HUMBOLDT-UNIVERSITÄT ZU BERLIN

Master thesis - Integrated Natural Resource Management (M.Sc.)

# What drives firms to successfully cooperate on climate change?

# - an institutional analysis of the Science Based Targets initiative


Submitted by

**Lea Ottilie Fink**

576218


1st Examiner: **Prof. Dr. Klaus Eisenack**

2nd Examiner: **Achim Hagen, M.A.**


**Division of Resource Economics**

*Faculty of Life Sciences*

*Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences*


Berlin, May 2018

**Abstract**

In consideration of the enormous greenhouse gas emissions gap threatening the global 2°C temperature target agreed in Paris, this study is aimed at increasing the understanding of how institutional arrangements can boost voluntary corporate climate mitigation action in order to bridge this alerting gap. Using the case of the Science Based Targets initiative, this study examines which institutional factors are likely to drive firms to set GHG emission reductions targets that are aligned with the Paris trajectory. To approach this endeavor, seven institutional attributes that Elinor Ostrom has empirically proven to function as collective action drivers in other resource contexts, are firstly, tested for applicability in the specific context of firms collectively acting on climate change, and secondly, used to empirically investigate the institutional relationship between the multi-stakeholder climate initiative under study and the participating companies. The findings indicate that having sufficient information about costs and benefits of the necessary GHG reductions, being able to communicate to expert stakeholders, such as peers, suppliers, investors and NGOs, as well as being informally monitored by those, are structural attributes that are likely to drive firms to voluntarily reduce GHG emissions. For companies to be able to obtain a climate leadership position among knowledgeable stakeholders appears to be the most unambiguous collective action driver in this context. Customers were found to have a very low interest in corporate emissions targets due to the intangibility of the issue, which explains why gaining a positive climate reputation within the general public does not appear to drive the setting of highly ambitious targets. If we want firms to *effectively* contribute to bridging the emissions gap, both voluntary initiatives and policy-making should increase public awareness in order to prevent greenwashing practices as well as further showcase and award verifiable corporate climate leadership.

**Table of Contents**

## List of tables

**List of abbreviations**

| | |
|---|---|
| °C | Degree Celsius |
| CDP | formerly: Carbon Disclosure Project |
| $CO_2$ | Carbon dioxide |
| COP | Conference of the Parties to the United Nations Framework Convention on Climate Change |
| CSR | Corporate Social Responsibility |
| GHG | Greenhous-gas |
| Gt | Gigatonne |
| INDC | Intended Nationally Determined Contribution |
| IPCC | Intergovernmental Panel on Climate Change |
| NDC | Nationally Determined Contribution |
| NGO | Non-Governmental Organization |
| SBTi | Science Based Targets initiative |
| SDA | Sectoral Decarbonisation Approach |
| UN | United Nations |
| UNEP | United Nations Environmental Program |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNGC | United Nations Global Compact |
| WRI | World Resource Institute |
| WWF | World Wildlife Fund |

# 1. Introduction

## 1.1 Problem statement: who will bridge the greenhouse gas emissions gap?

Climate change mitigation, hence the necessary reduction of greenhouse gas (GHG) emissions in order to avert massive global warming, presents a complex social task that requires an immense joint action of multiple institutionally heterogeneous actors. Long-standing efforts for a global governance system finally peaked in 2015 with the Paris Conference of the Parties to the UNFCCC, targeting governments to keep global average temperature *"to well below 2°C above pre-industrial levels"* (Article 2) (UNFCCC, 2015). Even though the agreement can certainly be regarded as long-awaited milestone, the difficulties resulting from the collective action dilemma posed by climate change, such as the existence of large-scale free-riding, seem hardly defeatable by merely relying on a global state-based solution. This is manifest in the fact that global emissions are still rising and further illustrated by the physical insufficiency of the current state pledges (NDCs) to cover even half of the necessary emission reductions, which results in the alarmingly high *"emissions gap"*. This discrepancy between the GHG emissions levels necessary to limit global warming to below 2°C and the GHG levels *"consistent with the global effect of the NDCs, assuming full implementation from 2020"* is demonstrating the need for a boost in global collaboration between governments, industry and the financial community before it will be too late (UNEP, 2017, pp. viii, xiii).

In the light of this evident necessity of immediate and effective collective mitigation action, the role of non-state actors, such as businesses and non-governmental organizations, has increasingly moved to the fore (UNEP, 2017). As we are already seeing an unprecedented polycentric momentum for climate action by non-state actors, further *"supporting and enabling"* those actions will be crucial in order to bridge the emissions gap (Rogelj, den Elzen, Höhne, & Fransen, 2016, p. 637). As companies substantially contribute to global GHG emissions, they subsequently have a large potential to contribute to their reduction, which they have started to tackle by implementing diverse climate management practices, such as the setting of GHG emission reduction targets and engaging in transnational governance initiatives (Bulkeley et al., 2012; Okereke, Wittneben, & Bowen, 2012). Corporate climate engagement has an enormous potential with regard to global emissions reductions and could eventually result in a *"virtuous circle"* by spurring further corporate as well as governmental climate action. If

institutionally supported by suitable policy measures, businesses can be expected to spread technological innovation, change societal norms and lead the socio-economic transformation to a low-carbon future (We Mean Business, CDP, 2016).

This promising mechanism is, however, not even close to developing its full potential. Seeking to enhance this voluntary private sector engagement, one needs to understand how institutional arrangements, *"a complex web of beliefs, norms, rules, and structures"*, are evolving in response to climate change and how to consequently be able to increase their potential as effective mediators between different actors within society (Okereke et al., 2012, p. 12).

### 1.2 Research objective and structure

Against the background of the severe urgency to collectively reduce global GHG emissions both fast and rigidly, it is clearly crucial to deepen the understanding of how to accelerate this process as effectively as possible. Climate change poses an enormous collective action dilemma to the world since its aversion requires enormous *voluntary* actions. The objective of policy-making should thus be *"to facilitate the development of institutions that bring out the best in humans"* (Ostrom, 2010a, p. 665). But how is that done? How do we get individuals to voluntarily contribute to the common good by reducing GHG emissions? To approach these questions we can *"ask how diverse polycentric institutions help or hinder the innovativeness, learning, adapting, trustworthiness, levels of cooperation of participants"* in order to combat climate change – a task that Elinor Ostrom and other scholars have been starting to tackle over the last decade (e.g. Ostrom, 2009a). This thesis wants to contribute to this learning process by shedding light on one specific group of actors that have in this context so far largely been ignored by the research community: *firms*.

The research objective is therefore to deepen the understanding of how institutions can drive collective voluntary climate action among firms. A growing amount of research exists on the firm's specific climate change responses and commonly found strategies (e.g. Aggarwal & Dow, 2012; Dunn, 2002; Hoffman, 2005, 2016; Jones & Levy, 2007; Levy & Rothenberg, 2014). Others have already developed lists of the prevailing *intrinsic* motivations, such as legitimacy-seeking, as well as *external* drivers, for instance, investor pressure, with respect to corporate climate action, however, often resulting in very

different findings (e.g. Backman, Verbeke, & Schulz, 2017; Gasbarro, Iraldo, & Daddi, 2017; Okereke, 2007; Qian & Schaltegger, 2017). All of those studies have created a valuable fundament for analyzing corporate climate action in different contexts and could be consulted when zooming in on institutions that are aiming at enhancing corporate action. On the other side of the "action situation" under study, existing research has tended to focus on the potential of climate initiatives, assuming that they continue to grow in impact (e.g. Bulkeley et al., 2012; Hickmann, 2017; UNEP, 2015). However, finding *"what makes a successful initiative" in* driving corporate climate action, is one of the several important questions to remain (UNEP, 2015, p. vi).

Aiming at contributing to answering this question while concurrently following Ostrom's call for future studies of heterogeneous settings where *"efforts to reduce GHG emissions are actually being taken at less than global scale"* (Ostrom, 2010b, p. 553), an already *successful* collective action arrangement is chosen as the main subject of study: the Science Based Targets initiative. A similar approach was chosen by Finke et al., however, aiming for the opposing objective to find *barriers* to collective corporate climate action by looking at a *failing* institutional arrangement (Finke, Gilchrist, & Mouzas, 2016). To my current knowledge, no study has yet investigated the interaction between voluntarily contributing firms and a climate initiative in order to shed light on a particular collective action arrangement where successful collective action is already observable. This thesis wants to contribute to closing this gap while at the same time contributing to the general understanding of the nexus between collective action theory, firms and climate initiatives.

