Scopus was chosen because of its extensiveness and interdisciplinary field coverage. Furthermore, WebofScience was included because of its high influence coverage (Iowa State University, 2022).

Database	Number of Results
Scopus	426
WebofScience	246

Table 5.2: Electronic Databases and results for Query

Selection Strategy

By completing the search strategy in the pre-defined databases, a list of articles was determined. This is seen as the **Identification** step, as mentioned by Xiao and Watson (2019). During step 2; **Screening**, the articles were first assessed on practical inclusion and exclusion criteria such as publication language and date range of publication (see Table 5.3) (Okoli & Schabram, 2010). Furthermore, these inclusion and exclusion criteria were based on the research questions (Kitchenham & Charters, 2007). The term *focused on an adequate region* refers to the requirement that articles address a region suitable for relatively complex inter-organizational information exchange. Therefore, developing countries were not taken into account. Furthermore, an overview of relevant business domains is provided in Table 5.4 and 5.5 in Appendix A2.

Inclusion Criteria	Exclusion Criteria
Article is written in English	Article does not address pre-defined terms
Article is peer-reviewed	Article has been retracted
Full text version available	Results of article are ungrounded
Article published after 2010	Not focused on adequate industry/region
Article in business domain	

Table 5.3: Inclusion and Exclusion Criteria

After the selection, results were compared and checked on uniqueness. As a last screening step, the applicability was determined by means of the title and abstract (Brereton et al., 2007). When in doubt, an inclusive approach was taken, and thus the articles were included for further selection, which is in line with Okoli and Schabram (2010). In Figure 5.2, reasons for exclusion are recorded, accompanied with the amount of articles after each step. The complete and screened list was checked for eligibility in step three with a full text review. The quality assessment ensured that studies were similar in methodological quality and that results are grounded. Reasons for exclusion are again reported on to prevent a selection bias (Suri & Clarke, 2009). As for the stopping rule, the rule of thumb by Levy and Ellis (2006) was used, in which is stated that the search can stop when no new information is found that adds to the understanding of the predefined topic. Finally, the full, residual list was checked by means of forward and backwards search, in which it was checked if there were major contributors in the list that might have interesting

publications that are not included. Furthermore, the forward search focused on articles that have since cited the articles reviewed (Xiao & Watson, 2019). This is seen as the **Inclusion** step.

Identification	Articles identified through database search Scopus (n=426) Web of Science (n=246)	
Screening	Articles screened inclusion and exclusion criteria. Scopus (n=195) Web of Science (n=144) Unique articles identified through database search (n=255) Articles identified through abstract screening (n=73)	Reasons for Exclusion 1. Not in English <i>Scopus (n=7), WoS (n=0)</i> 2. Before 2010 <i>Scopus (n=126), WoS (n=67)</i> 3. Not peer reviewed <i>Scopus (n=94), WoS (n=29)</i> 4. Not in business domain <i>Scopus (n=4), WoS (n=6)</i> Reasons for Exclusion 1. Article not unique <i>n = 84</i> Reasons for Exclusion 1. Focused on internal collaboration 2. Not applicable form of info sharing 3. Etc. Total excluded = 182
Eligibility	Full articles assessed for eligibility (n=33)	Reasons for Exclusion 1. Too focused on ERP 2. Too focused on supply chain integration 3. Etc. Total excluded = 40
Inclusion	Articles included (n=33)	

Figure 5.2: Four steps of review, based on Xiao & Watson (2019)

Phase 3: Synthesis of Learnings

All insights of phase one and two are combined in the different subchapters of the review, which follows a clear structure that ties studies into key themes, characteristics, or subgroups (Rowley & Slack, 2004). Snowballing was used next to the forward and backwards search to add relevant articles to the review. All reviewed articles are summarized and a comprehensive description of the results is given in chapter ??.

Appendix A1: Overview Applicable Business Domains

Applicable business domains are determined on the possible information gain for the search in relation to the research questions. Table 5.4 provides the overview for the business domains in Scopus, where Table 5.5 provides the business domains that were applicable on the Web of Science library.

