

Green but silent? A case study of the sustainability activities and communications of a large European manufacturing company

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ABSTRACT

This single, interview-based case study analyzes the sustainability activities and communications of a large, manufacturing firm from Europe. The examined corporate sustainability activities are analyzed in terms of stakeholder perceptions regarding carbon disclosure, management, accounting and performance. This research finds that the understatement of sustainability achievements due to an extensive focus on quality aspects can occur as a potential corporate strategy that firms can follow in transition from *silent green firm* to *vocal green firm*. Thereby, it allows for a fresh viewpoint upon carbon disclosure and greenwashing discourses. This research is helpful for scholars as well as sustainability and communication managers.

Keywords: Stakeholder perceptions, carbon disclosure, carbon management, carbon accounting, carbon performance, case study

INTRODUCTION

Today, large companies face increasing pressure to become more green, sustainability- and carbon-oriented (Trexler & Schendler, 2015). In 2015, the Paris Agreement sent ‘a clear message of the need to decarbonize the economy and encourages businesses to adopt a long-term perspective that balances economy and ecology’ (He, Luo, Shamsuddin, & Tang, 2021). Several stakeholders drive these environmental expectations (Freeman, 1984; Polonsky, 1995; Sprengel & Busch, 2011) and managers hope that GHG emission reductions will lead to decreasing costs and a better corporate image (Schaltegger & Csutora, 2012). Stakeholders are ‘any group or individual who can affect or (are) affected by the achievement of the organization’s objectives’ (Freeman, 1984, p. 46) and which can assert pressure onto a company, also in the context of environmental and carbon activities of a firm (Garcés-Ayerbe, Rivera-Torres, & Murillo-Luna, 2012; Hart, 1995; Sprengel & Busch, 2011).

Indeed, ‘businesses are most heavily influenced as their success is dependent on the behavior of the other groups, consumers, and government’ (Polonsky, 1995, p. 200). This success, nevertheless, is based on the perceptions that the stakeholders have of the company. If, for example, consumers perceive the firm as negative, they can boycott the products of the firm (Busse, Schleper, Weilenmann, & Wagner, 2017). Furthermore, jobseekers can evaluate the sustainability performance of a firm in order to find meaningful work (Albinger & Freeman, 2000). Thus, corporate sustainability and carbon disclosure play a critical role in shaping the perceptions of stakeholders like consumers, employees, NGOs, the government etc. as those groups base their perceptions on the disclosed carbon information of the firms. In this manner, stakeholders are able to assert pressure onto the firms to become more sustainable (Sprengel & Busch, 2011) and also influence sustainable firm behavior (Buysse & Verbeke, 2003; Sharma & Henriques, 2005).

Sustainability reporting and communications have significantly increased ‘over the last decade’ (Bradford, Earp, Showalter, & Williams, 2016, p. 83). In 2021, for example, over 9,600 companies reported through CDP on climate change, water security and forests (CDP, 2021). Carbon footprints tackle carbon dioxide emissions and their carbon dioxide equivalents (IPCC, 2014; WRI, 2004). They are ‘directly and indirectly caused by an activity or [...] accumulated over the life stages of a product’ (Wiedmann & Minx, 2008, p. 4).

In the context of (carbon) disclosure of footprints, scholars discuss different corporate strategies such as the legitimacy perspective, the voluntary disclosure perspective (Giannarakis,

Zafeiriou, et al., 2017) as well as potential greenwashing (Vries, Terwel, Ellemers, & Daamen, 2015). Sprengel and Busch (2011), furthermore, derive different response strategies that companies carry out to encounter stakeholder pressure to decrease a firm's GHG (greenhouse gas) emissions.

I focus on carbon disclosure and carbon communications because these activities can be seen as connecting points of internal carbon management to the firm's stakeholders (Giannarakis, Konteos, Sariannidis, & Chaitidis, 2017). I also describe carbon management systems as an important sustainability activity. Based on Klassen and McLaughlin (1996), Porter and Linde (1995) and Pinkse and Kolk (2008), Tang and Luo (2014, p. 84) describe a carbon management system as 'a functional tool – a way to implement a firm's carbon strategy or policy [...] to enhance the efficiency of input-use [...], mitigate emissions and risks and avoid compliance costs or to gain competitive advantage'. The study of Tang and Luo (2014) is limited to service-oriented companies. Therefore, they ask for the analysis of a manufacturing company as another step. While carbon (management) accounting describes 'the entirety of scopes, methods and procedures of accounting, which deal with greenhouse emissions in the context of corporate activities and influence' (Schaltegger & Csutora, 2012, p. 13), carbon performance carries a quality notion and aims at better comparisons of carbon figures (Goldhammer, Busse, & Busch, 2017; Hoffmann & Busch, 2008).

While He et al. (2021) emphasize that 'the study of carbon accounting is growing rapidly and steadily, in particular after the signing of the Paris Agreement, with a gradual shift from qualitative to [quantitative,] empirical studies', Wedari, Jubb, and Moradi-Motlagh (2021) call for future qualitative research in the field of carbon performance and carbon disclosure. They ask for more qualitative, interview-driven research from within companies.

Delmas and Cuerel Burbano (2011) distinguish four patterns of environmental firm behavior regarding the extent to which a company has good or bad environmental performance and how the firm communicates about that. The patterns are vocal and silent green firms, silent brown firms and greenwashing firms. These patterns are described as closed entities, without transition phases between them. This research wants to find out whether there are transition phases between the patterns and what characterizes those.

This research, as well as the question of how companies achieve good corporate carbon performance requires an internal view that is not limited to analyses of sustainability and annual reports of firms (Stüwe, 2023). It is worthwhile to carry out qualitative research with a focus

on different stakeholders of the firm. Therefore, my study is a qualitative, interview-based study that analyzes a single case (Yin, 2014) of a corporation (a large, manufacturing firm from Europe) which closes this gap. In my research, I analyze sustainability activities and communications of a large manufacturing firm from Europe from different stakeholder perspectives as well as corporate response strategies. In this context, I emphasize four different theoretical aspects of carbon activities and reporting: Carbon disclosure, carbon management, carbon accounting and carbon performance.

The research combines two perspectives: the one of external stakeholders like customer, suppliers and NGOs, and the one of internal stakeholders like sustainability managers and other employees. Furthermore, I examine in my study if the behavior of the manufacturing company can be described as a silent brown or green firm or vocal green firm or greenwashing firm. For this purpose, I analyze the firm's carbon management, accounting and performance from different stakeholder perspectives. The research addresses the following research questions:

Do transition phases of firm behavior regarding environmental communications and environmental performance exist and what characterizes those transitions? Which low-carbon initiatives, which communication strategies and what kind of transition characterize a large, European manufacturing firm?

The subsequent conceptual background section introduces corporate low-carbon initiatives, stakeholder perceptions and pressures, the concepts of carbon disclosure and greenwashing as well as carbon management, carbon accounting and carbon performance. The following methodology section offers an overview of the suggested qualitative approach of analysis. The results of the analysis follow. The penultimate section discusses theoretical and practical implications of this research, highlights its limitations and identifies opportunities for future research. The article concludes with a brief summary.

CONCEPTUAL BACKGROUND

Corporate low-carbon initiatives

This research aims at revealing low-carbon initiatives of a large, manufacturing firm from Europe. Several studies emphasize low-carbon initiatives in the context of municipalities and cities (Bulkeley & Castán Broto, 2013; Cheng, Yi, Dai, & Xiong, 2019; Genus & Theobald, 2015; Middlemiss & Parrish, 2010; van Doren, Driessen, Runhaar, & Giezen, 2020), among them several case studies. Furthermore, a study by Khan, Godil, Yu, Abbas, and Shamim (2022) examines the influence of low-carbon initiatives onto tourism in Asian countries. A few studies

analyze “low-carbon initiatives” (Lopes de Sousa Jabbour et al., 2021, p. 7107) in the corporate and managerial context and describe them as “low-carbon operations practices” (Furlan Matos Alves, Lopes de Sousa Jabbour, Kannan, & Chiappetta Jabbour, 2017, p. 225) which can be understood as corporate responses to current or future contingencies (Sousa & Voss, 2008). Contingencies are outside events or changing contextual factors that affect organizations, over which organizations cannot exert direct control, and which force companies to adapt their structures in order to keep up performance (Donaldson, 2001; Sousa & Voss, 2008). Furlan Matos Alves et al. (2017), Lopes de Sousa Jabbour et al. (2021) and Böttcher and Müller (2015) see climate change and supply chain disruptions as contingencies. They all distinguish low-carbon operations practices or low-carbon initiatives into three categories: products, processes (or production) and logistics (Furlan Matos Alves et al., 2017). Stüwe (2023) adds another category to this distinction: other company-level initiatives, which can include change of calculation method, corporate memberships and awards, carbon and sustainability target setting, offsetting of emissions, fostering of behavioral changes (of staff members) as well as managerial incentives (internal carbon price etc.). To my knowledge, there are no case studies about corporate low-carbon initiatives yet.

Stakeholder perceptions

Shen, Zheng, Adams, and Jaggi (2020, p. 457) distinguish between three stakeholder groups, that put pressure on the firms: external, internal and third-party stakeholders. To them,

external stakeholders include government, creditors, suppliers, customers and competitors, whereas internal stakeholders include shareholders, institutional investors and employees. The intermediate stakeholders group includes third-party stakeholders, mainly environmental protection organizations and audit institutions.

When it comes to the corporate perspective on stakeholders, Fletcher, Guthrie, Steane, Roos, and Pike (2003, p. 508) describe that ‘stakeholder management enables managers to ensure that the strategic and operational direction of an organization addresses stakeholder perceptions’. However, the literature about stakeholder perceptions can be divided into two different perspectives. On the one hand, there are studies based on the internal views of managers of a firm. For example, Kujala (2010) examines managers’ perceptions on corporate social responsibility. Furthermore, Henriques and Sadorsky (1999) present a study in which a firm’s perception of the importance of different stakeholder groups is analyzed.

On the other hand, some studies focus on the perceptions of other stakeholders. In this case, the authors analyze what the stakeholder perceptions are and how they contribute to the decision

making of a firm or the outcome of a situation (Bruijn, Kirkman-Liff, Bruijn, & Kirkman-Liff, 1992; Cuypers, Ping-Sheng, & Heli, 2016). My study focusses both on the internal sustainability managers' and other employees' perceptions as well as on the perceptions of customers, a supplier and an NGO. It examines stakeholder perceptions in the context of environmental and carbon activities of the firm and analyzes the dominant corporate communication strategy.

Stakeholder pressure

Sprengel and Busch (2011) reveal corporate response strategies to face stakeholder pressure to decrease a firm's GHG (greenhouse gas) emissions. In line with Murillo-Luna, Garcés-Ayerbe, and Rivera-Torres (2008), they find that managers do not differentiate between different sources of stakeholder pressures when it comes to carbon emissions but form a strategy that responds to the conglomerate of different stakeholder pressures. The authors distinguish between four response strategies:

While *minimalists* choose not to pursue many response activities except for a 'minimum response' in terms of their GHG efficiency and stakeholder information, the main strategy characteristic of *regulation shapers* is to engage in the political debate. *Pressure managers* employ externally oriented responses such as increasing the emission limits or seeking out new business environments as opposed to *emission avoiders* and their internal measures to reduce or avoid GHG emissions (Sprengel & Busch, 2011, p. 360).