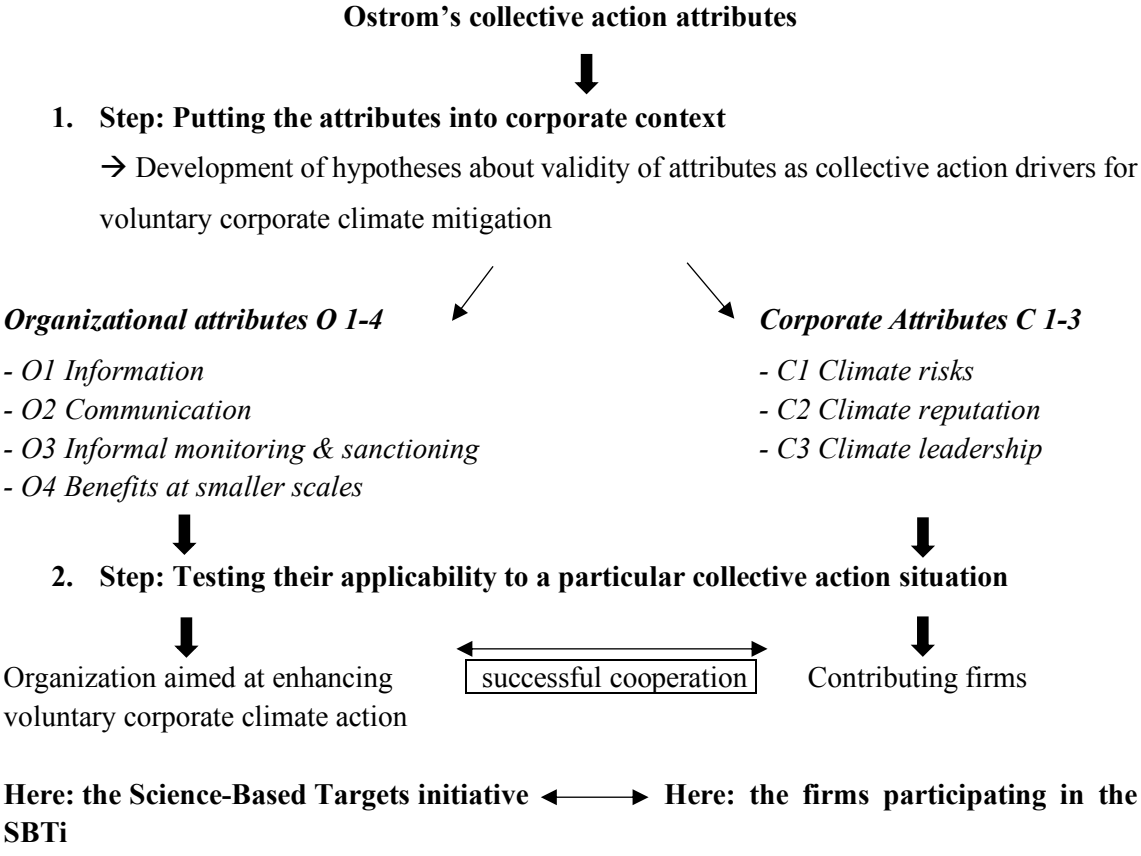
This objective is approached by analyzing the case of the Science Based Targets initiative and their participating firms: As a relatively young multi-stakeholder initiative, the Science Based Targets initiative, in the following referred to as *"SBTi"*, has already succeeded to spawn substantial climate change mitigation commitments among firms. The ambitious GHG emission reduction targets, stated by firms and bundled by the SBTi, have a large potential to contribute to closing the above-mentioned emissions gap – that is, assuming that the number of participating companies collectively contributing will increase as expected. This is why, the SBTi, as promising representative for successful collective corporate action on climate change, presents a suitable case for this research endeavor. A better understanding of this interaction would help not only existing climate protection initiatives and other institutions alike but further potentially assist policy-

makers when trying to enhance voluntary climate action by supporting these institutions through regulatory changes or funding.

When observing a particular setting of cooperation, such as the one created by the SBTi and its participating firms, one needs to *„think about which of the attributes of a particular system are likely to have a major impact on the patterns of interactions and outcomes to be explained"* (Poteete, Janssen, & Ostrom, 2010, p. 359), which I will put into action by zooming in at the Science Based Targets initiative's *"structural features"* that might *"affect the likelihood of voluntary cooperation"* (Ostrom, 2010b, p. 551) and therefore potentially explain the success of this arrangement. Even though *"a clear set of findings from the microsituational level have emerged regarding structural factors affecting the likelihood of increased cooperation"* (Ostrom, 2010a, p. 642), Ostrom stresses the importance of not relying on those findings as a template for other contexts and groups of contributors. Instead, future research should focus on analyzing the applicability of those findings for each collective action focal situation individually. Ostrom herself expected that a shortened list of the attributes that she and others have over decades proven to be widely applicable to different resource contexts are also applicable to the social dilemma of coping with climate change (Ostrom, 2009a). Those attributes will therefore be tested for applicability in this context in order to understand the success of the institutional arrangement between the SBTi and the participating firms. The research questions are therefore:

*Which institutional factors are driving corporate climate action within the Science Based Targets initiative? To what extent can Ostrom's attributes be found to successfully drive the cooperation between the SBTi and the participating firms?*

The following chart serves to illustrate the above explained study design:




The 2nd chapter lays out the theoretical background by presenting two different theoretical views on the governance of climate change (chapter 2.1 and 2.2), before briefly introducing the concept of polycentric climate governance (chapter 2.3). Chapter 3 is zooming in on the role of voluntary corporate initiatives aimed at climate mitigation: in this context, firms are, firstly, approached as responsible actors within a polycentric system, voluntarily contributing to the mitigation of climate change (3.1), secondly, corporate climate initiatives and their potential to bridge the 2°C gap are shortly described (3.2). Thirdly, the main case of this study, the Science Based Target initiative, is presented (3.3) by justifying the case selection as successful climate cooperation setting (3.3.1) as well as giving an overview over the initiative's mode of action (3.3.2). Chapter 4, which contains the "translation" of Ostrom's alleged collective action drivers into the context of firms acting on climate change, is divided into the four organizational attributes O1-4 (4.1), the three corporate attributes C1-3 (4.2) and lastly, a summary table of the resulting hypotheses (4.3). The methodological procedure of the study is outlined in chapter 5 by describing the chosen methods for case selection (5.1), data collection (5.2) and finally,

data analysis (5.3). This is followed by the two analysis-chapters, with chapter 6 containing the results for the organizational attributes and chapter 7 containing a brief presentation of the firms under study and the results for the corporate attributes. In chapter 8 the results are discussed and put into context, future research directions are outlined as well as limitations of the study examined. Chapter 9 comprises the conclusions and practical recommendations that can be derived of the study.

## 2. Do opposites attract? Two theoretical perspectives on the governance of climate change

### 2.1 The pessimist: from the collective action dilemma of climate change mitigation to a global climate regime?

The nature of the problem of global warming has been widely discussed, the narratives, however, are varying substantially regarding the necessary actions based on substantially different assumptions regarding human interaction. Already the classification of climate change as a natural resource problem varies with the angle of perspective: while a stable global climate can be interpreted as a global public good, the atmospheric sinks absorbing GHGs can be seen as a common-pool resource. Both lines of argumentation will be shortly presented in the following.

Paul Samuelson was among the first researchers to divide goods into two categories: private goods and public goods (Ostrom, 2010a). Private goods are characterized by *excludability*: one individual can easily exclude another or make him pay for it, and *rivalry:* if one individual consumes the good, the other cannot. Public goods, on the other hand, are characterized by *non-excludability:* no individual (even those that did not pay for it) can be excluded from the consumption of the good, and *non-rivalry:* the good can be consumed by everyone without being depleted (Samuelson, 1954). A stable climate thus meets both criteria of a public good as there is neither rivalry for its usage nor is it physically feasible to exclude anyone from benefitting from the aversion of massive global warming and enjoying a healthy state of the global climate (Paavola, 2012). Those characteristics usually result in a social dilemma when trying to govern the respective resource since the incentive for opportunistic behavior is naturally high: One benefits of the public good of a stable climate, independently of having contributed a share to its provision or not (Ostrom, 2009a). Conventional theorists have consequently been arguing that public goods necessarily have to be provisioned publicly since markets fail to do so (e.g. Samuelson, 1954). Looking at the concept of market failure is essential when aiming at understanding the argument for public governance of public goods since the control mechanism of the free market through supply and demand does not lead to an efficient and socially optimal allocation of the resource. Francis Bator defined market failure in 1958 as *„[...] the failure of [...] price-market institutions to sustain 'desirable' activities or to stop 'undesirable' activities"* (Bator, 1958, p. 351). Stern called climate change *"the greatest and widest-ranging market failure ever seen"* (Stern, 2007, p. i). Clearly, the

excessive emission of GHG emissions, which is causing extensive alterations of the atmosphere and this way increases the likelihood of various disastrous consequences, such as sea level rise, extreme weather events and severe water stress (Cambridge University Press, 2014), indeed presents an *"undesirable activity"* that the free market does not seem to be able to prevent through the infamous *"invisible hand"* mechanism.