Business Domain	Included Yes/No	#Papers
<i>Scopus</i>		
Business Management and Accounting	Yes	136
Computer science	Yes	64
Decision Sciences	Yes	63
Engineering	Yes	59
Social Sciences	Yes	45
Economics	Yes	31
Environment science	Yes	14
Energy	Yes	11
Mathematics	No	8
Arts and humanities	No	4
Psychology	No	3
Veterinary	No	3
Agricultural and biological	No	2
Chemical	No	1

Table 5.4: Overview of Business Domains Scopus

See next page for the overview of Web of Science results.

Business Domain	Included Yes/No	#Papers
<i>Web of Science</i>		
Management	Yes	70
Business	Yes	37
Operations Research Management Science	Yes	28
Engineering Industrial	Yes	27
Engineering Manufacturing	Yes	20
Information Science Library Science	Yes	17
Computer Science Interdisciplinary Applications	Yes	8
Economics	Yes	8
Environmental Sciences	Yes	8
Green Sustainable Science Technology	Yes	8
Computer Science Information Systems	Yes	7
Environmental Studies	Yes	6
Engineering Civil	No	4
Business Finance	Yes	3
Development Studies	No	3
Engineering Multidisciplinary	Yes	3
Transportation	Yes	3
Transportation Science Technology	Yes	3
Computer Science Artificial Intelligence	Yes	2
Construction Building Technology	No	2
Engineering Environmental	Yes	2
Geography	No	2
Agricultural Economics Policy	No	1
Chemistry Multidisciplinary	No	1
Engineering Electrical Electronic	Yes	1
Food Science Technology	No	1
Geosciences Multidisciplinary	No	1
International Relations	No	1
Materials Science Multidisciplinary	No	1
Materials Science Paper Wood	Yes	1
Multidisciplinary Sciences	Yes	1
Physics Applied	No	1
Political Science	No	1
Psychology Experimental	No	1
Psychology Multidisciplinary	No	1
Regional Urban Planning	No	1
Telecommunications	Yes	1
Urban Studies	No	1

Table 5.5: Overview of Business Domains Web of Science

Appendix B1: Interview Guide 1

Overview and indication of time

Introduction

Purpose — Introducing interviewee and establish, in an official way, that the interviewee has a thorough understanding of the topics to sufficiently answer questions regarding the study, thereby endorsing the validity and reliability of the study.

Approximate duration: 5 minutes

Present Situation

Purpose — To create a general understanding of (the extent of) Scope 3 emissions in the context of the specific case. Similarities and differences can be detected between the varying activities organizations undertake. In addition, motivations to start reporting on Scope 3 emissions, and why organizations are currently (not) reporting are discussed. Finally, a starting position in terms of reporting of every organization is established, to create an equal ground for comparison.

Approximate duration: 30 minutes

Information Sharing

Purpose — To develop an overall impression of how organizations think about the concept of information sharing with partners in their value chain. This highlights both the positive and negative sides, and provides answers on how certain situations would be dealt with. Whereas the previous chapter still focused on outlining a general, current situation, this chapter is more forward-looking and focused on information sharing specifically. Furthermore, some potentially influential factors are discussed, such as; willingness to share; power distance; commitment and trust.

Approximate duration: 30 minutes

Information Flow & Information System

Purpose — Interpretation of how an information collaboration should work, focused on the practical component. This is done by means of the data quality characteristics discussed in the “Present Situation” chapter, in a set-up that distinguishes between information product and information service.

Approximate duration: 15 minutes

Impact

Purpose — In the Problem Analysis chapter, two main flows can be determined: internal and external information flow. This part of the interview focuses on the impact of an information sharing system on both of these flows, as well as the organization as a whole.

Approximate duration: 10 minutes

1. Intro

Researcher provides general overview and implications of the research

Researcher stresses anonymity of the interview

1.1 Could you introduce yourself, explain your role in [organization] and how this is aligned with ESG/CSRD/Scope 3?

1.2 Do you have any further experience with ESG/CSRD/Scope3 outside [organization]?

2. Current Situation at [Organization]

2.1 What is meant by Scope 3 within [organization]?

2.2 Which part of Scope 3 is especially important and applicable for [organization]?

- See 15 Scope 3 categories. Appendix E.

2.3 Besides the fact that the CSRD, and thus Scope 3 reporting, becomes mandatory in the coming years, are there any other motivations for [organization] to report on Scope 3 emissions?