Furthermore, their analysis derives the following responses that companies might choose to encounter stakeholder pressure to reduce greenhouse gas emissions: 'GHG efficiency [increase,] [...] [information of] stakeholders of [...] [corporate] efforts to reduce GHG [...] [, engagement] in the political process on GHG regulation [...] [, exploration of] new markets/environments with lower pressures [...] [,] increases [of] the emission limits (offsetting, allowances) [...] [, reduction of] the production of GHG-intensive products [...] [, seeking] to become largely independent of GHG emissions [...] [and outsourcing of] emission-intensive processes/technologies' (Sprengel & Busch, 2011, p. 358). Within my research I will examine which of these responses are carried out by the company analyzed.

Carbon disclosure and carbon communications

Carbon disclosure forms the starting point for combining the stakeholder view with carbon accounting, management and performance as it embodies both carbon footprinting and its communications to stakeholders. Carbon disclosure is characterized by two conflicting views (Giannarakis, Zafeiriou, et al., 2017). Those are the so-called legitimacy theory (Deegan, 2002;

Gray, Owen, & Adams, 1996; Yu, Kuo, & Ma, 2020) and the voluntary disclosure theory (Dye, 1985; Verrecchia, 1983). In the context of the legitimacy theory, firms disclose environmental information in order to be legitimate and to being able to stay on the market. These firms often have inferior environmental performance and try to protect their business models from criticism of stakeholders (Deegan, 2002; Gray et al., 1996). According to Giannarakis, Zafeiriou, and Sariannidis (2017, p. 1081) disclosure, then, is ‘a means for corporate managers to affect stakeholders’ perception of their actual environmental performance’.

If firms, however, disclose environmental data voluntarily to distinguish themselves positively from competitors, this can be explained by the other approach, the voluntary disclosure theory. This view draws a positive link from environmental performance to climate change disclosure (Dye, 1985; Truong & Pinkse, 2019; Verrecchia, 1983). Disclosure, then, means that “superior environmental performers tend to disseminate more information to distinguish themselves from inferior environmental performers” (Giannarakis, Zafeiriou, et al., 2017, p. 1081). Both views exist parallelly in scholarly discussions.

Greenwashing

Parallel to this disclosure discourse, corporate greenwashing is another research topic. According to Vries et al. (2015), greenwashing is ‘the idea that companies deliberately frame their activities as ‘green’ in order to look environmentally friendly’. It can take different forms: ‘For instance, a company may provide the public with disinformation in order to repair or shape its reputation (Laufer, 2003), or it may publish an environmental promise without living up to it (Vos, 2009). However, while corporate greenwashing is typically characterized by a gap between rhetoric and reality, it doesn’t necessarily have to include outright lying of the involved managers or company staff (Vos, 2009). Vries et al. (2015, p. 142) add to the theory, that some companies face that ‘communicating that environmental policies and activities are motivated by concern for the environment could elicit positive reactions, but may also lead to accusations of corporate greenwashing’ and therefore emphasizes so-called dispositional skepticism. In this research, I will examine if this is the case for the analyzed company.

Delmas and Cuerel Burbano (2011, p. 66) explain greenwashing as a combination of bad environmental performance and positive communication about this performance and see it as ‘the act of misleading consumers regarding the environmental practices of a company (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)’. They furthermore call the firms which show a combination of bad

environmental performance and no communication ‘silent brown firms’ and those which are characterized by good environmental performance and communication about it ‘vocal green firms’. Those firms which are not communicating about their positive environmental performance are called ‘silent green firms’ (Delmas & Cuerel Burbano, 2011, p. 67). Stüwe (2023) found that process-related low-carbon initiatives are more relevant when it comes to determining the corporate carbon footprint of a company than product-related low-carbon initiatives due to the boundaries of the Greenhouse Gas Protocol (WRI, 2004). However, it is not clear which kind of sustainability initiatives are especially relevant in the context of the different firm types in line with Delmas and Cuerel Burbano (2011).

This research examines in which of the four categories the analyzed firm falls and explain how this might be influential for the firm’s sustainability initiatives and strategy. Furthermore, it finds out if there are transition phases between the four patterns and analyze them in detail.

In the following, I will introduce the terminology around carbon management, carbon accounting and carbon performance in order to shed light on these corporate activities for the later analysis from different stakeholder perspectives.

Environmental and carbon management systems

Hendrichs and Busch (2012, p. 62) introduce environmental management systems by first pointing to corporate quality control systems. They explain that companies often adapt their existing quality control systems in order to face environmental challenges like climate change as well. These are then called environmental management systems, voluntary guidelines that ‘support companies in implementing environmental policy’. An example of an environmental management system is a carbon management system. In a case study approach, Tang and Luo 2014 present two service-oriented corporations of which one gathers its environmental data by means of an excel sheet and one with the help of an external information system service provider. In both cases they find difficulties in environmental management due to the data handling such as the connection of branch data into a single data sheet or the concentration of responsibility to just a few persons in the company.

Gibassier and Schaltegger (2015, p. 341) analyze the carbon management system of Danone, a food and beverage company, in an in-depth single case study. They pose the questions of how

‘different corporate approaches dealing with carbon management accounting influence the measures of the total carbon footprint of a corporation and the carbon performance representation. The in-depth case

study also looks at how carbon management accounting can be connected to external reporting of carbon emissions to link internal performance management to external performance reporting’.

Schaltegger and Wagner (2006, p. 1) claim that

‘the management of sustainability performance requires a sound management framework which firstly links environmental and social management with the business and competitive strategy and management and, secondly, that integrates environmental and social information with economic business information and sustainability reporting’.

Siebenhüner and Arnold (2007, p. 343) describe factors that can deal as possible explanations for organizational learning processes in the context of sustainability and climate change mitigation, such as external factors like “market pressure” and “stakeholder demands” or internal factors such as structural, cultural and behavioral factors.

In this research, I analyze the firm’s environmental and carbon management, corresponding initiatives and communications, and how those have changed over time and why.

Carbon accounting

Stechemesser and Guenther (2012) offer a large literature review on carbon accounting and they find that there is no standard definition for carbon accounting despite the large body of research. Schaltegger and Csutora (2012, p. 1) describe carbon accounting as a ‘rapidly developing area of sustainability management’, it can therefore be seen as part of the carbon management process. Ratnatunga and Balachandran (2009) express carbon accounting as innovations to the fields of strategic cost management (SCM) and strategic management accounting (SMA), referred to as business accounting. Melville and Whisnant (2014) analyze information systems used for carbon accounting and carbon management. Carbon accounting is one aspect that is considered when it comes to the analysis of stakeholder perceptions within this research.

Carbon performance

Carbon performance refers to the actual outcome of carbon accounting and footprinting, and has a quality notation (Hoffmann & Busch, 2008). A concept of carbon performance used by a lot of scholars is carbon output intensity (Doda, Gennaioli, Gouldson, Grover, & Sullivan, 2016; Eun-Hee & Lyon, 2011; Y. He, Tang, & Wang, 2013; Kolk, Levy, & Pinkse, 2008; Liesen, Figge, Hoepner, & Patten, 2017; L. Luo, Lan, & Tang, 2012; L. Luo & Smith, 2019; L. Luo & Tang, 2021; Matsumura, Prakash, & Vera-Muñoz, 2013; Tang & Luo, 2014), which ‘describes the extent to which [a company’s] business activities are based on carbon usage for a defined

scope and fiscal year' (Hoffmann & Busch, 2008, p. 508). This concept is also reflected within the CDP methodology (CDP, 2017a). As mentioned before, the CDP has gained a lot of prominence over time (CDP, 2017b; Giannarakis, Zafeiriou, et al., 2017; Matisoff, Noonan, & O'Brien, 2013).

Based on only one regressor variable, this concept of carbon output intensity has a shortcoming: Carbon figures are difficult to interpret (Liesen, Hoepner, Patten, & Figge, 2015; Stüwe, Busse, & Goldhammer, 2023). While the carbon disclosure and communications discourse emphasize the reasons for reporting of the figures, in practice it remains relatively unclear, if a carbon footprint is representing good or bad carbon performance. Managers, on the one hand, do not necessarily understand the connections between the carbon footprint of their company and the footprints from the field of direct competitors. NGOs, on the other hand, cannot judge the effective carbon performance of a company of interest either.

Goldhammer et al. (2017) established a model of carbon estimation by using a regression approach. This approach allows the firm size of a company and the industry affiliation, which also Mazhar, Bull, and Lemon (2017) emphasize, to be combined with further regressor variables, i.e. capital intensity and centrality of production. Thereby, they allowed for Stüwe et al. (2023) to offer a new methodology to derive good and bad carbon performance as well as other notable cases of carbon performance such as the highest estimated emissions or the largest increase of reported emissions. In this manner, the carbon footprints become more interpretable. The research of Stüwe (2023) then builds upon this and provides an analysis of low-carbon initiatives and company-level factors in the context of carbon performance. This research can guide stakeholders to evaluate and discuss the competitive position of a firm and the quality of its low-carbon initiatives and sustainability communications and strategy.

Therefore, the understanding of carbon performance is another aspect that is considered when it comes to the analysis of sustainability initiatives and communications within this research.

METHODS

In line with Yin (2014), I analyze a single case study of a larger European manufacturing company. In the following, I describe the research procedure based on the steps presented by Eisenhardt (1989). Even though Eisenhardt (1989) uses these steps to describe studies of multiple cases, they are also helpful in the context of a single case study.

An initial definition of the research question is of high importance. It allows for setting the focus for the selection of cases. In order to tackle the research question, I choose the case of a

large, European, manufacturing company. According to Yin (2014, p. 51), there are five rationales for the use of a single case study instead of a multiple case study: ‘having a critical, unusual, common, revelatory or longitudinal case’. In my research, the corporate case can be considered ‘revelatory’ as I have the ‘opportunity to observe and analyze a phenomenon [, the stakeholder perceptions of carbon initiatives and extraordinary ways of carbon communications,] previously inaccessible to social science inquiry’ (Yin, 2014, p. 52).

Gibassier and Schaltegger (2015), He et al. (2021) and Wedari et al. (2021) all ask for more qualitative research in the context of carbon performance, carbon management and carbon accounting. Therefore, there is a fit between research question and selected case.

In the sense of crafting instruments and protocols (Eisenhardt, 1989), I combine data collection methods for triangulation. By means of thirteen (telephone) expert interviews of the sustainability team, customers and other stakeholders of the firm as well as content analysis of a sustainability report I carry out the research. The interviewees are considered knowledgeable agents in the sense of Gioia, Corley, and Hamilton (2012). In line with Yin (2014) I form three units of analysis from the interviewees: group 1 as four customers, group 2 as three sustainability experts and group 3 as seven other stakeholders of the company (other employees, a supplier and a member of an NGO with which the firm collaborates). Furthermore, I analyze the sustainability reports of 2018, 2019 and 2020.

According to Eisenhardt (1989), there is often an overlap of data analysis and data collection in this kind of research. I do not have overlaps of that kind as I start analyzing the data only after I completed the data collection. For the same reason, I do not use field notes to signal important steps in the research. I make, however, adjustments to the data collection within its course. After conduction of some interviews, I have changed some of the interview questions to make them more consistent with the interviewee’s position.