The earth's potential to absorb emitted GHGs, hence *the atmospheric sinks* that have a limited capability to absorb GHGs, can be seen as a common-pool resource that needs to be protected from collective overuse in order to achieve the maximum common benefit, which in this case is the aversion of disastrous consequences of climate change (Paavola, 2012). A resource needs to fulfill two conditions for classifying as a common-pool resource: *rivalry* and *non-excludability* (Ostrom, 1990), which are both applicable to the case of climate change (Paavola, 2008). Rivalry results from the scientific threshold of the atmosphere's maximum capacity to absorb GHGs, the use of one unit of the atmospheric GHG sink can thus not be used by another actor (Paavola, 2008). Accordingly, the capacity needed to absorb a certain amount of $CO_2$ emitted by, for instance, an energy-producer cannot absorb the $CO_2$ of its competitor, instead additional capacity is needed. The second attribute is the substantial difficulty to exclude unauthorized users (Ostrom, 1990), which is clearly given in the case of the aim to prevent resource users from causing GHG emissions. Energy use presents a crucial part of every day's life while the immediate necessity to take actions, the uncertainty about the possible threshold as well as the global nature of the activities and users further complicate the endeavor (Paavola, 2008). Similar to the above described incentive to free-ride on other's contributions in the public good scenario, the incentive for opportunistic behavior here is the physical possibility to maximize one's individual benefit by overusing the sink's capacity (Paavola, 2012). This may lead to the depletion of the resource, as illustrated by the prominent *"tragedy of the commons"* by Garrett Hardin (1968). Due to the physical attributes of the global atmosphere the costs that it would take to exclude unauthorized users are too high to solve the resource problem through the establishment of private ownership rights. This led to the aforementioned rationale of holding public governance responsible, thus perceiving an external – and, in the specific case of climate change: global - authority to protect the earth's climate as the only feasible solution (Paavola, 2012).

Both lines of argumentation hence forecast failure to avert massive global warming without a global enforcement scheme in place. Following this reasoning, perfectly rational individuals who are taking uncoordinated decisions independently of others, decisions that are subsequently purely based on individual benefit-seeking, will fail to voluntarily provide the public good, will fail to sustain the common-pool resource, and will further fail to achieve the socially optimal outcome for everyone – a classic collective action dilemma (Ostrom, 2009a). According to Elinor Ostrom (2010b, p. 551), *"the term 'collective action' refers to settings where decisions about costly actions are made independently but outcomes jointly affect everyone involved",* which is perfectly applicable to the necessity of voluntarily taking on the individual costs of reducing GHG emissions in order to create benefits for all, even enjoyable for those that have not contributed to the public benefit by reducing emissions themselves. The social dilemma thus arises from climate change mitigation costs being local while the benefits are mostly global (Carattini, Baranzini, & Roca, 2015, p. 243). Even though the socially optimal outcome could be obtained if everybody cooperated, since actors will try to minimize individual costs while freeriding on the other's contribution, no one will voluntarily cooperate. Such a collective action dilemma can therefore only be anticipated by implementing an external authority in order to enforce the necessary contributions for the common benefit of the group and thus, minimize the problem of freeriding and opportunistic behavior (Olson, 1967). Following the line of argumentation of the conventional theory of collective action, the future does not look bright for the 2°C temperature target agreed in Paris: no independent decision maker seeking maximum individual short-term material benefits will voluntarily reduce her or his energy use without externally imposed regulations at the global scale (Ostrom, 2010b, p. 551).

With regard to the problem of climate change this implies the call for an international top-down agreement that spans over the majority of the earth's nations since *"no single actor, or even class of actors, acting alone can resolve it"* (Hare, Stockwell, Flachsland, & Oberthür, 2010, p. 602). This call for mandatory top-down action found its first large-scale realization in the Kyoto Protocol in 1997, which was meant to oblige industrialized countries to take verifiable action in order to pave the way for a global solution (Hare et al., 2010). However Nicolas Stern (2007) and other researchers have shown that total emissions would even continue to increase if all Annex I countries cut emissions to zero,

while Non-Annex I countries would continue to grow – a fact that is commonly regarded as underpinning the need for global participation in climate change mitigation.

Even though the striving for a global solution has strong advocates among many researchers as well as policymakers, the process of establishing and maintaining a legally binding regime is both decelerated and hampered by enormous barriers: the sheer complexity of negotiations due to the amount and heterogeneity of nations, the aforementioned high incentive to free-ride and the individual actor's power to merely not participate, which can easily decrease the overall efficiency of a potential agreement, are further aggravated by the urgency and stringency of necessary emission reductions (Hare et al., 2010, p. 603). Efforts on the path to an enforceable global governance scheme have certainly been made: in the shape of the aforementioned Kyoto Protocol as well as the United Nations Framework Convention on Climate Change (UNFCCC). The progress, however, has been stumbling (Carattini et al., 2015, p. 243). And while the most recent UN FCCC (COP21), the *"Paris Agreement",* can certainly be seen as *"nothing less than a centennial benchmark for the human enterprise"* (Schellnhuber, Rahmstorf, & Winkelmann, 2016, p. 649), the current national intended contributions to emission reductions are so far neither binding nor, even if realized, physically sufficient to achieve the aforementioned 2°C temperature target (Rogelj et al., 2016). It seems evident that the pursuit of a global climate regime *"has proved to be a complex and slow process"* (Krabbe, Linthorst, Blok, Crijns-Graus, & van Vuuren, 2015, p. 1057), and even the initial euphoria about COP21 was eventually followed by disillusionment when Donald Trump announced the withdrawal of the U.S. from the Paris Agreement, which is expected to have fundamental consequences for the prospects of compliance with the agreement: The withdrawal does not only weaken the agreement's crucial universality as well as substantially decreases the chance of limiting global warming to 2°C, it further sets a bad example for global climate cooperation since the U.S., as the second largest emitters in the world, *"will be essentially be free-riding on other countries' mitigation efforts"* (Zhang, Dai, Lai, & Wang, 2017, p. 222). So, the world is clearly, at least to some extent, trying to collectively act on climate change by achieving a binding top-down agreement on a global level but has up to this point in time not yet succeeded. In fact, global emissions are likely to rise in 2017 by around 2 percent after having stayed constant for at least some years (Hausfather, 2017). Mancur Olson's predication that in large groups, *"rational, self-interested individuals will not act to achieve their common*

*or group interests"* (Olson, 1967, p. 2) seems to prove itself to be true in this context. Taking into consideration the aforementioned hurdles that seriously hamper the process of developing an effective global governance scheme, this does not come along as a surprise.

The frustration about the lack of progress in global negotiations and the pressing urgency of the issue has, however, not only led to disillusion and pessimism but also stimulated an increase of attention and openness for unprecedented climate action at local and regional levels as well as non-state climate mitigation activities catalyzed by initiatives (Blok, Höhne, Leun, & Harrison, 2012; Rogelj et al., 2016; UNEP, 2015). While some see themselves in an unsatisfactory waiting position, holding on to the global governance scheme as the only solution, others are in fact already successfully cooperating by voluntarily contributing to the necessary global cuts in energy-use (Ostrom, 2010b). With the awareness of the enormous emission reduction potential of those non-state actions as well as the scope of the actions themselves being constantly increasing (UNEP, 2015), one has to stumble about the obvious contradiction of the conventional theory of collective action (failure) and the concurrent obvious existence of voluntary action, which formed the starting point for Ostrom's endeavor to update the theory of collective action related to climate change (2010b) and will be explained in the following.

### 2.2 The optimist: successful collective action against all odds

The conventional collective action theory, while being easily applicable to various different natural resource dilemmas, and thus delivering a sound basis of argumentation for the necessity of external authorities, is regarded to have been built on *"rational choice"*-assumptions about human behavior which have in various empirical studies repeatedly been proven partly incorrect and insufficient to explain real human interaction (Ostrom, 2010b; Poteete et al., 2010). The studies by Ostrom and other scholars have shown, that while the issue of freeriding seems to be an important issue in various empirical studies, *"a surprisingly large number of individuals facing collective action problems do cooperate*" by successfully organizing themselves at a small to medium scale (Ostrom, 2009a, p. 10). In her efforts to update the collective action theory, Ostrom pledges to understand the differing behavior in social dilemmas to be caused by firstly, basing our presumptions on a behavioral *theory of human action*, thus assuming individuals to be capable of learning through interaction (instead of having perfect

information), *"boundedly rational"* as well as to be benefit-seeking based on diverse preferences and norms (instead of only maximizing short-term individual benefits). Secondly, human behavior and the resulting likelihood of collective action in a social dilemma were shown to be strongly affected by the specific *structural features*. Empirical research has further revealed the central role of trust in successful collective action situations, which can subsequently be enhanced by institutions, such as policies, in order to increase collective action levels (Ostrom, 2009a, p. 11).