2.4 Often, Scope 3 reporting is seen as one of the bigger obstacles of the CSRD. Is this also true for [organization]?

If yes; which specific obstacles complicate reporting?

If no; which obstacles had to be overcome in the past to come to the current reporting level?

2.5 Scope 3 reporting is often twofold: (1) acquiring the (right) information, and (2) translating all received information in reporting.

2.5.1 Can you explain how the needed information is currently acquired?

2.5.2 Can you explain how the acquired information is transformed into reporting?

2.6 The quality of Scope 3 data is often determined by means of a few data quality characteristics. Could you evaluate the current situation regarding Scope 3 reporting at [organization] through the following characteristics:

- **Completeness of data**

o Is the acquired data complete and are all relevant subjects included? Does the data provide the full picture of reality and are important/material subject not excluded?

- **Timeliness**: the extent to which data is available at the moment it is needed, and simultaneously up to date with all available knowledge.

- **Accuracy and reliability**: error-free records that can be used as a reliable source of information.

o What is the effect of double counting in the current reporting system?

- **Validity**: Do [organization] and possible partners make use of exchangeable formats?

2.7 Do you have anything to add or do you want to reflect on some critical aspects we missed in relation to current Scope 3 reporting at [organization]?

3. Information Sharing

The Green House Gas Protocol broadly describes four methods for arriving at a representation of Scope 3 emissions. The “Supplier-specific method” is seen as the most difficult, but most complete and correct variant: “Collect product-level cradle-to-gate GHG inventory data from goods or services suppliers.” This method thus requires data from the entire value chain, which must be obtained through mutual information sharing. The following questions will deal with sharing Scope 3 emissions data in the value chain.

Motivation and Obstacles Information Sharing

Researcher explains that the following questions are hypothetical and stresses that it is important to speak one's mind.

3.1 Risks

3.1.1 If any, which risks do arise for [organization] by sharing Scope 3 data with partners in the value chain?

3.1.1.1 How do those risks influence the practice of (fully) sharing data with partners?

3.1.1.2 How can those risks be mitigated?

3.1.1.3 Are these risks the same and/or equal for every partner in the value chain?

If yes; does this also entail that the willingness to share information is the same for every partner in the chain?

If no; why and how are risks different for specific partners in the value chain?

3.2 Antecedents

3.2.1 In relation to those risks, what is the role of trust in sharing Scope 3 data with partners in the value chain?

3.2.1.1 Could the lack of (full) trust also be contractually accommodated?

If yes; could you highlight the most important aspects that should be included in the contract?

If not; why can't this not be put in a contract?

3.2.2 How does (work)culture influence information sharing and the choice between contractual or trust agreements?

3.2.3 What is the influence of management by setting up an information sharing system?

3.2.4 Does the whole process then either work Top down, Bottom up or both?

3.2.5 What effects, and why, does power distance between organizations have on information sharing?

3.2.5.1 What is the effect on quality if you exert power?

3.3 Proceeding the Cooperation

3.3.1 Which organizational aspects with regard to objectives and a common vision does [organization] expect from a possible partner in order to proceed with information sharing? What do they consider when choosing new partners?

3.3.2 What incentives can different organizations in the value chain have to participate in information sharing? What is their project payoff?

3.3.2.1 What other ways exist to keep organizations involved, besides guaranteeing a certain project payoff?

3.3.2.2 Not every organization in a value chain is subject to the CSRD, and is therefore not obliged to participate in information sharing. How can these organizations be stimulated to share information?

3.3.3 Do you expect an effect between the quality of the data and the extent to which organizations participate in Scope 3 data sharing? As in; will more organizations participate in the value chain as the quality of the shared data improves?

Why or why not?

4. Information Flow & Information System We just discussed the characteristics of data quality: completeness, timeliness, accuracy, and validity. In literature, a distinction is often made between the information product and the information service when it comes to information sharing. The information product is information in itself, as it is stored in a database. The information service is more focused on the process that occurs after the information is stored and how it is prepared for the information user. The following questions assume that a collaboration has been established regarding information sharing, and will focus on the information flow.

4.1 Information Product. The characteristics most related to the information product are completeness and accuracy & reliability.