I carry out the data analysis and the coding procedure right after the completion of the data collection. For this end, I use embedded units of analysis in line with Yin (2014). I build three units among the interviews, the unit of customers of the firm (four interviews), the unit of sustainability experts of the firm (three interviews) and the unit of other stakeholders (six interviews). The reason for this split is that it allows for data comparison within and among the units. In the results part, I analyze the data within the units. Table 1 contains an overview of the interviews.

TABLE 1 Overview of interviews

Unit of interviews	Nr.	Length of interview	Role of interviewee	Abbrev.	Codes
Customers	1	07 min 21 sec	Customer 1	K1	11
Customers	2	11 min 09 sec	Customer 2	K2	11
Customers	3	07 min 09 sec	Customer 3	K3	11
Customers	4	09 min 07 sec	Customer 4	K4	15
Sustainability experts	5	17 min 42 sec	Sustainability expert 1	NE1	18
Sustainability experts	6	17 min 53 sec	Sustainability expert 2	NE2	14
Sustainability experts	7	20 min 23 sec	Sustainability expert 3	NE3	16
Other stakeholders	8	14 min 00 sec	Marketing expert	MAR	13
Other stakeholders	9	17 min 38 sec	Production expert 1	PR1	23
Other stakeholders	10	24 min 23 sec	Production expert 2	PR2	23
Other stakeholders	11	26 min 21 sec	Purchasing expert	ZEK	23
Other stakeholders	12	33 min 59 sec	Supplier	SUP1	20
Other stakeholders	13	12 min 22 sec	Non-governmental organization	NGO	16

When citing parts of the interviews I use the abbreviations from table 1 combined with the date of the interview and the corresponding line of the interview. For example (211021_K1: 12) means that the citation comes from the interview of customer 1 (K1), recorded on the 21th of October 2021 (211021), and from line number 12 (12).

In the second results part, I compare the three interview groups with each other and form the codes/categories based on these results. Then, I compare the emergent frame of constructs with the evidence of the embedded units to see if it fits with case data. Then, I sharpen my categories and make them fit better to the data until a point of saturation is reached.

I compare the emerged theories and concepts with extant literature and ask myself, what is similar to and what does contradict and why, in line with Eisenhardt (1989). For reaching closure, no more embedded units should be added when theoretical saturation occurs. As this is the case, I stop adding units. Furthermore, saturation is reached within the iterating between theory and data, according to Eisenhardt (1989).

After the completion of the data collection, I carry out the data analysis and the coding. I use different units of a single case study according to Yin (2014) and form three units: the customers, the sustainability experts and the other stakeholders. In line with Eisenhardt (1989), I search for within-case similarities first to find codes/categories.

RESULTS

Analyzing with-in case data

Building upon the extant literature as well as the data analysis of the embedded units, I establish the following nine categories of codes for all embedded units: Features of the interviewees, expectations and features of different stakeholders, perception of the company and the products, perceptions of carbon accounting, perceptions of the management systems, perceptions of the environmental initiatives, perceptions of the carbon strategy, perception of carbon disclosure and carbon communications, and perceptions of carbon performance. The following paragraphs describes the main with-in case similarities and the categories and codes for each unit.

Unit/group 1: Customers:

The group of customers consisted of people from outside of the company, people who had bought products of the company before. They can also be seen as external stakeholder. To check how the different interviewees viewed the firm as a whole, I started the analysis of the interviews with the overall perception of the firm.

Perception of the company - customers

The customers perceived the company as a professional, large market player with a lot of good equipment (211027_K2: 46), a large company, a market leader (220106_K4: 40) with high competence in its products ((211021_K1: 16), (220106_K4: 40)) and a lot of advertisement (220105_K3: 60).

Carbon management - customers

None of the customers had ever heard of a carbon management system of the company before ((211021_K1: 12), (211027_K2: 12), (220105_K3: 36), (220106_K4: 20)). The customers had no clear idea about which environmental initiatives or carbon strategy the firm carried out ((211021_K1: 10), (211027_K2: 10), (211027_K2: 18), (220105_K3: 30), (220106_K4: 18)) but one of them had heard of the FSC stamp as a sustainability label for paper (220106_K4: 18).

Carbon and environmental initiatives - customers

While characterized by a lack of knowledge around carbon initiatives, the customers emphasized the size and good image of the company and the quality of their bought products, delivery times and the prices ((211021_K1: 16), (211021_K1: 34), (220106_K4: 40))

Carbon disclosure, communications and collected energy and carbon data - customers

The customers also didn't know which energy and carbon data the company collected. Only one customer knew about the corporate carbon footprint but was skeptical about it as s/he had read that such figures got 'pushed from one side to the other and that there [...] [was] not a lot of substance behind it' (220106_K4: 23-26).

Carbon performance - customers

The customers were also insecure about what carbon performance was. One couldn't define it at all (211021_K1: 18), one defined it as 'the values of carbon output presented in a way that can easily be compared among companies' (211027_K2: 26), another one as 'reduction of CO₂' (220105_K3: 48-50) and 'how efficient something is used per unit of carbon, therefore as a unit to calculate something' (220106_K4: 30). When asked about the comparability of carbon performance among companies, for example among the firm and its nearest competitors, the customers gave different answers: two didn't know what to say ((211021_K1: 30), (220105_K3: 56)), one thought that carbon performance should be comparable if the 'procedure of measurement is well standardized and contains, besides the production of goods, also the transportation and so on' (211027_K2: 38). Another one believed that the figures should be comparable because 'the variables taken into account should be the same ones when the firms have a similar structure' (220106_K4: 34).

Unit/group 2: Environmental experts:

The experts consisted of three employees of the firm, NE1, NE2 and NE3 and can be considered internal stakeholders.

Perception of the company – environmental experts

The company was perceived as a large company, a market leader with 'the best products' and a 'satisfaction guarantee' for customers (211118_NE3: 86). The products were seen as 'not harmful to anybody' and the firm was considered to have an advantage caused by its size (211118_NE3: 86).

In a historical perspective, one expert explained that the communications of sustainability towards the customers was a rather recent phenomenon within the company. Even though, sustainability has been of high internal importance for a decade, towards the customers the company emphasized 'other topics' (211102_NE2: 56) like quality (211118_NE3: 86). But nowadays, the topic of sustainability became more important for customers as well and the

company extended its external sustainability communications. The focus herein lay on the emphasis of transparency that the firm had been active in this field for a long time but still had a lot of potential to improve (211102_NE2: 56).

Carbon accounting – environmental experts

Based on Melville and Whisnant (2014) I asked the experts about how they collected energy and carbon data, how they calculated key performance indicators and which information systems were used within this process. NE1 mentioned the firm's compensation project which was carried out with a partner institution. For this project, it was necessary to collect the carbon data as the basis for the offset. Besides the support of this institution the firm collected the energy and carbon data by means of an excel sheet (211028_NE1: 11-14). At the beginning of each year, the experts from the main site reminded the employees within the other sites to send them the latest data regarding energy, carbon, water use etc. Furthermore, an SAP system delivered the amounts of materials used by the firm ((211028_NE1: 15-18), (211118_NE3: 14-16)).

This data was used for the sustainability report and the CDP report that the firm published (211028_NE1: 34). NE1 explained that the data collection worked very well in the country where the main site was but that in other countries there could be delay. This delay, however, was usually not caused by the employees and the transmission of data but rather by the landlords or electricity providers which delivered the data at different times (211028_NE1: 36). Therefore, it was not a problem to get the data but to get it in the right time span for the sustainability report (211028_NE1: 38). Altogether, the collection of data was considered to work well (211118_NE3: 51-52).

In line with Gibassier and Schaltegger (2015), I furthermore asked about the connection of internal carbon management accounting and external carbon reporting. The environmental department collected the data and the sustainability communication department reported the results via sustainability report and website (211102_NE2: 33-38). Both was closely linked to each other (211118_NE3: 45-51).

Carbon management – environmental experts

The firm was involved in two management systems related to carbon, the ISO 14001 environmental management system and the ISO 50001 energy management system (211028_NE1: 7-10). The energy management system was implemented only within the country where the firm had its headquarters but within the foreign sites, other energy audits

were carried out every four years (211118_NE3: 12). The experts saw one main challenge of the energy management system within the requirement of constant improvement which these systems brought about. Going beyond the ‘low-hanging fruits’ of energy and carbon reductions was not easy as the firm had been active on this pathway for several years already (211028_NE1: 39-44). Another challenge was that other departments did not fully recognize the necessity of the implementations of the systems. The people of the environmental department stayed ‘patient’ and tried to convince the other departments of the importance of the systems (211118_NE3: 53-54).

Carbon and environmental initiatives and responses – environmental experts

The sustainability experts mentioned several carbon and environmental initiatives carried out by the firm. One expert mentioned the carbon compensation project in a developing country (211028_NE1: 60) as well as the use of production material with FSC [forest stewardship council] certification (211028_NE1: 62-64). Also, the use of LEDs (light-emitting diodes) was mentioned (211118_NE3: 82).

Carbon strategy – environmental experts

The head of the environmental department reported directly to the board (211118_NE3: 8-9). The firm declared some employees as site ‘sustainability ambassadors’ who were responsible for sustainability activities besides their other responsibilities within the firm (211102_NE2: 8).

The firm had set carbon reduction targets according to the Science Based Target approach, more specifically to reduce scope 1 and 2 emissions by 50% and the scope 3 emissions by 25% until 2025 with 2015 as the baseline year ((Sustainability report 2020), (211102_NE2: 28)). In 2020, the 2025 target was almost reached (211102_NE2: 28).

Carbon communications and collected energy and carbon data – environmental experts

As communication channels the experts mentioned the sustainability report, CDP, Climate Partner compensation and Science Based Targets (211028_NE1: 19-20). Emphasis was put on the key performance indicators of carbon, which were presented within the sustainability reports. Those were CO₂-equivalents for the scopes 1, 2 and 3, CO₂-equivalents per revenue and also per headcount. The underlying standard was the Greenhouse Gas Protocol (211118_NE3: 34-40). One expert explained that they worked with an agency which made graphics out of the figures so that the figures were easier to interpret and that the goal was to make them even more ‘consumable’ for the public but that, so far, the figures were only

communicated via the sustainability report (211102_NE2: 38). Furthermore, the experts published CO₂-equivalents per ton of used material ((211028_NE1: 26), (211118_NE3: 27-32)) and lately, they had published the product CO₂-footprint of a typical product (211102_NE2: 23-26). Another important factor besides carbon was the recycling quota (211102_NE2: 28).

The sustainability experts stated that the key performance indicators, especially the corporate carbon footprints, had relatively high credibility ((211118_NE3: 44), (211102_NE2: 30)). One expert believed that there was ‘no indicator which [could] be calculated in a better manner’ (211118_NE3: 44).

When it came to sustainability communications, one expert explained that so far, the sustainability activities of the company are not so well known in the public as the firm has not been talking much about those activities. While stakeholder with direct contact such as suppliers, NGOs, auditors or associations know about the sustainability activities, a lot of customers do not (211102_NE2: 56).

The firm had, for a long time, emphasized other topics than sustainability and even communicated that other topics were of more importance. Sustainability has been important but sustainability communications has not. But since recently, the topic has become more and more important as the market and the customers demanded it and the customers saw it as an impulse to buy the products of the firm as the customers gained more trust in a company which considered sustainability. That was the reason why the firm currently worked to enhance sustainability communications, especially towards the customers (211102_NE2: 56).