The updated theory of collective action is thus assuming, instead of excluding potential voluntary cooperation in advance, that successful cooperation will in fact occur in situations where certain *attributes* are prevalent, that have proven to enhance cooperation in previous empirical studies. Those attributes are certainly not a cooking recipe: Finding the right combination of structural features and hereby creating an institutional context, that *"leads many of those affected to trust one another and to be willing to take an agreed-upon action that adds to their own short-term costs because they do see a long-term benefit for themselves and others",* is crucial (Ostrom, 2010b, p. 551). Since this thesis' theoretical perspective is evolving around Elinor Ostrom's updated theory on coping with climate change, it will subsequently be based on Ostrom's understanding of institutions, who described them as *"enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world"* (Crawford & Ostrom, 1995, p. 582). Humans collectively create institutions to structure all kinds of interactions and consequently strongly influence the outcome of the respective situation: The rules or the absence of rules affect *"the opportunities and constraints individuals face in any particular situation, the information they obtain, the benefits they obtain or are excluded from, and how they reason about the situation"* (Ostrom, 2009b, p. 3). And this is precisely where an essential mechanism of action comes into play: While the conventional theory predicts a lack of incentives to cooperate to a global good since it predicts the resulting benefits to be of merely common nature, thus, unable to compensate the individual's short-term costs, in the case of voluntary GHG emissions "*multiple benefits are created by diverse actions at multiple scales*" and are accordingly crucial as base for future decision-making (Ostrom, 2010b, p. 553).

### 2.3 Instead of waiting for conciliation: a polycentric approach

Since the reduction of GHG emissions yield multiple benefits at multiple scales, Ostrom pledges for *a polycentric approach* to coping with climate change, a concept developed in the 1960s by her husband Vincent Ostrom and other scholars (Ostrom, 2010b). A polycentric system arises when *"multiple public and private organizations at multiple scales jointly affect collective benefits and costs"* (Ostrom, 2012, p. 355). Instead of high governmental bodies taking every decision and all systems at lower levels having to follow each of those commands, *"a truly polycentric system is one in which governmental units both compete and cooperate, interact and learn from one another"* (Cole, 2011, p. 405) and can comprise regions, cities, or businesses. One presumption of the success of the polycentric approach to climate change mitigation as a collective action problem is the fundamental role of mutual trust among the resource users that others will be contributing instead of freeriding. Especially since this mutual trust among the different resource users will be equally essential for a functioning global governance scheme, polycentric climate governance is expected to be powerful in enhancing trust levels through an increase of communication and interaction, which is then likely to further increase experimentation and learning processes (Cole, 2015; Ostrom, 2010b). Collective climate action is expected to generally come about more easily at smaller scales, mitigating the difficulties of reaching agreements within large groups as stated by Olson (Olson, 1967): the risk of freeriding is minimized due to higher individual impacts on collective-action outcomes. In addition, coordination and decision-making are less costly and homogeneity might increase among the participating actors (Paavola, 2012, p. 423). The circumstance that *"(...), while many of the effects of climate change are global, the causes of climate change are the actions taken by actors at smaller scales"* led Ostrom to pledge to apply the system of polycentric governance to climate change (Ostrom, 2010b, p. 551). But not only since Ostrom started calling for a more polycentric approach to climate governance, the debate about the potential of *sub-global* climate action, sometimes labeled as *"building blocks"* or *"voluntary, bottom-up systems",* has been swelling up substantially (Cole, 2015, p. 114). Polycentric climate governance emerges in a bottom-up manner when heterogeneous actors are taking voluntary climate actions in order to realize certain benefits resulting from climate change, to avoid the respective costs or both (Ostrom, 2009a). Since non-state actors, such as companies and NGOs are expected to have a large potential for the establishment of an effective climate polycentric governance scheme (Cole, 2015; Paavola, 2012), they will be analyzed in the following.

## 3. Corporate climate initiatives within a polycentric governance scheme

Since the aim of this study is to understand the institutional relationship between the Science Based Targets initiative and its participating firms, it is important to firstly observe each actor on their own. In order to obtain the basis of understanding for the later application of Ostrom's theory to the corporate context, both group of actors will be shortly presented regarding their role as polycentric climate actors.

### 3.1 Voluntary corporate climate action: firms as polycentric climate actors

Both costs and benefits at multiple scales resulting from corporate energy use naturally play a large role for firms considering whether and to what extent to reduce their GHG emissions. Based on Ostrom's updated collective action theory, this thesis bases the understanding of firms as individual actors on the aforementioned *"behavioral theory of the individual",* on one hand seeking benefits for themselves, however varying *"in their other-regarding preferences and norms about the appropriate actions they should take in particular settings"*, since they are capable of learning, but do not possess perfect information (Ostrom, 2009a, p. 11).

Among the various anthropogenic sources of GHG emissions causing global warming, *"the role of business corporations is of paramount importance"*, especially regarding their responsibility to contribute to reaching the 2°C temperature target (Damert, Paul, & Baumgartner, 2017, p. 123). A recent large-scale study found that close to two-thirds of the historically generated greenhouse gas emissions since the beginning of the industrialization in 1854 until 2010 were produced by only 90 companies in fossil-fuel intensive sectors, of which half have been privately owned (Heede, 2014, p. 238). Up to today the 1.000 heaviest GHG emitting companies account for around 20 % of global emissions (UNEP, 2015). With the growing societal awareness for climate change and the heavy corporate responsibility in this issue, firms are increasingly confronted with harsh regulatory, investor, societal as well as customer pressure to reduce emissions (Okereke et al., 2012; Reid & Toffel, 2009). While a large part of firms has evidently not yet started to tackle the issue by reducing emissions, with total emissions from energy and industry sectors rather increasing than decreasing (Cadez & Czerny, 2016; Slawinski, Pinkse, Busch, & Banerjee, 2017), the public pressure as well as the diverse business risks and opportunities resulting from climate change (Cogan, 2006) has already spurred

notable climate action of proactive firms: A growing number of companies have set themselves GHG emission reduction targets that exceed policy goals by national governments and further, joined diverse climate initiatives (Gouldson & Sullivan, 2013; Krabbe et al., 2015). This led to a shift of focus in governance debates due to *"the emergence of new hybrid forms of governance based on different forms of co-regulation with varying blends and forms of input from public, private and civic actors"* (Sullivan & Gouldson, 2017, p. 414) that will be briefly discussed in the following subchapter.

### 3.2 Bridging the 2°C gap? Corporate initiatives in the spotlight

A variety of non-state climate initiatives have emerged globally in all sectors. Founded by diverse actors, for instance, communities, companies, NGOs, cities or as an international *"cooperative initiative"* involving different groups of actors, such as the Science Based Targets initiative, bottom-up climate initiatives are now receiving attention with regard to their potential to reduce global GHG emissions at an extent which would significantly contribute to closing the aforementioned emissions gap (UNEP, 2015). As opposed to *"waiting for a global solution"* by relying on a monocentric climate regime, *"a variety of smaller-scale transnational cooperative arrangements"* have emerged, not least on the base of *"other incentives",* such as economic self-interest (Stewart, Oppenheimer, & Rudyk, 2013, p. 1).

Climate initiatives were found to be typically engaged in sharing information, capacity building, setting targets, and taking direct climate action. In order to achieve the respective objective, private initiatives focused on mitigation by rule setting tend to create *"harder"* forms of institutional structures, compared to hybrid initiatives that are mostly focused on adaption measures (Bulkeley et al., 2012). Hickmann (2017), who recently investigated the relationship of voluntary corporate climate initiatives, or *"business sector climate governance experiments"* as he writes, and the international climate negotiations, has found that a non-state climate initiative can in fact fill in important regulatory gaps. He is, however, also flagging that the independent character of these initiatives was limited since they rely on the existence of an overarching policy framework set up by nation-states as corporate behavior relied on unambiguous policy signals in the long run (Hickmann, 2017, p. 94). Paavola (2012) as well as, more recently, Sullivan and Gouldson (2017) further state that voluntary initiatives would only result in

emission reductions as long as the reduction activities implicate cost savings for the respective companies, which, would, nevertheless, still yield substantial emission reductions. Even though the emergence of polycentric climate governance marks a promising trend, it is too early to finally judge about the scalability and thus, long-term potential of non-state initiatives as polycentric actors (Jordan, Huitema, Hildén, & van Asselt, 2015). Given the aforementioned high risk of free-riding and the general complexity of the problem of climate change, it is clearly demanding to design institutions to mobilize and sustain cooperation. But optimism has sparked among researchers about agreements at smaller scales since they seem to build trust and hence incentivize long-term action based on the existence of excludable as well as non-excludable benefits, despite others freeriding (Hannam, Vasconcelos, Levin, & Pacheco, 2017, p. 77). Following Ostrom's and UNEP's calls to investigate how a successful climate initiative could look like, I have selected the case of the Science Based Targets initiative, which will be presented in the following.

## 3.3 The Science Based Targets Initiative

### 3.3.1 A successful case of collective corporate action on climate change?

Following Ostrom's call to study a specific institutional context in order to deepen the understanding of structural factors that are likely to enhance collective action, I chose the Science Based Target initiative as the main subject of study. The relatively young transnational multi-stakeholder initiative was collaboratively founded by CDP, the World Resources Institute (WRI), the World Wide Fund for Nature (WWF), and the United Nations Global Compact (UNGC) and launched in November 2015 during COP21 in Paris where 195 national governments collectively agreed on limiting global warming to *"well below 2°C"* in order to advert massive climate change. The initiative is claiming to successfully address the collective-action dilemma of achieving the necessary global GHG emission reduction by actively engaging firms to take ambitious voluntary climate action and thus contributing to bridging the aforementioned 2°C emissions gap (SBTi, 2018a).