4.1.1 In what ways can [organization] pay attention to both completeness and accuracy, thereby optimizing the quality of its information product? (intra-focus)

4.1.2 How can the quality of information received from partner organizations be guaranteed? Thinking about completeness and accuracy. (inter-focus)

4.2 Information Service. The characteristics most related to the information service are timeliness and validity.

4.2.1 In the context of timeliness; how could organizations within the value chain ensure that data is available when one of the partners needs this data?

4.2.2 In the context of validity; to what extent do you think it is possible to make agreements about data standards with partners in the chain?

4.2.2.1 What should be taken into account when making agreements about standards?

4.2.2.2 Are standards/shareable formats already being used anywhere? This can be ESG or non-ESG related.

5. Impact

5.1 When is receiving Scope 3 information considered successful?

5.2 When is sharing Scope 3 information considered successful?

5.3 How will reporting Scope 3 emissions impact [organization]?

5.4 Do you have anything to add or do you want to reflect on some critical aspects we missed in relation to sharing Scope 3 emissions data for[organization]?

Appendix B2: Interview Guide 2

1. Intro

- Explaining what has been carried out in the study since the last time we spoke.
- Explain the purpose of today with an overview of what we will discuss.
- Giving time indication of full interview (= +-45 min).
- Ask if the interview may be recorded.

2. Short Term - Validation Model - 10 minutes

2.1 Could you explain step-by-step how information for reporting on Scope 3 emissions is currently collected?

2.1.1 Relating to the previous answer; how do you envision the ideal situation for getting the right information?

2.2 In what ways does complexity currently prevent the development and standardization of processes through which you can gather information? These include lack of clarity around Scope 3 emissions, difficulties with value chain complexity and not having full control.

2.3 Are you currently held back in any way by a lack of resources (Time, money, talent/knowledge)?

2.3.1 If so; Could you explain specifically in what way this is holding back development and if there are plans to address this?

2.3.2 If not; was this the case in the past, and how was it remedied at that time?

3. Long-term - Relationship Building - Trust stream - 5-10 minutes

3.1 We also talked about the difference between contractual and relational trust in the previous interview in mid-December. How do you see the relationship between these two forms (contract versus trust) at the beginning of a collaboration? And how does it change over time?

3.1.1 How do you see this reflected in your current collaboration?

3.1.2 What is the ideal (but achievable) situation for you?

3.1.3 How does this affect certain uncertainties, such as the fear of being compared to other suppliers or the possibility of public reputational damage?

4. Long Term - Relationship Building - Engagement stream - 5-10 minutes

4.1 The results of the study showed that creating engagement in collaboration becomes increasingly important as collaboration progresses. Is attention currently being paid to increasing the engagement of information partners? If so; how?

4.1.1 How could joint goal setting help with this?

4.1.1.1 Is that currently being done?

4.1.1.2 What kinds of goals would you like to set jointly with partners in the future?

4.1.2 How do you view setting up reward systems?

4.1.2.1 For example, providing discounts or premiums?

4.1.2.2 In what ways would it be best to focus on relational value?

5. Long-term - Relationship Building - Leadership stream - 5-10 minutes

5.1 Could you explain how management is currently involved in setting up the information process?

5.1.1 Executive involvement: creating strategy

5.1.2 Formal authority: building (trust) relationships, providing resources

5.1.3 Informal leadership: operational leadership

5.2 In what additional ways could management contribute to building the relationship?

5.3 We just talked about the common resource problem in setting up information sharing processes. In your opinion, what is the role of management in this?

6. Long Term - Relationship Building - Capabilities stream - 5 minutes

6.1 Explaining the ideal process for information sharing at the beginning of this interview included a role for IT systems, and their interchangeability. To what extent is that currently possible?