And the expert expressed that there was now a sustainability ‘vibe’ in the company that lead to emphasis not only on carbon but also on many other sustainability topics (211102_NE2: 54).

Carbon performance – environmental experts

Regarding carbon performance, the sustainability experts were more knowledgeable than the customers. They defined carbon performance as ‘how [...] [the firm managed] to minimize its CO₂-values, therefore to become more efficient’ (211028_NE1: 46), or ‘presumably the performance of our CO₂-footprint which means how it changes positively [...] [or] negatively’ (211102_NE2: 48).

When asked about the comparability of carbon performance among companies, for example among the firm and its nearest competitors, the sustainability experts gave similar answers: One stated that it was well comparable among the nearest competitors because the firms came from

the same industry. The carbon performance of firms from other industries might be difficult to compare with the firm's performance (211028_NE1: 52-54). The other one also thought it was comparable 'among companies that work in a similar manner' but that the scope 2 emissions were dependent on the electricity mix of the country, for example characterized by nuclear power in France or coal power in Poland (211118_NE3: 71-76). One expert thought that the firm's carbon footprint should be less than one from a firm that produces something 'extreme', something more energy-intensive (211102_NE2: 52). Two experts also brought up that not all of the competitors communicated the (carbon) data like the firm did ((211028_NE1: 52-54), (211102_NE2: 52)).

When asked about the subjective assessment of the firm's carbon performance on a scale from 0 to 10, where 10 was the best, the interviewed experts answered differently: one first stated '7', then turned to '5' because the expert thought that internally, a lot had already been done and a lot of efficiency measures had been carried out. But when it came to scope 3 emissions, within the supply chain, there was a lot of potential for improvement, regarding data collection and actual measures (211028_NE1: 48-50). The second one also saw 'potential' for improvement within the carbon reductions but stated '6-7' (211102_NE2: 50) and the third one only gave '3-4' points because as an expert s/he had the 'knowledge about what to improve' and s/he was feeling like s/he had to 'push the other [...] [employees] a little bit' into the right direction. At the same time, s/he assumed that others might state something between '6-8' because the firm had been active in the field for more than a decade and had also published the sustainability reports since then (211118_NE3: 67-70). Altogether, the average estimation of carbon performance of the sustainability experts was rather low.

When asked about certain features of carbon performance, initiatives in which the company was already doing well, the experts mentioned the ISO 50001 certification of an energy management system and the corresponding measures carried out (211028_NE1: 56-58) and the setting of the carbon target and a specific sustainability 'vibe' within the company that people really wanted to reach the carbon goals (211102_NE2: 54) and that the company put more emphasis onto sustainability than competitors (211102_NE2: 56). Furthermore, two initiatives were mentioned: the analysis of products according to their sustainability impact and the ambition to question packaging and sending options with change of sending options in other countries, for example carbon neutral sending (211102_NE2: 54). An expert also explained energy efficiency measures:

We introduced LED everywhere, we evaluate our running machines and new machines energetically and have good programs to save energy. [...] We also have a job bike to involve our employees [...] to become a little carbon conscious. [...] What furthermore characterizes us is that we still have potential in the areas of mobility, company cars and business trips, and in the area of material input (211118_NE3: 77-82).

Also, the expert stated that the carbon reporting fulfilled high scientific standards (211118_NE3: 77-82).

Unit/group 3: Other stakeholders of the firm

The other stakeholders can be divided into other internal stakeholders and other external stakeholders. Other internal stakeholders were two participants from the production, one from the purchasing department and one from the product marketing department. The other external stakeholders were an employee of the main supplier of the firm and also a member of an NGO that collaborates with the firm.

Perception of the company – other internal stakeholders

The internal stakeholders described how they and other stakeholders perceived the firm. Sustainability was considered an important topic by all interviewees ((211124_ZEK: 9-12), (211223_MAR: 23-26), (211202_PR1: 69-72), (211221_PR2: 39-42)). The marketing department communicated the sustainability initiatives of the firm to the customers. Herein, it worked closely with the environmental department. Recently, they have started to scan the products according to sustainability criteria and carry out a sustainability ranking for products together. Some products showed the FSC stamp already (211223_MAR: 23-26). The firm also carried out customer surveys which gave the impression that customers put a lot of emphasis on sustainable consumption and also the FSC stamp nowadays (211223_MAR: 27-30). There were also surveys for the suppliers of the company, established by the purchasing department. These surveys indicated that the suppliers also emphasized sustainability and saw the initiatives of the firm as positive (211124_ZEK: 21-24). Furthermore, some suppliers saw the firm as a role model and imitated initiatives to improve the environmental performance of their own firms (211124_ZEK: 31-36). The production managers, however, stated that not all of the employees in production emphasized sustainability as much as they themselves or the people from the environmental department ((211202_PR1: 69-72), (211221_PR2: 39-42)). While some production workers were interested in sustainability, others rather wanted 'to do their work and then go home' (211202_PR1: 69-72).

Sustainability was considered a topic which has been rooted within the company's operations for a long time and of which the importance will further increase in the future (211221_PR2: 39-42).

However, besides the clear sustainability orientation, the company's other main focus was still seen in quality aspects. One employee stated: 'We have the best products' with high quality combined with a sustainability focus and the products have a long lifespan (211223_MAR: 39-44). When trying to emphasize sustainability aspects, there seemed to be no compromises when it comes to keeping up the quality of the products ((211202_PR1: 34-38), (211221_PR2: 61-62)), quality always came first. However, the firm implemented a lot of sustainability measures to save carbon and energy, for example (211202_PR1: 34-38).

The firm was considered a large firm, a market leader and a very good local employer not only by the customers, but also by the employees, the other internal stakeholders ((211202_PR1: 132-135), (211221_PR2: 62)).

Another aspect typical to the firm were the seasonal fluctuating operations of the company. The main production took place in one particular season and during the rest of the year the firm carried an overcapacity of the machinery park (211221_PR2: 52). The firm was considered to be very reliable when it came to delivery times for the customers (211221_PR2: 62).

Perception of the company – other external stakeholders

The supplier also pointed to the high-quality aspiration of the supplier firm. The suppliers' 'origin [...] [was] that [...] [they had] to produce a product that's always perfect' (211203_SUP1: 120). Also, the analyzed firm was regarded as very quality-oriented with a very easy app to customize the products in a 'low-threshold' manner for the customers (211105_NGO: 46-47).

Carbon accounting – other internal stakeholders

When asked about connections of the production and the carbon accounting of the environmental department, the production managers stated that there was hardly any connection except for energy management and the transfer of oil, gas and electricity data (211202_PR1: 19-26). The firm used several information systems to collect, calculate and report carbon data. Within the energy measurement system, 'the firm [...] [was] prepared to measure around 60-65% of the main large users by capturing and documenting the measured values' (211202_PR1: 27-33). These values were then used by the production department or the environmental

department for the calculations (211202_PR1: 27-33). By main large users the interviewee meant single production halls, climate technology, cold water sets or compressors: things which could be measured by the system as single units (211202_PR1: 27-33).

Carbon accounting – other external stakeholders

The other external stakeholders didn't give insights into carbon accounting phenomena of the firm.

Carbon management – other internal stakeholders

In line with the management systems ISO 50001 and 14001 (energy and environmental) the firm aimed at the 'goal to become better and better' (211202_PR1: 34). This steady improvement ambition was deeply embedded within the management systems idea. The interviewees saw the challenges of the management systems in its complexity (211124_ZEK: 59-60) and the high documentation efforts it brought about. A way to deal with this extra effort was to collaborate with the environmental department and do the work jointly (211202_PR1: 92-99).

Carbon management – other external stakeholders

The supplier firm also had an ISO 14001 environmental management system implemented (211203_SUP1: 66). The interviewee also thought that the firm was 'on a quite high level' when it came to carbon footprint and energy consumption reduction and that 'the next steps [would] get more difficult' (211203_SUP1: 86). This estimation was similar to the view of the sustainability experts. The member of the NGO had no knowledge about the firm's environmental management system (211105_NGO: 26-27).

Carbon and environmental initiatives and responses – other internal stakeholders

The other internal stakeholders also mentioned the use of the FSC stamp on the purchased papers ((211223_MAR: 19-20), (211221_PR2: 35-36), (211124_ZEK: 19-20)) and the carbon compensation project in a developing country ((211223_MAR: 21-22), (211221_PR2: 37-38), (211124_ZEK: 76)) as well as a climate-neutral distribution to the customers (211223_MAR: 21-22). In the context of plastic prevention one interviewee mentioned the use of a biological degradable product part and recycled plastics for the products (211223_MAR: 19-20). Another one emphasized plastic prevention within purchasing and production (211124_ZEK: 25-26). Also, when it came to (carbon) efficiency initiatives, the firm had carried out at least three projects: improvements in the heating systems (oil heating to gas heating in existing buildings

and a new building with geothermal heating) (211202_PR1: 122-130), establishment of new windows (211202_PR1: 131) and the use of LED lighting (211223_MAR: 34). One interviewee was responsible for the Supply Sustainability Award which was brought about in 2020 (211124_ZEK: 4) and talked about potential improvements in transportation within the firm and along the supply chain (11124_ZEK: 13-14). For the award, the firm asked some 300 suppliers about their sustainability initiatives (Sustainability report 2020).

Carbon and environmental initiatives and responses – other external stakeholders

The employee of a supplier firm stated that they had carried out a life cycle analysis of their product including their own supply chain and also the impact of their product within the customer firm which I analyze. This life cycle analysis helped the supplier to get an overview of carbon emission along the supply chain (211203_SUP1: 39-40). In collaboration with the analyzed firm, plastic prevention also played a role for the supplier (211203_SUP1: 33-34), (211203_SUP1: 49-50). The employee also mentioned the importance of the FSC stamp certification (211203_SUP1: 34), (211203_SUP1: 47-48)). In collaboration with the NGO, the analyzed firm carried out several biodiversity projects at their main site and helped the NGO to acquire land for further biodiversity projects elsewhere (211105_NGO: 14-19). Also, the firm took part in a local project which aims at ‘cleaning up the city’ (211105_NGO: 20-21). The NGO interviewee was well informed about the sustainability reports of the company and ‘diverse other environmental protection initiatives’ of the company (211105_NGO: 20-21).

Regularly, a stakeholder survey had been capturing the opinions of eleven different stakeholder groups of the firm: employees, suppliers, owners, lenders, customers, social groups, auditors, associations, politics, media and research or universities. The firm was also active in several political associations (Sustainability report 2020).

Carbon strategy – other internal stakeholders

The other internal stakeholders emphasized the continuous improvement of the management systems and the carbon target (211202_PR1: 61-65). However, the production manager did not see that the goals of energy savings were broken down from the company level to the level of the production (211221_PR2: 39-42).

Carbon strategy – other external stakeholders

The supplier employee found that ‘the direction [...] [of the sustainability orientation was] clear’ and that his firm and the analyzed firm agreed upon this direction (211203_SUP1: 71-72).

The NGO member pointed to a challenge of the carbon strategy of the firm:

The product as such causes an environmental burden within the production under some circumstances and one tries to optimize the processes in operations so that the negative effects onto the environment are minimized (211105_NGO: 34-35).

