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WORKING TOGETHER, DECARBONIZING BETTER? A RELATIONAL VIEW OF COLLABORATIONS FOR SCOPE 3

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Overview

The pressure on firms to measure and reduce their scope 3 CO_2 (scope 3) emissions accelerates, for instance, through mandatory sustainability legislation such as the European Corporate Sustainability Reporting Directive (CSRD), which will include scope 3 emissions as a reporting requirement. Scope 3 comprises all emissions caused indirectly by an organization's activities in its value chain (Greenhouse Gas Protocol 2011). Following this definition, 75% of a firm's carbon footprint is, on average, allocated to scope 3 (CDP 2014; UN Global Compact Network UK 2023). Hence, scope 3 represents the most significant opportunity to influence GHG reductions (Greenhouse Gas Protocol 2011). In addition, the share of scope 3 in comparison with scope 1 and 2 emissions has been growing over-proportionately over the past decades (Hertwich and Wood 2018), further increasing its relevance. However, firms struggle with the measurement and reduction of scope 3 emissions, so they unintentionally underrepresent their fair share of scope 3 emissions (Blanco et al. 2016; Klaaßen and Stoll 2020). Such firms' deficiencies can endanger the ability to reach the Paris climate targets (Li et al. 2020). Hence, firms must find ways to capture and reduce all of their indirect emissions, including those of their supply chain partners (Plambeck 2012). Firms that overcome the challenges related to scope 3 can obtain a competitive advantage (Sharfman et al. 2009). In contrast, those that fail will face business risks and can't contribute their fair share to mandatory decarbonization targets (Sharfman et al. 2009; Steger 1996). This combination of managing risks and pursuing opportunities has encouraged firms and researchers to better understand supply chain management in this context (Jira and Toffel 2013). Supply chain collaboration is repeatedly mentioned as a solution to master scope 3 measurement and reduction (Patchell 2018; Schulman et al. 2021; Blanco et al. 2017; Plambeck 2012). However, the literature thoroughly assessing supply chain collaborations with the purpose of CO_2 reduction is still scarce. The antecedents and preconditions of firms engaging in collaboration with the aim of scope 3 measurement and reduction have been explored from the manufacturer perspective (Theißen et al. 2014; Lintukangas et al. 2022) as well as from the supplier perspective (Jira and Toffel 2013). Further, it has been analysed based on CDP responses, that 3 types of information processing types exist that differ based on the level of buyer's engagement (Dahlmann and Roehrich 2019). Yet, the impact of supply chain collaboration on scope 3 performance has not been thoroughly assessed, i.e., the role of supply chain collaborations in addressing the massive challenges regarding scope 3 emissions. Moreover, collaborations have solely been considered for suppliers and at times customers, potentially neglecting other relevant stakeholders within and outside the firm. Therefore, by applying the relational view as the theoretical lens (Dyer and Singh 1998), I analyse the following research question: *"How do supply chain collaborations help to meet challenges and opportunities in scope 3 measurement and reduction?"*

Methods

To answer the research question, I follow a two-step research approach. First, I conduct a systematic literature review on the keywords "value chain emissions" and "scope 3 emissions", yielding 17 peer-reviewed articles relevant to the focal topic. Second, I conduct an exploratory, inductive qualitative study via multiple cases (Eisenhardt 1989; Yin 2018). This approach is most suitable to the research question for several reasons. It allows the exploratory analysis of multiple cases (De Massis and Kotlar 2014), which is especially meaningful for a new phenomenon to build a stronger theory (Yin 2018). Consequently, theories are more generalizable and accurate (Eisenhardt and Graebner 2007). A multiple case study design further fits the "why" and "how" questions of this work (Yin 2018) and allows direct exchange with the subjects (Miles et al. 2014) - in this case sustainability and purchasing managers - in Germany.