6.2 How would you best learn to interact with each other's systems?

7. Long Term - Complexity- 5 minutes

7.1 We were just talking about complexity. In what ways might further develop your systems reduce this complexity?

7.2 In terms of systems and standardization, what is the best/wanted method for you(r) (organization)?

Closure

Appendix C: Limited versus Reasonable Assurance

Type of engagement	Objective	Evidence gathering procedures	The assurance engagement report
Reasonable assurance engagement	A reduction in assurance engagement risk to an acceptably low level in the circumstances of the assurance engagement, as the basis for a positive form of expression of the auditor's conclusion. Reasonable assurance means a high but not absolute level of assurance.	Sufficient appropriate evidence is obtained as part of a systematic assurance engagement process that includes: (1) obtaining an understanding of the assurance engagement circumstances; (2) assessing risks; (3) responding to assessed risks; (4) performing further evidence gathering procedures; and (5) evaluating the evidence obtained.	Description of the assurance engagement circumstances, and a positive form of expression of the conclusion.
Limited assurance engagement	A reduction in assurance engagement risk to a level that is acceptable in the circumstances of the assurance engagement but where that risk is greater than for a reasonable assurance engagement, as the basis for a negative form of expression of the auditor's conclusion.	Sufficient appropriate evidence is obtained as part of a systematic assurance engagement process that includes obtaining an understanding of the matter to be audited and other assurance engagement circumstances; but evidence gathering procedures are deliberately limited in comparison with a reasonable assurance engagement.	Description of the assurance engagement circumstances, and a negative form of expression of the conclusion.

Table 5.6: Limited VS. Reasonable Assurance, based on AUASB's Framework for Assurance Engagements (2022)

Appendix D: Quotes Problem Statement

Interviewee 1: *Global Innovation Lead KPMG*

Date Interview: *26-06-2022*

Table 5.7: Quotes Interviewee 1

Quote Number	Quote
1.1	I definitely think we should start sharing things with each other, just like we now share invoices with each other or share other information between companies.
1.2	Determining the KPIs will still be in terms of reporting, but I think getting the data will be the biggest issue. Firstly, because that data is not available now, or not in the right details, and there is no central point where we can get it from. There is no system, there is nothing at all.
1.3	Where are you going to measure it, how are you going to measure it, are you doing it correctly, where are you going to store it, and only then do you talk about the input of that data. The rest will not be so difficult. But finding the source of the data and knowing that it is correct is much more of a challenge than with financial data.
1.4	Yes, so there will definitely have to be a certain roadmap made for those companies about where to start, and what steps come next just saying.
1.5	Yes, to get the data in an automatic way, and to share the data in a kind of automatic way, because otherwise I think companies will get very busy with that. That costs too much.
1.6	Coincidentally, this morning I was at a company that is going to roll out a charging network for trucks in Europe. They will not hesitate to report their emissions figures, for example, or report their KPIs, because their entire company focuses on sustainability and ESG. I can imagine that many companies, such as Shell, are not open to this at all, because they are major polluters. So the more they disclose, the more shareholders will say: hey, I don't need that as an investment.

Interviewee 2: *ESG Expert, Senior Consultant KPMG*

Date Interview: *24-08-2022*

Table 5.8: Quotes Interviewee 2

Quote Number	Quote
2.1	Companies simply don't have that knowledge yet, and neither does KPMG. This also means that if companies, in addition to the financial part in the annual report, also have to include an extensive sustainability part, that will take a lot of work.

Continues on next page

Table 5.8 – *Continued from previous page*

Quote Number	Quote
2.2	I actually think that if you really want to do well, you have to focus on those three facets. First, you look at reliability. How can you be sure that your data is very accurate? Is the number correct. Are there things you can easily change to make yourself look better? Completeness is about whether the figures are correct. If you just look at the example with those shoes: we have not included transport costs. So you have to take everything with you. Timeliness is also important. If I report quarterly and you report annually, then you have a completely different frequency and you don't quite know what is good. Everything has to be placed in the spirit of the times in order to be able to compare it with each other. If you get those three right, and set it up properly, you could say you have the best, most truthful result.
2.3	So now it's mainly where is your data from? Where is your information? And indeed in measuring at certain parts.
2.4	There will probably be companies that work together a lot, depending on the size of your company, of course, but I think you definitely need to set up a lot of collaboration to get the best information together. But also for companies internally, and also certainly with your buyers and customers.
2.5	Part is also that if you need data from me, only I don't care about that, then I'm not going to put any effort into sharing it or collecting it at all.
2.6	Part is of course sensitive to competition. Suppose I am not green at all, and you are. But I do want to get my sales. I do want the customers to come to me eventually, so there is a risk involved.
2.7	Sometimes there may be sensitive information. Especially if, for example, you have competitors that are better or worse in terms of sustainability
2.8	They have to report on many more topics in proportion. They are with fewer people, and therefore less knowledge. In addition, you also have less power in your entire chain. If you buy a lot from China, it can easily be that a supplier says: I don't know. But if you are a very large company, and a very large customer, you have much more power to say: we just want this and arrange it. As a small company you can't do that.
2.9	In addition, I also think that it matters how you look at profit and shareholders as a company. If you have an investment company as a shareholder, they will always be focused on making the most profit.
2.10	Perhaps that target group can still be important. Young people are often more concerned with it. Some companies are also much more disruptive. You also often have to be able to demonstrate that you are doing a good job. That also indicates the target group. Think that could be a big factor, which we've never talked about.