Carbon disclosure, communications and collected energy and carbon data – other internal stakeholders

The main internal and external communication channel, ‘the main source of information’ (211124_ZEK: 43-44) when it came to reporting of carbon and energy data was considered to be the annual sustainability report which had been published for 10 years ((211202_PR1: 39-44), (211223_MAR: 10), (Sustainability report 2020)). This report was a source of knowledge for interested employees (211124_ZEK: 37-38). There were also training programs for sustainability for employees (211124_ZEK: 39-42)

Suppliers were activated via a supplier survey and the Supply Sustainability Award which started in 2020 (211124_ZEK: 4).

The other internal stakeholders believed that the key performance indicators such as the carbon footprints were reliable. The separation of scope 1-3 was considered helpful (211124_ZEK: 51-58). One employee stated that the carbon footprint per material throughput should be more reliable than the carbon footprint per headcount as the operations were highly seasonal and in the main season there were a lot more employees there (211202_PR1: 49-60).

The sustainability activities had become ‘more broad’ in recent years, for example products were screened according to sustainability criteria since 2020 and products should become better and better ((211223_MAR: 19-20), (211223_MAR: 23-26)). Furthermore, a more sustainable product had been introduced in order to ‘do more for sustainability’ step by step within the range of products (211223_MAR: 27-30).

The expert expressed that s/he believed that sustainability had to do with the ‘public image’ and that this will become more and more important over the coming years. S/he thinks that the firm wanted to communicate that the products were sustainable, with a ‘good conscience’, which is also important for the customers (211223_MAR: 26).

Carbon communications and collected energy and carbon data – other external stakeholders

The supplier employee and the NGO member didn't know about the exact key performance indicators of the firm ((211203_SUP1: 21-26), (211105_NGO: 28-30)). The NGO member, however, was aware of the fact that those could be found within the sustainability report and everyone could theoretically read about them (211105_NGO: 28-30). When asked about the reliability of carbon indicators the NGO member stated that the underlying calculation procedures always had to be considered but that s/he had trust in the procedures of the firm as the firm was 'very ambitious in this sector' (211105_NGO: 32-33).

Carbon performance – other internal stakeholders

The other internal stakeholders had some knowledge about carbon performance and defined it as follows: 'a quotient [...] how well we are in the carbon emissions or in the carbon reduction' (211223_MAR: 32-33), 'saving of CO₂, the footprint of CO₂ has to become smaller' (211202_PR1: 104-105), 'a term of efficiency [...], how much output I generate, for example, with the input of [...] [a certain] amount of greenhouse gas or CO₂ emission' (211221_PR2: 49-50) and 'an indicator for the CO₂ emissions, the CO₂ impact, an indicator to make that measurable' (211124_ZEK: 61-62).

When asked about the comparability of carbon performance among companies, for example among the firm and its nearest competitors, the other internal stakeholders gave similar answers. They all thought the figures were comparable when the same industry or similar products were considered:

One has to consider similar branches, for example both should be producing firms. If we take a competitor, that is similar to us and also produces products and not only sells online with outsourced production, it is comparable (211223_MAR: 36).

One said that if the firms produced 'a similar product, it should be comparable' depending on the 'basis figures' (211202_PR1: 116-121). One said:

I would say it is comparable because we [and our nearest competitors] produce similar products on surely similar production paths and therefore we have very similar or the same challenges (211221_PR2: 53-54).

And the last one said:

Within the same industry, I would say, there is a certain comparability. If we speak about a producing firm and a small agency then it would be a lot more difficult (211124_ZEK: 65-66).

When asked about the subjective assessment of the firm's carbon performance on a scale from 0 to 10, where 10 was the best, the interviewed persons answered differently: one stated a rather high figure '7' (211223_MAR: 34). The reason for the high figure was seen in the high amount of initiatives in the past like LED lighting and a lot of other carbon reduction measures (211223_MAR: 34). One stated only '6' due to a high loss rate in production (211202_PR1: 106-115), one stated '4-5' outside of the main season and '7-8' during the main season as the machine park was working more efficiently with the higher production amounts. S/he also emphasized the loss rates (211221_PR2: 51-52). The last one stated '8' because of the strong sustainability focus of the firm (211124_ZEK: 63-64).

When asked about certain features of carbon performance, initiatives in which the company was already doing well, the interviewees emphasized the 'high value of sustainability [focus] within the company which is also anchored at the board level' (211223_MAR: 38). One interviewee appreciated that there were 'only few requirements' or standards coming from the environmental department and the board and that still people aimed at reducing the loss rate and had a high 'consciousness' about sustainability. Furthermore, s/he states that the lack of requirements actually led to a high flexibility within the sustainability initiatives. S/he put the quality aspiration before the sustainability aspiration stating that

It is not our main goal to be sustainable but while achieving our business goal which is making customers happy with produced [...] products, we want to achieve the maximum sustainability (211221_PR2: 55-60).

This matched the impression that targeted sustainability communications in connection with the product properties within the firm were a rather recent phenomenon.

Carbon performance – other external stakeholders

The other external stakeholders also had some knowledge about what carbon performance could be. The supplier employee defined it as their product carbon footprint which had been optimized by means of a life cycle assessment (211203_SUP1: 77-80) and the NGO member defined it as the way how one can reduce the CO₂-footprint of a company (211105_NGO: 38-39). When asked about the comparability of carbon performance among companies, for example among the firm and its nearest competitors, the other external stakeholders gave different answers. The supplier had no knowledge about carbon performance comparability but the NGO member was the only one who evaluated the comparability of carbon performance as 'difficult' as the location of the companies played a role as well as the production conditions (211105_NGO: 42-43).

When asked about the subjective assessment of the firm's carbon performance on a scale from 0 to 10, where 10 was the best, the interviewed persons answered similarly: The supplier employee stated '9' (211203_SUP1: 87-102) and the NGO member '8' (211105_NGO: 40-41).

When asked about certain features of carbon performance, initiatives in which the company is already doing well, the NGO member emphasized 'the work of the firm on several fields': the production and the high amount of chemical recycling, the employees who also thought in terms of sustainability, for example by using bicycles, and the development of the sites themselves, the ecological optimization of the sites, as well as the consideration of the suppliers in carbon terms (211105_NGO: 44-45). Altogether, the average estimation of carbon performance of the other stakeholders was rather high.

DISCUSSION

Implications for research

This research examines stakeholder perceptions in the context of environmental and carbon activities of a large, manufacturing firm from Europe and analyzes the related corporate sustainability communications in form of a single case-study (Yin, 2014).

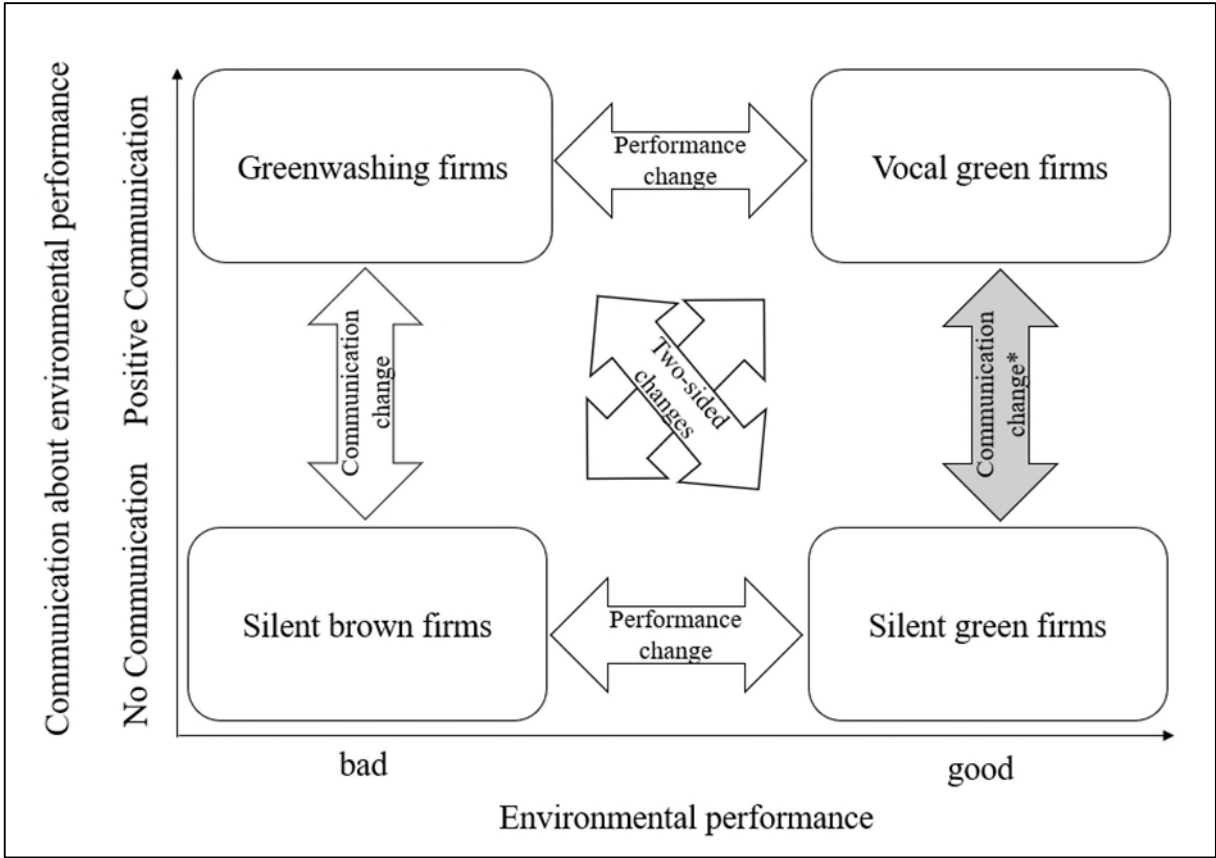
The analysis revealed that the perception of the company as a whole was similar in all groups and mostly positive. However, the customers had almost no knowledge about sustainability activities and communications. The firm was seen strongly connected to its quality aspiration which has been mentioned by all different groups of interviewees. That means that the quality of the products played a central role for the firm. Due to the character of the main products of the company, the firms' dominant communication strategy has been the emphasis of the quality and longevity of the products. This quality aspiration is also reflected in the common history of the main supplier and the company. But not only the employee of the supplier emphasized this, also the internal stakeholders.

At the same time, however, the sustainability experts and the other internal stakeholders, the NGO member and the employee of the supplier expressed that the firm has been active in the field of sustainability for more than 10 years already and this research revealed multiple sustainability initiatives of the firm, for example energy management, a process-related initiative. During the last few years, the involved staff has also introduced sustainability initiatives directly linked to the product: They now brought up a more sustainable product, they use an environmental standard of the supplied products, the FSC stamp for paper, they made it possible to compensate for the carbon emissions caused by the products by means of a

deforestation project in a developing country, they use less plastic for their products and have established carbon neutral sending.