In practice, the SBTi is helping companies to set themselves GHG emission reduction targets for corporate GHG emissions which are verifiably aligned with *"current climate science".* In order for the targets to be *"science-based",* they need to be *"in line with the*

*level of decarbonization required to keep global temperature increase below 2 degrees Celsius compared to pre-industrial temperatures",* thus aligned with the *"2°C temperature target"* which was described in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014) and agreed in Paris (SBTi, 2018h). In order to provide the necessary methodology to firms on how to set the respective targets, the *"Sectoral Decarbonization Approach"* (SDA) was developed in a multi-stakeholder process integrating external scientists, NGOs, and industry representatives of more than fifty sectors. This methodology can then be implemented by the participating firms using the accompanying online calculation tool, which is currently still being refined in order to be available for all sectors (SBTi, 2015a).

Within the slightly more than two years of existence, 339 companies have committed to participate in the initiative out of which a total of 89 companies have approved science-based emission reduction targets (numbers as per January 2018, SBTi, 2018f). Since the research objective is to find attributes that are likely to explain the successful voluntary cooperation on climate change, one has to assess to what extent a collective action arrangement such as this between the SBTi and the voluntarily participating firms can be regarded as successful. Cox and other researchers around Ostrom have defined that a case is to be regarded as successful if it *"reported successful long-term environmental management"* and collective action (Cox, Arnold, & Villamayor Tomás, 2010, p. 40). Even though the starting conditions as well as the first two years of the SBTi seem very promising, it is, due to the still relatively short lifespan of the initiative, at least at this point of time not yet possible to unambiguously assess the initiative's long-term performance. There are, however, strong indications that justify the assumption of the SBTi's long-term environmental success in this context, which will be briefly presented in the following.

The initiative's overarching objective is *„that by 2020, science-based target setting will become standard business practice and corporations will play a major role in driving down global greenhouse gas emissions"* (SBTi, 2018a). In fact did some 864 large companies, via the 2017 CDP information request, already announce their intention to set science-based targets within the next two years, which fosters the impression that the recognition about the necessity for corporate targets aligned with planetary boundaries is growing for real (Pineda, 2018). Further, a report by the We Mean Business Coalition

assessing the emissions reduction potential of five *"highly promising"* global corporate climate initiatives is forecasting that around 2000 high-impact companies will have an approved science-based target by 2030, which would translate into a total GHG emission reduction of almost two billion of metric tons of carbon dioxide and therefore in fact substantially contribute to reaching the endangered 2°C temperature target (We Mean Business, CDP, 2016).

In the light of the above, I consider the context of the SBTi and those participating firms that already have approved emission reduction targets as a successful collective action arrangement that is worth investigating due to its uniquely scientific approach as well its large scale physical potential. From a collective action theoretical point of view, the Science Based Targets initiative is a rule-structured situation of human interaction, aiming at *"institutionalizing science-based targets"*(SBTi, 2018a). The initiative's objective is thus to shape the consequences of the individual and collective choices of actions and strategies being made in this context. As described in chapter 2, the characteristics of an institutional setting can strongly affect individual decision-making, which justifies the assumption that the institutional context created by the SBTi strongly affects both the decision basis of firms whether to set science-based targets as well as the way they interact with each other and their stakeholders once they have joined. It is therefore crucial that those creating or adjusting those underlying structures understand *"how particular combinations of rules affect actions and outcomes in a particular ecological and cultural environment"* (Ostrom, 2009b, p. 3).

It is important to understand who are the *"individuals"* cooperating here. The first group, "the climate initiative", is in this case made up by the four partner organizations that brought the initiative to life and consequently have a large impact on the initiative's strategy, structural features, mode of action, and hence on the likelihood of the SBTi's success. The second group are the participating firms, out of which some were actively engaged in the development of the initiative's arrangement, whose major contribution is, however, to enter into the collective commitment to cut their greenhouse gases in a regulated manner. And third, the stakeholders of the participating firms (and less in focus here: of the NGO's), such as investors, partner companies and customers, that can be assumed to indirectly cooperate in two ways: contributing to the firm's scope 3 emissions by, for instance, using their products as well as providing the chosen firms with capital

leaves them with considerable power to react to and influence the respective corporate climate strategies.

### 3.3.2 Mode of action

In order to create the basis for the later analysis of the specific features of the SBTi, it is important to obtain a fundamental understanding of the process of setting science-based emission reduction targets, which will be established through the following brief introduction into the initiative's mode of action.

The Science Based Targets initiative is *"calling on companies to demonstrate their leadership on climate action by publicly committing to adopt science-based emissions reduction targets, accelerating take-up of these targets as a business norm"* (SBTi, 2017a). Firms answer this call to action by firstly signing and submitting the commitment letter, which expresses the willingness *"to lead the way"* by aligning the corporate emission targets with the eligibility criteria of the SBTi and guarantees the respective company a public announcement as a *"committed"* company on the SBTi as well as the organizational partner websites (SBTi, 2017a). After having committed to participating, the company has a maximum of 2 years to develop a target that meets the following criteria (summary of the most important):

1. *Science-based target boundary:* The target covers all company-wide scope 1 and 2 GHG emissions, as required per GHG Protocol Corporate Standard.
2. *Timeframe:* The obligatory mid-term target covers a minimum of 5 years and a maximum of 15 years, while the progress to date is to be excluded (additional long-term targets, e.g. 2050, are strongly recommended).
3. *Ambition:* The target is (at least) consistent with the 2°C trajectory (target aligned with 1.5°C trajectory is strongly recommended), is an absolute target (certain exceptions for intensity targets if equally effective) and is calculated using the latest methodology.
4. *Scope 3:* A screening is obligatory for all relevant scope 3 categories - if they exceed 40 % of total scope 1, 2, and 3 emissions, a scope 3 target is required. Fossil fuel electricity-generating companies are always obliged to set scope 3 target for the use of sold products.

5. *Reporting:* A company-wide GHG emissions inventory as well as the progress against the emission targets are publicly reported on a yearly basis (SBTi, 2017b).

To develop the science-based targets, firms can use the aforementioned Sectoral Decarbonization Approach (SDA) method, which was developed by the initiative and is based on the 2°C scenario of the International Energy Agency and aligned with the IPCC's representative concentration pathway RCP 2.6. In order to not exceed the global target of 2°C until 2100, the estimated global budget comprises 1.055 $GtCO_2$ until 2050, which is then allocated to the different business sectors and eventually to the respective firms, using both physical and financial indicators (SBTi, 2015b). Once the targets are developed, the firm can get them unofficially validated before the final submission. As soon as they have been confirmed by the initiative to meet the aforementioned criteria, the company and their targets will be *"showcased"* on the SBTi website (SBTi, 2018g).

Committing to the SBTi and consequently setting emissions reduction targets in line with the Paris trajectory does in most cases imply a substantial change of the operational business practice, such as shifting to new energy sources or implementing stricter election criteria for suppliers, which can go as far as companies shifting their complete core business model (We Mean Business, CDP, 2016). In every case the commitment requires long-term planning and investments. Since the companies that have already set a science-based target clearly have to substantially reduce GHG emissions both on the immediate and on the long-run in order to keep the amount of emissions aligned to the globally agreed upon 2°C-goal, they are regarded to be contributing their fair share to the provision of the public good: the necessary carbon emission reductions to provision a stable climate.

## 4. The alleged collective action drivers: Ostrom's attributes in the corporate context

Ostrom stresses that each analysis needs to particularly recognize the importance of the unique institutional context since the prevailing differences can lead to substantially different collective action outcomes and resulting policy implications. The attributes of an *"immediate micro-situation and the broader contextual setting in which individuals interact"* strongly influence the likelihood of voluntary cooperation in a collective action situation (Ostrom, 2009a, p. 14). Elinor Ostrom and other researchers have dedicated several decades of work in order to empirically find patterns as bases for categories of variables which might shape the human interaction and aspired outcomes in a certain way. This work enables scholars studying a specific collective action context to base their presumptions on a valuable and empirically grounded foundation: a list of institutional attributes that was shown to drive the likelihood of cooperation among individuals or groups in a variety of common-pool resource dilemmas (Ostrom, 2009a). The list of variables that was developed through the conduction of numerous *"carefully designed experiments"* as well as hundreds of field studies is at this point mainly used in order to test theory and investigate on the respective collective action outcomes (Poteete et al., 2010, p. 231). In one of her latest publications *"A Polycentric Approach of Coping with Climate Change",* Ostrom discusses a selection of the aforementioned attributes applying to the specific context of the global collective action problem of climate change mitigation (2009a). Those seven attributes which are assumed to drive successful collective action on reducing global GHG emissions function as the base for the formulation of presumptions in this research endeavor.

Since the attributes were repeatedly shown to increase the likelihood of cooperation in various collective-action dilemmas, hence, to function as *"collective action drivers",* it is reasonable to assume that they might retrospectively help to understand the specific context of voluntary corporate climate action. By applying the theory to firms as polycentric organizations, those cooperating firms are analyzed as bounded rational individuals which take decisions based on individual and joint cost and benefits just as any other actor. While Ostrom formulated her theory in respect of *"millions of actors"* affecting the state of the global climate in order to underline the wide applicability of her assumptions to various human interactions, she did not mention the specific context of firms (Ostrom, 2009a, p. 5).