Appendix E: 15 Categories GHG Protocol

The Greenhouse Gas Protocol (2020) defines the 15 scope 3 categories as follows:

1. Purchased goods and services

Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 – 8.

2. Capital goods

a. Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year.

3. Fuel- and energy related activities (not included in scope 1 or scope 2)

a. Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2, including:

- i. Upstream emissions of purchased fuels (extraction, production, and transportation of fuels consumed by the reporting company).
- ii. Upstream emissions of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling consumed by the reporting company).
- iii. Transmission and distribution (TD) losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a TD system) – reported by end user.
- iv. Generation of purchased electricity that is sold to end users (generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users) – reported by utility company or energy retailer only.

4. Upstream transportation and distribution

- a. Transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company).
- b. Transportation and distribution services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company).

5. Waste generated in operations

- a. Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company).

6. Business travel

- a. Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company).

7. Employee commuting

- a. Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).

8. Upstream leased assets

- a. Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee.

9. Downstream transportation and distribution

- a. Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company).

10. Processing of sold products

- a. Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers).

11. Use of sold products

- a. End use of goods and services sold by the reporting company in the reporting year.

12. End-of-life treatment of sold products

- a. Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.

13. Downstream leased assets

- a. Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor.

14. Franchises

- a. Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchiser.

15. Investments

- a. Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2.

Appendix F: Overview of Standards

Exposure Draft	Subject	Standard
Environment		
Climate Change		
	General, strategy, governance and materiality assessment	<i>Transition plan for climate change mitigation</i>
	Policies, targets, action plans and resources	<i>Policies implemented to manage climate change mitigation and adaptation</i> <i>Measurable targets for climate change mitigation and adaptation</i> <i>Climate change mitigation and adaptation action plans and resources</i>
	Performance measurement	<i>Energy consumption and mix</i> <i>Energy intensity per net turnover</i> <i>Scope 1 GHG emissions</i> <i>Scope 2 GHG emissions</i> <i>Scope 3 GHG emissions</i> <i>Total GHG emissions</i> <i>GHG intensity per net turnover</i> <i>GHGH removals in own operations and the value chain</i> <i>GHG mitigation projects financed through carbon credits</i> <i>Potential financial effects from material physical risks</i> <i>Potential financial effects from material transition risks</i> <i>Potential financial effects from climate related opportunities</i>
Pollution		
	Policies, targets, action plans and resources	<i>Policies implemented to prevent and control pollution</i> <i>Measurable targets for pollution</i> <i>Pollution action plans and resources</i>
	Performance measurement	<i>Pollution of air, water and soil</i> <i>Substances of concern and most harmful substances</i>
	Taxonomy Regulation for pollution prevention and control	

Pollution related incidents and deposit impacts and risks, and financial exposure to the undertaking

Financial effects from pollution-related impacts, risks and opportunities

Water and Marine Resources

Policies, targets, action plans and resources

Policies implemented to manage water and marine resources

Measurable targets for water and marine resources

Water and marine resources action plans and resources

Performance measurement

Water management performance

Water intensity performance

Marine resources-related performance taxonomy regulation for water and marine resources

Financial effects from water and marine resources-related impacts, risks and opportunities

Biodiversity and Ecosystem

General, strategy, governance and materiality assessment

Transition plan in line with targets on no net loss by 2030, net gain from 2030 and full recovery by 2050