Due to the heterogeneity of European firms, it is reasonable to limit the group of cases further via a theoretical sampling approach (Eisenhardt 1989) to explore comparable organizations with purposeful differences in scope 3 measurement and reduction for analysis. I focus on firms headquartered in Germany, as this is the largest economy in the EU, characterized by ambitious decarbonization targets in comparison with other countries. All firms have a yearly revenue of over one billion euros, as large firms have typically more established processes (Davila 2005) and are more likely to engage in collaboration due to sufficient resource availability (Lintukangas et al. 2022). All firms have more than 75% of their CO_2 emissions allocated to scope 3, hence the topic should be more relevant to the focal firms than to any average firm (CDP 2014). As scope 3 is an advanced decarbonization topic, only firms are approached that have an overall pro-active approach to decarbonization, represented through

a decarbonization strategy and scope 1 and 2 CO_2 emission targets published. Lastly, I apply a polar sampling strategy given the limited number of cases, which can be observed (Pettigrew 1990; Eisenhardt 1989) as well as enriching existing literature, which has solely focused on successful examples in this field (Sharfman et al. 2009). While half of the firms are regarded as *leading in scope 3* due to a comprehensive measurement, and a specific scope 3 target, approved by the science-based target initiative (SBTi), other firms are defined as *lagging in scope 3* since they do not fulfill these conditions. The final sample consists of 12 firms, for which one or two firm representatives are interviewed. While the case interviews serve as the primary data sources, the findings are further triangulated with expert interviews as well as archival data collected from the firms' sustainability reports and websites.

Results

I reveal significant challenges and opportunities concerning scope 3 measurement and reduction, expanding the scope of currently mentioned challenges and opportunities in the literature. I further identify five types of collaborations with the purpose of scope 3 measurement and reduction: inter-functional, supplier, customer, industry, and cross-industry collaboration. While supplier and customer collaborations are well-known in extant literature, the remaining three collaboration types must be shortly introduced. Inter-functional collaborations describe a new form of collaboration between a firm's sustainability department, equipped with technical decarbonization knowledge, and the purchasing and sales personnel, equipped with the firm's upstream and downstream data and relationships respectively. Within an industry collaboration, each participating firm sends experts for scope 3, to define a common calculation technique and tool for scope 3 in a selected industry. The scope of cross-industry collaboration is even more pronounced, establishing standards across industries, and avoiding the establishment of competitive systems. While leading firms already pursue various of these five collaboration types, lagging firms in scope 3 engage less frequently in collaborations, suggesting a positive impact of collaborations on the sophistication of scope 3 measurement and reduction. Therefore, enhanced effectiveness of collaborative relationships over arm's length, transactional relationships in the field of scope 3 are observed. Further, the five collaboration types are complementary and not mutually exclusive, as they help firms to address different challenges and opportunities. Lastly, I show that those collaborations that are closest to the firm, such as inter-functional collaboration and supplier collaboration, are currently more frequently deployed by firms than industry or cross-industry collaborations.

Conclusions

This study manifests the bridge between the research on scope 3 and sustainable supply chain engagement by assessing how sustainable supply chain collaborations help firms to meet the challenges and opportunities of scope 3 from a relational view (Dyer and Singh 1998). Hereby, I follow the call for papers to evaluate the role and function of supply chain collaborations to improve firms' scope 3 measurements and reduction (Schulman et al. 2021; Patchell 2018; Blanco et al. 2017; Lee 2012; Dahlmann and Roehrich 2019). While I reconfirm the value of supply chain collaboration postulated by other researchers (Lintukangas et al. 2022; Patchell 2018), I am the first to assess the link between challenges in scope 3 measurement and reduction and different supply chain collaboration types. Through my conceptualization of supply chain collaboration, I not only confirm the relevance of supplier and customer collaborations presented by previous authors (Dahlmann and Roehrich 2019; Lintukangas et al. 2022), but I also demonstrate that inter-functional, industry, and cross-industry collaborations should be considered for successful scope 3 measurement and reduction, offering a wider scope than previous studies.

Regarding the theoretical framework underlying this work, my results suggest the relational view as a promising pathway for supply chain collaboration topics. This is relevant guidance for future research, as the relational view has only recently been applied in the context of sustainable supply chains (Lintukangas et al. 2022).

In addition, my findings will provide practitioners with a clearer understanding of the different types of supply chain collaboration, including the purpose of each supply chain collaboration type and the complementary nature of the collaboration types. This will help in overcoming scope 3 deficiencies currently observed in many firms. My policy implications for regulators entail that collaborations are a key vehicle to increase a firm's scope 3 sophistication, and consequently also reach the Paris climate targets. Further support and guidance should be provided by non-governmental climate and industry associations for customer, industry, and cross-industry collaborations, as these are currently less frequently pursued by firms, while highly relevant in their function of combatting scope 3 challenges and realizing scope 3 opportunities.

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