To be able to analyze the interaction between, at the one hand, the institutional attributes of the climate initiative and, at the other hand, the characteristics of the participating firms, I divided the seven attributes into two categories: four *"organizational attributes"* (O1- O4) and three *"corporate attributes"* (C1- C3).

In the following, each attribute will be introduced individually by *firstly*, illustrating its theoretical implications arising from the "updated" collective action literature around Elinor Ostrom, and *secondly*, discussing its applicability to the specific study context of *firms* taking voluntary environmental action. As discussed above, the objective is to apply Ostrom's collective action drivers to the context of successful corporate climate change mitigation – this implicates a search for traces through literature on corporate climate and environmental action in order to justify the relevance of each attribute and the subsequent appropriation as the base for the formulation of the hypotheses to be tested.

### 4.1 Organizational attributes

**O1: The availability of reliable information about immediate and long-term costs and benefits of actions**

This attribute and the following, *the ability to communicate with others involved*, are closely linked since the communication with other actors making similar decisions is gradually leading to a higher level of information via a collective and interactive learning process (Ostrom, 2009a, p. 11). It is therefore important to differentiate in order to enable operationalization by here specifically looking at the information provided by the mediating organization, here the climate initiative rather than focusing on the *"collectively gathered knowledge"* which could be potentially increasing among the participating actors in the course of the cooperative process. Ostrom has found that cooperation is more likely to successfully take place in institutional settings where *"the reliability and frequency of information about the phenomena of concern are relatively high"* (Ostrom, 2009a, p. 13). To the respective group this information is necessary in order to understand *"the target level of group allocations to the CPR"* (Poteete et al., 2010, p. 157). Further, cooperation is more likely to appear, if *"participants know who else has agreed to change behavior"* (Ostrom, 2009a, p. 13). In numerous experiments, the knowledge about the other participants was shown to increase both trust within the group and consequently the willingness to voluntarily contribute (Poteete et al., 2010, p. 155). Those aspects form the base for problem awareness and subsequently: action. In

this case this would accordingly implicate informing actors about: the threat of global warming as a whole, who else is voluntarily taking action, and finally, the quantity of corporate GHG emission reductions necessary to contribute to its mitigation.

Although individuals or organizations usually possess relatively detailed information about the short-term costs and benefits of their *individual* actions, they are most likely in need for more comprehensive information on both the immediate and long-term costs and benefits of potential *collective* actions to be taken, such as voluntary GHG emission reductions since they *"may not have complete information about the externalities they generate"* (Ostrom, 2009a, p. 9). The knowledge about those costs and benefits are, however, clearly necessary in order to be able to integrate them into the decision-making process which paves the way for changing individual behavior for the sake of the common good (Ostrom, 2009a, p. 14).

Allen and Craig (2016, p. 8) state that, likewise in the context of firms, cooperation on climate change increases with a better knowledge of the challenges they face. Further, a firm's knowledge about both short- and long-term costs and benefits of taking climate action is obviously crucial for strategic decision-making. Both substantial risks as well as profitable opportunities arise from the market shift caused by global warming: Changes in, for instance, customer demand, legislation, cost of capital, and physical risks affecting production can leave firms as either winner or losers depending on their respective core strategy and business sector (Hoffman, 2016, p. 3). What all firms have in common, however, is that information about costs and benefits are necessary in order to firstly outweigh and subsequently take a strategic decision, such as switching from fossil to renewable energy driven production (Hoffman, 2016, pp. 3–4). This knowledge clearly grows over time and through reciprocity with other actors (Allen & Craig, 2016, p. 8). As mentioned above, this study particularly studies the externally derived information provided by an organization, here the SBTi, to the prospective firms in order to help them to form an informed base for decision-making.

It thus appears probable that the availability of information on both the scientific context of climate change, the other contributors, the necessary overall emissions reductions as well as the costs and benefits of setting science-based targets contributes to the successful cooperation of the SBTI and the participating firms.

**O1 Hypothesis 1:** *The SBTi offers reliable information on climate change and the immediate and long-term costs and benefits of participation to firms.*
**O1 Hypothesis 2:** *The provided information is important for the participating firm's voluntary cooperation.*

**O2: The ability to communicate with others involved**

When observing the problem of coping with climate change from a conventional collective action perspective, which can be re-enacted by conducting a non-cooperative experiment, such as the famous prisoner's dilemma, multiple individuals and organizations are unlikely to voluntarily contribute since they make their decisions on the level of energy use independently and "*without any previous communication"* with the other decision-makers (Ostrom, 2009a, p. 9). The presumption of no-communication appears hereby as a crucial variable: While communication is considered as irrelevant by non-cooperative game theory (if not enforced by an external authority), repeated communication experiments have clearly shown that the ability to *"cheap talk"* with others before making a decision does in fact have an undoubtedly positive impact on the level of cooperative behavior among participants, independently of external enforcement (Poteete et al., 2010, p. 153). There are two aspects that should be clarified among participants before individual decision-making in order for the communication-process to successfully drive optimal group outcome: *"(1) the target level of group allocations to the CPR and (2) a strategy for allocating the target input allocation across appropriators"* (Poteete et al., 2010, p. 157). In the context of climate change that would translate into (1) collective knowledge and an agreement about the total amount of necessary GHG emission reductions in order to deter the overuse of the carbon sink (see O1 on the provision of general information above), and (2) the agreement about how to allocate the necessary reductions among the participants, in other words: collectively settle on who is allowed to emit how much. If a group manages to reach a voluntary agreement, the communication process has the potential to overcome the potential heterogeneity of participants, an alleged barrier to cooperation (Poteete et al., 2010, p. 157). The updated collective action theory understands individuals and organizations as *"capable of learning more accurate information as they interact in a particular setting"*: Both rapidity and accuracy of this collective learning process can be institutionally enhanced by enabling communication among the participants (Ostrom, 2009a, p. 11).

It is important to elaborate on how communication drives cooperation in social dilemmas. An array of studies was conducted to find the most relevant reasons for this strongly positive relation, which are categorized well in a comprehensive overview study by Shankar and Pavitt (2002). Their literature research has shown, that the following three mechanisms are the most prevailing of influencing cooperative behavior in a variety of resource dilemmas (Shankar & Pavitt, 2002, p. 259): Communication enhances trust among members, is part of a process leading to the emergence of cooperative social norms, and is further used strategically to form agreements, make promises, and commit to cooperate.

The objective is now to apply those findings to the corporate context. In order to justify the assumption that the ability to communicate drives cooperation among firms within the context of the SBTi, corporate literature about communication driving GHG emissions reductions by enhancing trust, the emergence of cooperative social norms and strategic coordination is consulted. The concept of communication is rather complex in the corporate context since communication results from pursing varying business objectives and is consequently aimed at different addressees, comprising both shareholder as well as diverse stakeholder, such as consumers, investors and non-governmental organizations (Crane & Glozer, 2016, p. 1230). It is therefore not sufficient to analyze Ostrom's attribute *"the ability to communicate with others involved"* by exclusively looking at the communication among the respective cooperating companies since a variety of stakeholders, such as employees, customers, investors, governments, communities, or suppliers, are clearly also relevant communication recipients.

Having its roots in the 1970s, corporate sustainability communication has for a long time been seen as a reactive act in order to gain or maintain the companies' license to operate, primarily dealt with within the public relations or marketing department and often unmasked by the public as corporate *"greenwashing"* (Allen & Craig, 2016, p. 7). With the shift from perceiving climate-friendly business practices as a side issue towards a rather comprehensive societal understanding of the sheer physical necessity to reduce GHG emissions, both the respective narrative as well as the understanding of the role of communication have been changing slowly, but substantially. A broader perspective acknowledges the importance of communication as *"the means through which CSR*

*sustainability-related initiatives are created and disseminated within organizations and among their key stakeholders"* (Allen & Craig, 2016, p. 1). Hence, communication in fact appears to be crucial for effective *"interorganizational collaboration"* on climate change (Allen & Craig, 2016, p. 9). Likewise, Okereke et al. (2012, p. 26) see consistent communication with relevant stakeholders as a *"precondition for successful climate action"*.

All of the three aforementioned mechanisms carved out by Shankar and Pavitt (2002) of how communication is driving cooperation in social dilemmas can be found in the literature to likewise apply to the corporate context: *Firstly,* communication on climate change action, often channeled through annual report disclosures (e.g., CDP climate reporting) and press releases, and hereby signaling responsible behavior to the public, enhances trust in order to build, maintain or repair environmental legitimacy (Crane & Glozer, 2016, p. 1233). *Secondly,* communication is constitutive as it stirs the development of new social norms related to common sustainability practices across different sectors and thus *"crafting coherent and robust strategy"* (Okereke et al., 2012, p. 26). Corporate communication, on the collective level, can thus co-constitute the construction of new *"ethical"* corporate identity (Crane & Glozer, 2016, p. 1234). *Thirdly,* communication is essential for *"agreeing through consensus over priorities*", which is necessary to enhance trust that others will contribute what they have committed to and thereby reduces the risk of freeriding (Okereke et al., 2012, p. 26).