Policies, targets, action plans and resources

Policies implemented to manage biodiversity and ecosystems

Measurable targets for biodiversity and ecosystems

Biodiversity and ecosystems action plans and resources

Performance measurement

Pressure metrics

Impact metrics

Response metrics

Biodiversity-friendly consumption and production metrics

Taxonomy regulation for biodiversity and ecosystems

Biodiversity offsets

Financial effects from biodiversity-related impacts, risks and opportunities

Resource Use and Circular Economy

General, strategy, governance and materiality assessment

	<i>Resource use and circular economy integration in the business model</i>
	<i>Processes to identify resource use and circular economy-related impacts, risks and opportunities</i>
	<i>Resource use and circular economy -related impacts, risks and opportunities</i>
Policies, targets, action plans and resources	<i>Policies implemented to manage resource use and circular economy</i>
	<i>Measurable targets for resource use and circular economy</i>
	<i>Resource use and circular economy action plans and resources</i>
Performance measurement	<i>Resources inflows</i>
	<i>Resources outflows</i>
	<i>Waste and emissions</i>
	<i>Resource value strategy</i>
	<i>Circular enablers</i>
	<i>Taxonomy Regulation for the transition to a circular economy including enabling activities</i>
	<i>Financial opportunities related to resource use and circular economy other than the Taxonomy Regulation</i>

Society

Own Workforce

Policies, targets, action plans and resources	<i>Policies related to own workforce</i>
	<i>Processes for engaging with own workers and workers' representatives about impacts</i>
	<i>Channels for own workers and workers' representatives to raise concerns</i>
	<i>Targets related to managing material negative impacts, advancing positive impacts, and managing material risks and opportunities</i>
	<i>Taking action on material impacts on own workforce and effectiveness of those actions</i>
	<i>Approaches to mitigating material risks and pursuing material opportunities related to own workforce</i>
Performance measures	<i>Characteristics of the undertakings' employees</i>
	<i>Characteristics on non-employee workers in the undertakings' own workforce</i>

Working conditions

Training and skills development indicators
Coverage of the health and safety management system

Performance of the health and safety management system

(optional) *Working hours*

Work-life balance indicators

Fair remuneration

Social security eligibility coverage

Equal opportunities

Pay gap between women and men

Annual total compensation ratio

Discrimination incidents related to equal opportunities

Employment of persons with disabilities

Differences in the provision of benefits to employees with different employment contact types

Other work-related rights

Grievances and complaints related to other work-related rights

Collective bargaining coverage

Work stoppages

Social Dialogue

Identified cases of severe human rights issues and incidents

Privacy at work

Workers in the Value Chain

General, strategy, governance and materiality assessment

Policies related to value chain workers

Processes for engaging with value chain workers about impacts

Channels for value chain workers to raise concerns

Targets related to managing material negative impacts, advancing positive impacts, and managing material risks and opportunities

Taking action on material impacts on value chain workers and effectiveness of those actions

Approaches to mitigating material risks and pursuing material opportunities related to value chain workers

Affected Communities

General, strategy, governance and materiality assessment

Policies related to affected communities

Processes for engaging with affected communities about impacts

Channels for affected communities to raise concerns

Targets related to managing material negative impacts, advancing positive impacts, and managing material risks and opportunities

Taking action on material impacts on affected communities and effectiveness of those actions

Approaches to mitigating material risks and pursuing material opportunities related to affected communities

Consumers and End Users

General, strategy, governance and materiality assessment

Policies related to consumers and end-users

Processes for engaging with consumers and end-users about impacts

Channels for consumers and end-users to raise concerns

Targets related to managing material negative impacts, advancing positive impacts, and managing material risks and opportunities

Taking action on material impacts on consumers and end-users and effectiveness of those actions

Approaches to mitigating material risks and pursuing material opportunities related to consumers and end-users

Governance

Governance, Risk Management and Internal Controls

General, strategy, governance and materiality assessment

Governance structure and composition

Policies, targets, action plans and resources

Corporate governance code or policy

Nomination process

Diversity policy

Evaluation process

Remuneration policy

Risk management processes

Internal control processes

Performance measurement

Composition of the administrative, management and supervisory bodies

Meetings and attendance rate

Business Conduct

Policies and Targets

Business conduct culture

Policies and targets on business conduct

Action plans and dedicated resources

Prevention and detection of corruption and bribery

Anti-competitive behavior prevention and detection

Performance measurement

Anti-corruption and anti-bribery training

Corruption or bribery events

Anti-competitive behavior events

Beneficial ownership

Political engagement and lobbying activities

Payment practices