The sustainability initiatives of the firm are worthwhile and the firm can be classified as a ‘green firm’ (Delmas & Cuerel Burbano, 2011). However, it seemed like communications regarding the sustainability of the products themselves had taken off only recently. The firm has been active in sustainability and published the sustainability reports but rather emphasized its quality aspiration in the past. In this sense, the firm appeared as a ‘silent green firm’ as of Delmas and Cuerel Burbano (2011) which was active in sustainability manners but didn’t communicate much about it (except for the sustainability report). While Delmas and Cuerel Burbano (2011) distinguish between four categories, my research showed that also transition phases between the categories exist. In this case study, the analyzed firm was in transition between silent green firm and vocal green firm. Thereby, this study can extend existing theory. Figure 1 shows my extension of the model of Delmas and Cuerel Burbano (2011):

FIGURE 1



Extension of the model of Delmas and Cuerel Burbano (2011)

*Transition observed in the case: from silent green to vocal green firm

In the case, the firm was in transition from a silent to a vocal green firm. Reasons why the firm was silent initially was mainly the firm's quality focus and it seemed that in the past, the firm did not want to provide customers with information that might be distracting them and their buying decisions from the firm's products. There might have been a fear of greenwashing accuses, but the interview data gave no further proof for that.

The reason for the shift from silent green firm to vocal green firm was seen mainly in changing market pressure and customer demands by the interviewees. This is in line with Siebenhüner and Arnold (2007) who find different explanations for organizational learning in the context of climate change mitigation and sustainable development.

The analyzed firm reacted to changes in society towards a sustainability vibe and analyzed changing customer demands by means of stakeholder questionnaires. As there was a shift in customer demands and market conditions and the firm was aware of the importance of its public image, the firm promoted new products and extended sustainability communications. Sustainability was also important to current or potential employees and one interviewee described the positive vibe within the company. The interviewees did not emphasize competition pressure in this context, probably as the firm was market leader and this kind of pressure to become greener was more apparent for smaller competitors.

The research also pointed to the idea of dispositional skepticism (Vries et al., 2015) in the case, as it seemed as if the analyzed firm had been holding back sustainability communications over a period of some years. It is possible that the managers of the firm were holding back sustainability communications as they were worried about potential accusations of greenwashing from external stakeholders. Therefore, the research shows that not only large energy firms but also large manufacturing firms potentially suffer from greenwashing accuses. If, and to what extent, this skepticism was prevailing, remains unclear and could be analyzed by future research.

Another topic that was perceived as a controversy was the question whether the products were harmful in the context of environmental protection or not. A sustainability expert expressed his attitude that the products of the firm caused no harm. It was also emphasized that the recycling quota of chemicals was very high. In contrast to that, the NGO member believed "that the product as such causes an environmental burden [...] under some circumstances and that [the firm] tries to optimize the processes in operations so that the negative effects onto the environment are minimized" (211105_NGO: 34-35). One can say that the firm is dependent on

certain chemicals but tries to minimize their use. Even though the products themselves and the productions certainly cause environmental harm, the research revealed several ambitious sustainability initiatives such as the science-based carbon targets approach.

These environmental initiatives can be considered company responses to stakeholder pressure in line with Sprengel and Busch (2011). In the following Table 2, I separate the initiatives and sort them into the response categories of Sprengel and Busch (2011). Furthermore, I sort them into the categories of Furlan Matos Alves et al. (2017) and Stüwe (2023).

TABLE 2 Response categories

Number	Category (Sprengel and Busch (2011))	Empirical result found?	Keywords of empirical results	Distinction in line with Furlan Matos Alves et al. (2017) and Stüwe (2023)
1	Increasing GHG emission efficiency	✓	Alternative heating systems, windows and lighting (LED)	Process
2	Informing stakeholders of the company's efforts	✓	Sustainability report, stakeholder survey, supply chain award	Other
3	Engaging in political process regarding future reduction regulation	(✓)	Stakeholder survey, membership in different political associations	Other
4	Exploring new markets or environments with less pressure	-	Operations in Europe only	Logistics
5	Increasing their emission limits or offsetting	✓	Compensation project in developing country	Other
6	Reduction of production and sale of GHG-intensive products	✓	Use of less plastic in existing products	Product
7	Seeking to become largely independent of direct GHG emissions	(✓)	Heating system	Process
8	Outsourcing GHG intensive processes or technology	-	Operations in Europe only	Logistics

Sprengel and Busch (2011) derive four response strategies that companies choose while facing stakeholder pressure to reduce carbon emissions. According to the interview results, one could identify the analyzed firm as an ‘emission avoider’ because relatively much input is put into

internal means of carbon reductions and the firm takes carbon reductions seriously. As the firm focused mainly on the ‘internal measures to reduce or avoid GHG emissions’ instead of external communications or lobbying, the firm (at least in the past) can be considered such an ‘emission avoider’ (Sprengel & Busch, 2011, p. 360).

In this case study, the product-related initiatives were of high importance. The shift in sustainability communications towards a broader stakeholder field was mainly focusing on sustainability aspects of the product, whereas the process-related initiatives, such as the environmental management, had been dominant in the past years. Like in Gibassier and Schaltegger (2015), there is a very close connection of internal carbon management accounting and external carbon reporting. The environmental department collects the data and the sustainability communication department reports the results via sustainability report and website.

Implications for practice

This single case study of a large, European manufacturing firm is of special importance as the firm can deal as a role model for other firms. The analyzed company is an interesting example for a firm that is ambitious in sustainability activities and stakeholder management but that has, over many years, not straightforwardly communicated its activities to its customers. Mainly emphasizing the ambition to make the best and most reliable products, it seems like the communications of sustainability activities could not really unfold in the past. The interviewed customers had a lot of knowledge about the products and were very satisfied with the handling and the delivery times but they had no knowledge about the multiple sustainability activities of the company. Only recently, the firm has found a balance about how to communicate product quality and sustainability, amongst others by adding sustainability attributes to the product itself, i.e. by introducing product-related sustainability initiatives: the use of FSC certification, the possibility of compensation of the carbon emissions of the product, the use of less plastics for the products as well as the carbon neutral sending. In this manner, the sustainability activities are touching the core-business of the firm now.

Sustainability (and communication) managers might take notice of the possibility to communicate quality aspects of the products and sustainability side by side. In this manner, greenwashing accusations might be prevented just like in Vries et al. (2015) who find that large energy companies should not disclose environmental information alone but along with economic information to appear more trustworthy to stakeholders. Holding back environmental information due to fear of greenwashing accusations is not a good strategy, according to Vries

et al. (2015). Therefore, it seems like the analyzed company and the sustainability communications are well equipped for future success and stakeholder pressures.

For NGOs and customers, it might be interesting to find that there are silent green firms in practice indeed and that they might not have heard about their existing sustainability activities yet. This means that it is worthwhile for stakeholders to closely analyze the firms' publications and communication channels or benchmark the firm in the sense of Stüwe et al. (2023) before making judgements about a firm's carbon or sustainability performance.

If the firm continues its sustainability communications, hopefully, all other stakeholders, especially the customers, will become more aware of the multiple sustainability efforts that the firm is already carrying out and the high ambitions the firm has due to its science-based target approach. The research reveals the choices of sustainability projects of a company which can deal as an inspiration to researchers and practitioners as they reflect an interesting approach of sustainability management.

Limitations of research and potential for future research

This research is limited in several ways. First of all, only three groups of interviewees have been selected even though the firm defines eleven stakeholder groups for itself. Besides the customers, the sustainability experts, the other employees, the supplier and the member of an NGO further stakeholders could have been selected, for example other NGOs, investors and the media like in X. Luo, Zhang, and Zhang (2021) or politics in the context of carbon disclosure like in X. Luo, Zhang, and Liu (2022). This could be great potential for further research. Then, more and longer interviews could be carried out for every group. While the interviewed customers, for example, had almost no knowledge about the firm's carbon activities and initiatives, a greater sample size of customers might have produced a different result. As this is a single case study, multiple case studies with the same research focus would be interesting. This could allow to compare different firms with each other and find out if transitions from silent green firms to vocal green firms often bring about a shift from process-related to product-related sustainability initiatives.

It would also be very interesting to know which technical innovations will enhance the firms' pathways to sustainability even further and how large the carbon reduction potential of these innovations would be. Also, future research could try to find out to which extent the firm and other firms within the manufacturing sector have to deal with greenwashing accusations in the

sense of Vries et al. (2015). Qualitative research like this could furthermore be combined with quantitative research.

CONCLUSION

Based on Yin (2014) and Eisenhardt (1989), I carry out this interview-based study which examines stakeholder perceptions about low-carbon initiatives and sustainability communications in a single case of a large, manufacturing firm from Europe and which also derives response strategies of the firm. I use the three cases of customers, sustainability experts and other stakeholders to examine different stakeholder perceptions. Building on Sprengel and Busch (2011), the study furthermore analyzes environmental response strategies facing stakeholder pressure regarding carbon reductions. In this context, the firm can be categorized as an emission avoider in line with Sprengel and Busch (2011). The corporate strategy prevailing in the past can be described as understating sustainability success and emphasizing a quality notion of the products and the firm appeared to be a ‘silent green firm’ in line with Delmas and Cuerel Burbano (2011). Only recently, the firm has started to actively communicate the sustainability aspects of its products and operations towards a broader range of stakeholders and is in transition towards a ‘vocal green firm’. The research can show that the model of Delmas and Cuerel Burbano (2011) lacks transition phases and thereby extend existing theory. The study enhances qualitative research about corporate low-carbon initiatives and firms’ pathways to sustainability.

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Appendix (interview guidelines and code system) for:

Green but silent? A case study of the sustainability activities and communications of a large European manufacturing company

Interview guideline for customers of X 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's connection to X
- Which X products did you buy and which further product of X do you know?
- I am talking about sustainability activities of X now. Of which ones have you heard?
- Where and how did you take notice of those sustainability activities?
- About which certified carbon management systems of X do you have knowledge?
- Which energy and carbon data does X collect and which metrics does X calculate from that?
- Where did you find these metrics?
- What is the credibility of such metrics in your opinion?
- What could be challenges to implementation of a sustainability strategy and how might they be overcome?
- As what do you understand the term carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für Kunden von X 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Verbindung des/der Interviewten zu X
- Welche Produkte von X haben Sie gekauft und welche weiteren Produkte kennen Sie von X?
- Mir geht es jetzt um Xs Nachhaltigkeitsaktivitäten. Von welchen haben Sie schon gehört?
- Wo haben Sie von den Nachhaltigkeitsaktivitäten gehört?
- Von welchen zertifizierten CO2-Management Systemen von X haben Sie Kenntnis?
- Welche Energie- und CO2-Daten sammelt X und welche Kennzahlen berechnet X daraus?
- Wo haben Sie diese Kennzahlen gefunden?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Was könnten Herausforderungen bei der Implementierung einer Nachhaltigkeitsstrategie bei X sein und wie könnte X diese überwinden?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet X Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie sonst noch wissen/sagen?