The mechanisms described in the collective action literature explaining the relationships between communication and cooperation are seemingly likewise in place in the specific context of firms and CSR activities such as climate change mitigation. It therefore seems justified to assume, that the ability of firms to communicate both with other firms and their stakeholders about their climate mitigation efforts does indeed drive voluntary climate cooperation.

**O2 Hypothesis 1:** *The SBTi enables communication among the participating firms and to other stakeholders.*
**O2 Hypothesis 2:** *The provided communication possibility is important for the participating firm's voluntary cooperation.*

**O3: Existence of formal and informal monitoring & sanctioning**

Voluntary contributions to a public good were in many contexts shown to be more likely in settings where the conformance of the respective actors with the existing rules is to some extent being monitored and sanctioned (Ostrom, 2009a, p. 12). Both field studies and lab experiments have demonstrated that participants often develop formal or informal ways of monitoring and sanctioning themselves in order to minimize rule-breaking. CPR experiments have further shown that the incentive for the introduction of sanctioning-rules is so high that individuals are even willing to pay in order to financially sanction others for defection (Poteete et al., 2010, p. 158). However, depending on the physical feasibility of monitoring and sanctioning and the resulting costs and benefits of the respective measures, they do not necessarily lead to higher trust levels and thereby higher joint returns. In each context one should therefore study the effect potential monitoring and sanctioning mechanisms *"on the levels of trust or distrust they engender"* (Poteete et al., 2010, p. 230).

Elinor Ostrom has stressed the importance of informal monitoring and sanctioning in settings of sustained cooperation in several of her publications (1990, 2009a, 2010a). In order to illustrate this relation in the context of climate change she has instanced studies showing that *"using various forms of competition among households and groups and feedback on who is doing the best at reducing energy is a strategy for reducing emissions"* (Ostrom, 2009a, p. 38). The effect of competition through displaying the individual progress on emission reductions clearly depends on the existence and intensity of communication and is a promising mechanism of informal monitoring and eventually sanctioning if the most cooperative actors receive some kind of rewards while the least cooperative go away empty-handed.

When consulting corporate literature on a potential impact of monitoring and sanctioning mechanisms on corporate climate action, one clearly needs to differentiate between governmental enforcement of obligatory corporate targets for GHG reduction and the potential informal enforcement of a reduction target arising from voluntary cooperation of a company and an NGO. While companies are likely to reduce sufficient emissions in order to fulfill the respective governmental regulations, it is very difficult for an NGO to put any formal enforcement pressure on firms themselves. Since they do not dispose of direct power over the resources crucial to the company and subsequently lack the

necessary instruments to introduce efficient monitoring and sanctioning mechanisms (Kolk & Pinkse, 2007, p. 373). To begin with, the physical properties of climate change of *"ubiquity of impacts, intangibility, non-marginal changes, long time frames, and uncertainty"* complicate monitoring efforts in order to economically analyze actions related to climate change (Fran et al., 2014, p. 352). Further, sanctioning defections is hardly enforceable by solely addressing one separated group of actors opposing the entire group of resource users, which is made up by every individual in the world causing GHG emissions. This group of contributors, here the respective firms collectively reducing GHG emissions organized through a voluntary climate initiative are voluntarily adding to the public benefit of climate change mitigation without practically or legally having any higher responsibility than those firms who are contributing less or nothing at all. It is thus legit to assume that *formal* monitoring and sanctioning mechanisms do not play a substantial role in the context of voluntary climate initiatives since they are found rarely if at all in practice.

It does, however, in this context seem necessary to look more closely into *informal* monitoring and sanctioning mechanisms as potentially having a positive impact on *voluntary* collective climate action. For a long time already, it has not been sufficient for firms to merely have access to the shared resource (here the carbon sink), while at the same time complying with the official rules as it is the case in other resource contexts. Apart from doing business in line with the corresponding national legislation and other external authorities, firms are expected to comply with the expectations of their stakeholders whose capital they are depending on (Kolk & Pinkse, 2007, p. 371). These expectations of, for instance customers, arise from *"informal institutions",* socially composed and culturally transmitted values and norms (Schaltegger & Hörisch, 2017, p. 261). Firms in most cases wish to achieve *"congruence between the social values associated with or implied by their activities and the norms of acceptable behavior in the larger social system which they are a part of"*, which is commonly described as seeking *"organizational legitimacy"* (Dowling & Pfeffer, 1975, p. 126). Each social system and within, its own inherent social norms and values, is constantly changing and subsequently driving organizational change, which can then again stimulate a change of perception in society. The strong and ongoing increase of media coverage on climate change related issues led to the public being more aware and public opining about adequate corporate behavior shifting slowly, however, fundamentally (Dawkins & Fraas, 2011, p. 304).

This process is further accelerated by interorganizational competition: Consumers tend to choose to allocate their resources to those organizations that they believe *"are serving them better"* (Dowling & Pfeffer, 1975, p. 126). A disparity of the two value dimensions resulting from, for instance, a sudden loss of legitimacy due to an environmental scandal is therefore likely to result in economic *sanctions* since consumers will simply shift their purchase power to another firm more in line with their social values and norms of the time (Dowling & Pfeffer, 1975, pp. 124–126). Informal sanctions can further comprise sensitive consequences for the concerned company, such as hindered access to capital and a decreased share value due to a loss of trustworthiness among investors (Dawkins & Fraas, 2011, p. 307). In order to fulfil this dynamic task of obtaining and maintaining legitimacy and avoid economic sanctioning by their stakeholders, firms are forced to constantly take actions to stay in favor of their stakeholders, which can be categorized in three common strategies: changing the way of doing business in order to satisfy prevailing social demands, trying to adjust society's perception in the direction of the firm's business conduct through communication and ultimately, use communication to make consumers associate the firm with *"symbols, values, or institutions which have a strong base of social legitimacy"* (Dowling & Pfeffer, 1975, p. 127). The most prominent example of corporate behavior in order to secure their *license to operate* is environmental disclosure or sustainability reporting, which enables interested stakeholder to informally monitor the firm's behavior by either buying from or investing if their social beliefs are sufficiently congruent with the firm's business conduct or sanctioning the firm by shifting to a competitor or raising public awareness in order to avenge potential misconduct (Schaltegger & Hörisch, 2017, p. 262).

To conclude, while the aspect of *formal* monitoring and sanctioning does not seem to play a large role in the context of *voluntary* corporate climate action, *informal monitoring* mechanisms in the form of the various stakeholders scrutinizing corporate behavior based on their dynamic social value system, and *informal sanctioning* mechanisms in the shape of stakeholders withholding capital or campaigning against a firm following a loss of legitimacy, are both highly applicable and relevant in this context. It is therefore fair to assume that the existence of informal monitoring and sanctioning mechanism drive voluntary collective climate action among firms.

**O3 Hypothesis 1***: The SBTi does not enable mechanisms of formal monitoring and sanctioning.*

**O3 Hypothesis 2:** *The SBTi enables mechanisms of informal monitoring and sanctioning within the SBTi.*

**O3 Hypothesis 3:** *Being informally monitored is important for the participating firm's voluntary cooperation.*

**O4: The existence of benefits at smaller scales**

In her publications related to climate change, Elinor Ostrom repeatedly stresses the importance of assessing whether potential benefits at multiple scales exist resulting from individual energy use and other climate relevant activities apart from those benefits on a global scale of directly contributing to the reduction of GHG emissions (Ostrom, 2010b, p. 551). The conventional theory of collective action, represented by, for instance, Mancur Olson, states that the substantial reason why collective action for providing a public good, and thus achieving the optimal social outcome, will fail is the lack of individual benefits that may compensate the actor for his short-term individual costs arising from voluntarily contributing to the provision of a public good which increases the social benefits for all (Olson, 1967). The existence of short-term individual benefits is therefore crucial since they can theoretically offset those necessary individual investments and thus mitigate the conflict of individual rationality and collective benefit (Poteete et al., 2010). Actors are further expected to only be willing to adapt to new social norms if they predict the benefits to exceed the long-term costs (Ostrom, 2000, p. 15). Ostrom and others have found that numerous benefits at multiple scales do in fact exist and are seemingly already driving voluntary climate action. Using a carpool for going to work instead of driving alone and hence both saving private costs as well as reducing one's individual carbon footprint is a typical example in this context. Thus, when applying the updated theory of collective action by analyzing a specific context, one needs to carefully study the existence of diverse benefits of the respective mitigation efforts since they are most likely substantially influencing the incentive-structure of the respective actors and subsequently have a major impact on their future decision-making regarding their voluntary contributions to the public good (Ostrom, 2009a, p. 14).