Interview guideline for customers of X 2022 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's connection to X
- Which X products did you buy when and which further product of X do you know?
- How important is sustainability for you, in your day-to-day-life and the products you buy?
- I am talking about sustainability activities of X now. Are you interested in that and of which ones have you heard?
- Where and how did you take notice of those sustainability activities?
- What have you heard of the FSC stamp and the CO2 compensation of X?
- About which certified carbon management systems of X do you have knowledge?
- Which energy and carbon data does X collect and which metrics does X calculate from that?
- Where did you find these metrics?
- What is the credibility of such metrics in your opinion, of the corporate carbon footprint that all sites of X cause?
- What could be challenges to implementation of a sustainability strategy and how might they be overcome?
- As what do you understand the term carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für Kunden von X 2022 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Verbindung des/der Interviewten zu X
- Welche Produkte von X haben Sie wann gekauft und welche weiteren Produkte kennen Sie von X?
- Wie wichtig ist Ihnen Nachhaltigkeit im Alltag und in den Produkten, die Sie kaufen?
- Mir geht es jetzt um X's Nachhaltigkeitsaktivitäten. Interessieren Sie sich dafür und von welchen haben Sie schon gehört?
- Wo haben Sie von den Nachhaltigkeitsaktivitäten gehört?
- Was haben Sie vom FSC-Siegel und der CO2-Kompensation von X gehört?
- Von welchen zertifizierten CO2-Management Systemen von X haben Sie Kenntnis?
- Welche Energie- und CO2-Daten sammelt X und welche Kennzahlen berechnet X daraus?
- Wo haben Sie diese Kennzahlen gefunden?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen, also dem Corporate Carbon Footprint, den alle X Standorte verursachen?
- Was könnten Herausforderungen bei der Implementierung einer Nachhaltigkeitsstrategie bei X sein und wie könnte X diese überwinden?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet Xs Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie sonst noch wissen/sagen?

Interview guideline for sustainability team NE1+3 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- ~~Definition of carbon management system (CMS)~~
- Information about the interviewee's job position
- Which certified carbon management systems does X have?
- How does X adopt information systems focused on energy use and GHG emissions? ~~How does X apply these information systems?~~ So which information systems does X use for the calculation of energy use and GHG emissions?
- How does X collect energy and carbon data and calculate metrics?
- How does X report these metrics to internal and external stakeholders?
- Which KPIs are based on those carbon data and how are they being calculated?
- Which standards are underlying the CO₂-footprint calculations?
- What is the credibility of such metrics in your opinion?
- What is the connection between internal carbon management accounting¹ and external reporting of carbon emissions?
- How well does the data collection of all X sites work?
- What are the challenges to implementation (of CMS) and how might they be overcome?
- As what do you understand carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für das Nachhaltigkeitsteam von X NE1+3 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- ~~Definition von Carbon Management System (CMS)-1~~
- Informationen abfragen zur Position des/der Interviewten
- Welche zertifizierten Carbon Management Systeme hat X?
- Wie adaptiert X Informationssysteme, die sich auf Energieverbrauch und Treibhausgase beziehen? Also welche Informationssysteme nutzt X für die Berechnung des Energieverbrauchs und der Treibhausgase?
- ~~Wie wendet X diese Informationssysteme an?~~
- Wie sammelt X Energie- und CO₂-Daten und berechnet Kennzahlen?
- Wie berichtet X Kennzahlen an interne und externe Stakeholder?
- Welche KPIs werden letztendlich aufbauend auf den CO₂-Daten berechnet?
- Nach welchen Standards wird der CO₂-Fußabdruck berechnet?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Wie funktioniert die Verbindung von internem Carbon Management Accounting² und externem CO₂-Reporting?
- Wie gut funktioniert die Datensammlung aller Unternehmensstandorte?
- Was sind Herausforderungen bei der Implementierung der CMS und wie gehen Sie damit um?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet Xs Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie mir sonst noch mitteilen?

Interview guideline for sustainability team of X 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's job position
- Which stakeholders did X define for itself?
- With which stakeholders do you have contact?
- How does X address the different stakeholders?
- Which carbon data does X collect?
- Which KPIs does X calculate from that?
- What is the credibility of such metrics in your opinion?
- What is the connection between internal carbon management accounting¹ and external reporting of carbon emissions?
- What are the challenges to implementation (of CMS 14001 and 50001) and how might they be overcome?
- As what do you understand carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für das Nachhaltigkeitsteam von X 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Position des/der Interviewten
- Welche Stakeholder hat X für sich definiert?
- Mit welchen Stakeholdern haben Sie Kontakt?
- Wie adressiert X die verschiedenen Stakeholder?
- Welche CO₂-Daten sammelt X?
- Welche KPI werden daraus berechnet?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Wie funktioniert die Verbindung von internem Carbon Management Accounting² und externem CO₂-Reporting?
- Was sind Herausforderungen bei der Implementierung der CMS 14001 und 50001 und wie gehen Sie damit um?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach die Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet Xs Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie mir sonst noch mitteilen?

Interview guideline for production team of X 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's job position
- Which connection points does the production have with the carbon accounting of the environmental department?
- How does X adopt information systems focused on energy use and GHG emissions? How does X apply these information systems? So which information systems does X use for the calculation of energy use and GHG emissions?
- How does X collect energy and carbon data and calculate metrics?
- How does X report these metrics to internal and external stakeholders?
- Which KPIs are based on those carbon data and how are they being calculated?
- What is the credibility of such metrics in your opinion?
- Which requirements about CO2 reductions for the production are coming from the environmental management department?
- Could the production managers always fulfill the requirements of X, for example the use of the FSC stamp?
- How do the employees within production evaluate X's environmental management?
- What are pros and cons of potential requirements about CO2 reductions for you in the production?
- How do you, as an employee identify yourself with X's environmental requirements?
- How well does the data collection of all X sites work?
- What are the challenges to implementation (of CMS) and how might they be overcome?
- As what do you understand carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für das Produktionsteam von X 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Position des/der Interviewten
- Welche Berührungspunkte hat die Produktion mit dem Carbon Accounting der Umweltabteilung?
- Wie adaptiert X Informationssysteme, die sich auf Energieverbrauch und Treibhausgase beziehen? Also welche Informationssysteme nutzt X für die Berechnung des Energieverbrauchs und der Treibhausgase?
- ~~Wie wendet X diese Informationssysteme an?~~
- Wie sammelt X Energie- und CO2-Daten und berechnet Kennzahlen?
- Wie berichtet X Kennzahlen an interne und externe Stakeholder?
- Welche KPIs (key performance indicators) werden letztendlich aufbauend auf den CO2-Daten berechnet?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Welche Vorgaben für die Produktion zum CO2-Einsparen kommen aus der Umweltabteilung?
- Konnten die Produktionsmanager die Vorgaben von X immer direkt umsetzen, z.B. die Verwendung des FSC Siegel?
- Wie stehen die Mitarbeitenden in der Produktion X's Umweltmanagement gegenüber?
- Was sind für Sie in der Produktion Vor- und Nachteile von möglichen Vorgaben zu CO2-Einsparungen?
- Inwieweit identifizieren Sie sich als Mitarbeitender mit den Umweltauflagen von X?
- Wie gut funktioniert die Datensammlung aller Unternehmensstandorte?
- Was sind Herausforderungen bei der Implementierung der CMS und wie gehen Sie damit um?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie X's Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und X's nächsten Wettbewerbern? Warum?
- Was zeichnet X Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie mir sonst noch mitteilen?

Interview guideline for purchasing team of X 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's job position
- Who communicates with the suppliers?
- Why does X, in your opinion, define the suppliers as important stakeholders?
- What does the purchasing department have to do with CO2 KPIs?
- Which requirements about CO2 reductions for the purchasing department and the suppliers are coming from the environmental management department?
- Could the suppliers always fulfill the requirements of X, for example the use of the FSC stamp?
- How do the stakeholder evaluate X's environmental management?
- What are pros and cons of potential requirements about CO2 reductions for the purchasing departments?
- How do you, as an employee, identify yourself with X's environmental requirements?
- Are the employees trained in environmental management?
- How does X report these metrics to internal and external stakeholders?
- Which information systems does X use for the collection of CO2-data?
- Which KPIs are based on those carbon data and how are they being calculated?
- What is the credibility of such metrics in your opinion?
- What are the challenges to implementation (of CMS) and how might they be overcome?
- As what do you understand carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für den Einkauf von X 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Position des/der Interviewten
- Wer übernimmt die Kommunikation mit den Lieferanten?
- Warum definiert Ihrer Meinung nach X die Lieferanten als wichtige Stakeholder?
- Was hat der Einkauf mit CO2-Kennzahlen zu tun?
- Welche Vorgaben für die Einkaufsabteilung und die Lieferanten zum CO2-Einsparen kommen aus der Umweltabteilung?
- Konnten die Lieferanten die Vorgaben von X immer umsetzen, z.B. die Verwendung des FSC Siegel?
- Wie stehen die Lieferanten Xs Umweltmanagement gegenüber?
- Was sind für Sie im Einkauf Vor- und Nachteile von möglichen Vorgaben zu CO2-Einsparungen?
- Inwieweit identifizieren Sie sich als Mitarbeiter mit den Umweltauflagen von X?
- Werden die Mitarbeitenden in Sachen Umweltmanagement geschult?
- Wie berichtet X Kennzahlen an interne und externe Stakeholder?
- Welche Informationssysteme nutzt X für die Erfassung von CO2-Daten?
- Welche KPIs werden letztendlich aufbauend auf den CO2-Daten berechnet?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Was sind Herausforderungen bei der Implementierung der CMS und wie gehen Sie damit um?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet Xs Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie mir sonst noch mitteilen?

Interview guideline for marketing team of X 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- Information about the interviewee's job position
- Which connection points does the production have with the carbon accounting of the environmental department?
- How does X collect energy and carbon data and calculate metrics?
- How does X report these metrics to internal and external stakeholders?
- Which KPIs are based on those carbon data and how are they being calculated?
- What is the credibility of such metrics in your opinion?
- Besides the carbon accounting, what are other marketing-relevant environmental activities of X?
- How do you evaluate the influence of the FSC stamp and the product compensation on marketing?
- How do the employees within marketing evaluate X's environmental management?
- Why are the requirements of the environmental department to production helpful for marketing?
- How much do customers appreciate those and do customers know about them?
- Are there market research results about that? Which ones?
- As what do you understand carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's carbon performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für das Marketingteam von X 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Informationen abfragen zur Position des/der Interviewten
- Welche Berührungspunkte hat das Marketing mit dem Carbon Accounting der Umweltabteilung?
- Wie sammelt X Energie- und CO2-Daten und berechnet Kennzahlen?
- Wie berichtet X Kennzahlen an interne und externe Stakeholder?
- Welche KPIs (key performance indicators) werden letztendlich aufbauend auf den CO2-Daten berechnet?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Neben dem CO2-Accounting, was sind weitere Marketing-relevante Umweltaktivitäten von X?
- Wie bewerten Sie die Marketingwirkung des FSC-Siegels und der Produkt-Kompensation?
- Wie stehen die Mitarbeitenden im Marketing X's Umweltmanagement gegenüber?
- Warum sind die Auflagen der Umweltabteilung an die Produktion hilfreich für das Marketing?
- Wie sehr schätzen die Kunden diese und wissen die Kunden überhaupt davon?
- Gibt es konkret dazu Marktforschungsergebnisse? Welche?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie X Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und X's nächsten Wettbewerbern? Warum?
- Was zeichnet X Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie mir sonst noch mitteilen?

Question guideline for a supplier S of firm X 2021 by Claudia Stüwe

- **Have you read and signed the data security introduction sheet?**
 - Brief research introduction: My research deals with carbon footprint and carbon management systems of your customer company X.
 - **What is your job position, in which department at X's supplier S and what are your tasks?**
 - Why does X, in your opinion, define the suppliers as important stakeholders?
 - What is the role of S in X supply chain? Which products are delivered to X?
 - **Which of S's CO2 measures are reported to X? Scope 1-3?**
 - **What are the key elements of S's environmental strategy?**
 - **Which requirements about CO2 reductions for the supply chain are coming from X?**
 - Could you as a supplier always fulfill the requirements of X, for example the use of the FSC stamp?
 - **How do you as a supplier evaluate X's environmental management?**
 - What are pros and cons of potential requirements about CO2 reductions for you within the supply chain?
 - How do you, as an S employee, identify yourself with X's environmental requirements?
 - **X reports carbon key performance indicators (KPIs) like carbon emissions per ton of product or per employee count. What is the credibility of such metrics in your opinion?**
 - **Does S have an environmental management system? 14001 and 50001?**
 - **What are the challenges to implementation (of such systems) and how might they be overcome?**
 - As what do you understand the term "carbon performance" CP?
 - Would you estimate S's CP as good or bad (Scale 0-10 with 10 as the best)? Why? (In your own opinion.)
 - And how would you estimate the CP of X in your own opinion?
 - **How comparable is, in your opinion, the CP between companies, for example between X and X's nearest competitors?**
 - **What are the main characteristics of X's CP?**
 - **And the main characteristics of S's CP?**
 - What make X/S stand out of competitors?
 - **What else do you want to let me know?**
- German translation
- Datensicherheitsbelehrung
 - Kurze Einführung in die Forschung
 - Informationen abfragen zur Position des/der Interviewten
 - Warum definiert Ihrer Meinung nach X die Lieferanten als wichtige Stakeholder?
 - Was ist die Rolle von S in X's Lieferkette? Welche Produkte werden an X geliefert?
 - Welche CO2-Kennzahlen von S werden an X berichtet? Scope 1-3?
 - Was sind die Kernelemente von S's Umweltstrategie?
 - Welche Vorgaben für die Lieferanten zum CO2-Einsparen kommen von X?
 - Konnten Sie als Lieferant die Vorgaben von X immer umsetzen, z.B. die Verwendung des FSC Siegel?
 - Wie stehen die Lieferanten X Umweltmanagement gegenüber?
 - Was sind für Sie in der Lieferkette Vor- und Nachteile von möglichen Vorgaben zu CO2-Einsparungen?
 - Inwieweit identifizieren Sie sich als Mitarbeitender eines Lieferanten mit den Umweltauflagen von X?
 - X berichtet key performance Indikatoren (KPIs) wie CO2-Emissionen pro Tonne Produkt oder pro Mitarbeitendenzahl. Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
 - Hat S ein Umweltmanagementsystem? 14001/50001?
 - Was sind Herausforderungen bei der Implementierung dieser Systeme und wie gehen Sie damit um?
 - Als was verstehen Sie den Begriff Carbon Performance?
 - Als wie gut schätzen Sie S's Carbon Performance (Scale 0-10) ein, wenn 10 das Beste ist? Warum?
 - Und die von X?
 - Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und X's nächsten Wettbewerbern? Warum?
 - Was zeichnet X Carbon Performance besonders aus? Und S?
 - Was hebt X/S von Wettbewerbern ab?
 - Was möchten Sie mir sonst noch mitteilen?

Interview guideline for NGO Y 2021 by Claudia Stüwe

- Data security introduction
- Brief research introduction
- What is the Y and its aim?
- Ask for information about when the **interviewee** came to Y
- In which department of Y do you work and what are your working tasks there?
- I know that X has a cooperation with the Y. Since when and what is this cooperation about?
- Which sustainability activities of X in O. does the Y support?
- I would now like to talk about other sustainability activities of X now. Of which ones have you heard?
- Where and how did you take notice of those sustainability activities?
- About which certified carbon management systems of X do you have knowledge?
- Which energy and carbon data does X collect and which metrics does X calculate from that?
- Where did you find these metrics?
- What is the credibility of such metrics in your opinion?
- What could be challenges to implementation of a sustainability strategy and how might they be overcome?
- As what do you understand the term carbon performance?
- Would you estimate X's carbon performance as good or bad (Scale 0-10)? Why?
- How comparable is, in your opinion, the carbon performance between companies, for example between X and X's nearest competitors?
- What is characteristic for X's **carbon** performance?
- What makes X stand out of competitors?
- What else do you want to let me know?

Interviewleitfaden für NGO Y 2021 von Claudia Stüwe

- Datensicherheitsbelehrung
- Kurze Einführung in die Forschung
- Was ist der Y und dessen Ziel?
- Informationen abfragen, wann der Interviewte zum Y gekommen ist
- In welcher Position arbeiten Sie und was sind Ihre Aufgaben im Y O.?
- Ich weiß, dass X mit dem Y kooperiert. Seit wann und worin besteht diese Kooperation?
- Welche Nachhaltigkeitsaktivitäten von X in O. unterstützt der Y?
- Mir geht es jetzt um X's andere Nachhaltigkeitsaktivitäten. Von welchen haben Sie schon gehört?
- Wo haben Sie von den Nachhaltigkeitsaktivitäten gehört?
- Von welchen zertifizierten CO₂-Management Systemen von X haben Sie Kenntnis?
- Welche Energie- und CO₂-Daten sammelt X und welche Kennzahlen berechnet X daraus?
- Wo haben Sie diese Kennzahlen gefunden?
- Wie hoch ist Ihrer Meinung nach die Aussagekraft dieser Kennzahlen?
- Was könnten Herausforderungen bei der Implementierung einer Nachhaltigkeitsstrategie bei X sein und wie könnte X diese überwinden?
- Als was verstehen Sie den Begriff Carbon Performance?
- Als wie gut schätzen Sie Xs Carbon Performance (Scale 0-10) ein? Warum?
- Wie vergleichbar ist Ihrer Meinung nach Carbon Performance zwischen Unternehmen, zum Beispiel zwischen X und Xs nächsten Wettbewerbern? Warum?
- Was zeichnet Xs Carbon Performance besonders aus?
- Was hebt X von Wettbewerbern ab?
- Was möchten Sie sonst noch wissen/sagen?

Code system

List of codes	Frequency
Codesystem	277
Features of the interviewees	0
Features of the interviewees > Customer expectations regarding sustainability	9
Features of the interviewees > Customers' purchased products or connection to company	10
Features of the interviewees > Expert's department and tasks of the interviewee	16
Expectations and features of different stakeholders	5
Expectations and features of different stakeholders > Suppliers	7
Expectations and features of different stakeholders > Production	2
Expectations and features of different stakeholders > Customers	5
Perception of the company and the products	0
Perception of the company and the products > Usability of the product	1
Perception of the company and the products > Mentioned features of the company	0
Perception of the company and the products > Mentioned features of the company > Quality aspiration of the company	3
Perception of the company and the products > Mentioned features of the company > Quality aspiration of the company > Quality before sustainability?	3
Perception of the company and the products > Mentioned features of the company > Quality aspiration of the company > Customer satisfaction high	2
Perception of the company and the products > Mentioned features of the company > Quality aspiration of the company > History of the branche	2
Perception of the company and the products > Mentioned features of the company > Fluctuating seasonal operations	3
Perception of the company and the products > Mentioned features of the company > Good local employer	4

List of codes	Frequency
Perception of the company and the products > Mentioned features of the company > Big company, market leader	8
Perception of the company and the products > Mentioned features of the company > A lot of advertisement	1
Perception of the company and the products > Mentioned features of the company > Sustainability orientation of the company	3
Perception of the company and the products > Mentioned features of the company > Reliable delivery times	1
Perception of the company and the products > Mentioned features of the company > Research and development orientation	1
Carbon accounting	0
Carbon accounting > Connection of internal carbon accounting and external reporting	4
Carbon accounting > Data collection	0
Carbon accounting > Data collection > Data collection within Germany	5
Carbon accounting > Data collection > Data collection outside of Germany	4
Carbon accounting > Information systems	6
Management systems	0
Management systems > Features of management systems	4
Management systems > Management system of supplier	2
Management systems > No knowledge of management systems	6
Management systems > Challenges to implementation of management systems	9
Environmental initiatives	0
Environmental initiatives > Carried out other environmental initiatives	0
Environmental initiatives > Carried out other environmental initiatives > Cleaning up the city	1
Environmental initiatives > Carried out other environmental initiatives > Plastic prevention	3
Environmental initiatives > Carried out other environmental initiatives > FSC stamp	7
Environmental initiatives > Carried out other environmental initiatives > Biodiversity at company site and bought land	1

List of codes	Frequency
Environmental initiatives > No knowledge of carbon initiatives	6
Environmental initiatives > Carried out carbon initiatives	0
Environmental initiatives > Carried out carbon initiatives > Increasing GHG emission efficiency (1)	0
Environmental initiatives > Carried out carbon initiatives > Increasing GHG emission efficiency (1) > LED	2
Environmental initiatives > Carried out carbon initiatives > Increasing GHG emission efficiency (1) > Heating	1
Environmental initiatives > Carried out carbon initiatives > Increasing GHG emission efficiency (1) > Sustainability Supply Award	1
Environmental initiatives > Carried out carbon initiatives > Increasing GHG emission efficiency (1) > Life cycle analysis of supplier	1
Environmental initiatives > Carried out carbon initiatives > Reduction of production & sale of GHG-intensive products (2)	0
Environmental initiatives > Carried out carbon initiatives > Informing stakeholders of the company's efforts (3)	0
Environmental initiatives > Carried out carbon initiatives > Engaging in political process regarding fut. reduction reg. (4)	0
Environmental initiatives > Carried out carbon initiatives > Increasing their emission limits or offsetting (5)	0
Environmental initiatives > Carried out carbon initiatives > Increasing their emission limits or offsetting (5) > Compensation project in developing country	5
Environmental initiatives > Carried out carbon initiatives > Exploring new markets or environments with less pressure (6)	0
Environmental initiatives > Carried out carbon initiatives > Becoming largely independent of direct GHG emissions (7)	0
Environmental initiatives > Carried out carbon initiatives > Becoming largely independent of direct GHG emissions (7) > Transportation	1
Environmental initiatives > Carried out carbon initiatives > Outsourcing GHG emissions intensive processes or technolog. (8)	0
Environmental initiatives > Potential future carbon initiatives	0
Environmental initiatives > Potential future carbon initiatives > Windows and insulation	1
Environmental initiatives > Potential future carbon initiatives > Loss rate	1
Environmental initiatives > Potential future carbon initiatives > Customer sensibilization and external reporting	3
Carbon strategy	0

List of codes	Frequency
Carbon strategy > Carbon target	3
Carbon strategy > Challenges of carbon strategy	3
Carbon strategy > No knowledge of carbon strategy	2
Carbon strategy > Role of employees, the environmental department and the board	3
Carbon strategy > Role of employees, the environmental department and the board > (No) regulations from the board or env. department	5
Carbon communications	0
Carbon communications > No knowledge of carbon communications and kpis	12
Carbon communications > Communication channels	6
Carbon communications > Communication channels > Photo competition	1
Carbon communications > Communication channels > Sustainability report and website	3
Carbon communications > Communication channels > Employee sustainability training	1
Carbon communications > Key performance indicators of carbon	11
Carbon communications > Key performance indicators of carbon > Subjectiv assessment of indicator quality	9
Carbon performance	0
Carbon performance > Definition of carbon performance	16
Carbon performance > Subjective assessment of carbon performance	17
Carbon performance > Comparability of carbon performance	13
Carbon performance > Features of carbon performance	12