Since the research objective is to analyze the institutional context of a successful relationship between an initiative aiming at enhancing voluntary climate action among

firms and the respective participating firms, the objective here is not to find all those individual benefits companies could obtain from reducing their GHG emissions or other climate change mitigation actions. The aim of this thesis is rather to investigate on the role of those benefits that are either enhanced or entirely provisioned by committing to a certain initiative, in this case the Science Based Targets initiative and are thus likely to contribute a large share to the success of this arrangement. It is therefore reasonable to limit the research to the analysis of the existence of potential *excludable* benefits, only comprising those benefits exclusively available to participating companies that comply with the initiative's rules. In contrast, the effective contribution to climate change mitigation through an individual reducing his energy use, which is usually creating diffused benefits for society as a whole since no one outside the group of contributors can be excluded from benefitting a healthier climate are regarded as *non-excludable* benefits (Hannam et al., 2017, p. 66), which will not specifically taken into consideration here.

As mentioned above, various individual benefits at smaller-than-global scales can arise from reducing GHG emissions. Global warming and the arising social and regulatory pressures on the private sector are spurring a large market shift at accelerating speed which is yielding both chances to capitalize on as well as serious threats to business. Since the status quo varies from firm to firm, it is clearly not possible to make universally valid statements as this market transformation will produce both *"winners and losers"* (Hoffman, 2005, p. 23). Therefore, the necessary actions to be taken on an individual firm level need to be carefully chosen and adapted to the respective business context, starting off by conducting an in-depth cost and benefit analysis in order to choose the strategy that is fostering the firm's long-term success the most. Hoffmann (2005, 2016) conducted research on the most commonly perceived *"strategic benefits"* from voluntary GHG reductions and found the following to be the most important: *value in regulatory compliance* (anticipating, influencing and benefitting from prevailing and upcoming regulation), *value in risk management* (reduction of financial, physical and legal risks), *value in corporate reputation and human resource management* (enhancing the firm's external and internal reputation), *value in operational efficiency* (reducing dependency and costs by decreasing resource input), *value in capital acquisition* (securing long-term investments of increasingly aware investors), and *value in strategic direction and market growth* (Hoffman, 2016, pp. 7–11).

Those listed firm-level benefits are clearly of individual nature as they produce various tangible and intangible benefits that might compensate the firm for taking climate action. While some value-creation, for instance the innovation of a renewable energy technology that other firms and stakeholders can profit from, might not be merely excludable, the majority of the aforementioned benefits are clearly of excludable nature. They might arise for every company voluntarily reducing GHG emissions, independently of participating in an initiative or not. Since the research objective is, however, to investigate the role of excludable benefits from participating in the SBTi, those *general* individual benefits arising from GHG emission reduction will only be integrated if specifically enhanced through setting approved science-based emission reduction targets via the SBTi. An initiative calling for collective action among companies can be seen as a coalition that has decided to collectively work for a common goal, here the reduction of global GHG emissions. It is consequently legitimate to assume the inherent willingness to increase the number of participants in order to expand the initiative's overall impact. Independently of whether the initiative was founded within the non-profit-sector by, for instance, an NGO or whether it is an industry-led initiative started by firms themselves, the process of cooperation is usually initiated by a group of actors willing to cooperate gathering and consequently founding an institutional frame for the endeavor, such as an initiative. The initiative is then growing in size as long as companies regard the benefits of participation as larger as the expected costs and, based on this calculation, join the group of contributors (Hannam et al., 2017). The individual costs equal the investments necessary in order to comply with the initiative's rules, here: to set approved science-based emission reduction targets and subsequently reduce the required amount of GHG emissions. The individual benefits, exclusively available for participating companies, can be of financial, physical or intangible nature.

Even though an interesting research question for itself, it lies beyond the scope of this thesis to study in depth which excludable co-benefits yield from participating in the Science Based Target initiative or other climate initiatives since they are likely to vary widely among different sectors and business models (Hoffman, 2016, p. 12). This attribute serves a rather overarching objective: Since all of the corporate attributes could be recognized as excludable benefits, C4 is rather used to operationalize the participating firms' overall perception of *the importance* of those benefits. The objective is hence to investigate, whether those excludable benefits play an important role for companies to

voluntarily align their emission reduction strategies with the highly demanding criteria of the SBTi. In case the participating firms are perceiving those benefits as essential elements for successful cooperation, thus substantially influencing the incentive structure for taking action, it would be reasonable to assume that the excludable benefits arising from participation can consequently be regarded as effective collective action drivers.

**O4 Hypothesis 1:** *The SBTi provides the participating firms with excludable benefits.*
**O4 Hypothesis 2:** *The provided excludable benefits are important for the participating firm's voluntary cooperation.*

### 4.2 Corporate attributes

**C1: The importance of the common resource for own achievements and long-term horizon**

Elinor Ostrom states that the likelihood of successful cooperation on climate change is increased if *"the individuals involved see the common resource as important for their own achievements and have a long-term horizon"* (Ostrom, 2009a, p. 12). Resource-dependency is further an essential variable describing appropriators since it can substantially alter the individual assessment of value of the sustainable supply of the respective resource and consequently alter the estimation of the expected costs and benefits of voluntary action (Ostrom, 2000, p. 15). The physical interdependence among all appropriators within a common pool resource situation, in the sense that each action of one user influences the external conditions for all the others, is further intensified by higher resource-dependency (Ostrom, 1990). In the context of climate change, resource-dependency can be construed diversely: on the one hand, an actor might depend on the stable climate, i.e. the constancy of sea level or rainfall patterns, as a resource being threatened by global warming (minimization of the physical risk) or, on the contrary, depend on the accessibility of the carbon sink in order to keep on emitting certain amounts of GHG, which could be threatened by, for instance, regulatory changes (minimization of regulatory or market risks).

Resource-dependency, in the form of relying on either a healthy climate or the possibility to emit GHGs, and thus having to react to physical, regulatory or market changes resulting from impending climate change, clearly has a crucial impact on corporate activity. 90 %

of 1.713 multinational firms responding to CDP in 2017 reported that they did in fact *"identify inherent climate change risks that have the potential to generate a substantive change in their business operations, revenue or expenditure"* (CDP, 2017). For firms to anticipate those risks early and rigidly enough to avoid losing profit or their *license-to-operate* in the future is therefore one of the main corporate motivations to take climate action (Gasbarro et al., 2017, p. 13). The physical risks are especially high for firms located in *climate-sensitive areas*, e.g. along coasts, as well as those in *climate-sensitive sectors*, such as firms in agriculture, tourism, property and insurance sectors (Okereke, 2007, p. 480). The physical risks are further higher for *"those dependent on climate-sensitive inputs"*; for instance those in infrastructure, energy automotive and transportation sectors (Gasbarro et al., 2017, p. 10). 70 % of the 2400 companies, representing 56 % of global market capitalization, reported to CDP in 2017, that they see substantial physical risks resulting from global warming to their business activities (CDP, 2017). The risk resulting from regulatory changes is seen as an other major driver for reducing GHG emissions (Gasbarro et al., 2017; Okereke, 2007). Industries that depend on or produce fossil fuels, such as oil, coal, automobile, power generation, air transport as well as generally energy-intensive sectors like agriculture, paper, cement, and metal production are hit the hardest by this regulatory risk: the more a business model relies on carbon, the higher the risk a company will face regarding potential regulatory changes, such as cap and trade schemes, fuel or carbon taxes increasing prices of energy and other inputs or lower demand for energy-intense products (Jones & Levy, 2007, p. 430). In fact, over 80 % of the firms reporting to CDP stated last year that they are facing regulatory risks resulting from climate change (CDP, 2017). Market risks represent a third category which can again assume substantially different faces depending on the individual firm. Risks resulting from market changes are mostly caused by technological innovations that might make a firm or a whole industry unnecessary, changing customer needs or reputational changes that will be dealt with in detail in the next subchapter (Gasbarro et al., 2017, p. 10).

As Okereke (2012, p. 12) put it aptly, *"climate change upsets established institutional arrangements through physical and political adjustments and shocks"*. While this statement can be expected to generally hold true for companies in all sizes, locations and business sectors, the resulting reactions to those shocks will appear in the shape of both opportunities and threats of varying intensity. Thus, even though the impacts as well as

the resulting corporate strategies will differ widely among firms, depending in a nonlinear manner on the respective sector, historical experience, area of operation, size and several other factors, virtually every company is or will be to some extent confronted with risks resulting from climate change (Gasbarro et al., 2017; Kolk & Pinkse, 2007; Okereke, 2007).

It is thus legit to assume that the firms participating in the SBTi are exposed to physical, regulatory or market risks resulting from climate change, which they do seek to, at least to some extent, guide against by setting science-based emission reduction targets.

**C1 Hypothesis 1:** *The participating firms see their business model in the long run to be at physical, regulatory or market risks caused by climate change.*
**C1 Hypothesis 2:** *The participating firms guide against their climate risks by their voluntary cooperation.*

**C2: The importance of reputation as a trustworthy reciprocator**

Empirical research has repeatedly found *"a necessary central core of trust and reciprocity among those involved that is associated with successful levels of collective action"* (Ostrom, 2009a, p. 35). The efficient mechanism between trust and reciprocity is hereby *"mutually reinforcing"* in both directions. Where this mechanism is enabled by information, communication and common learning through positive or negative feedback, cooperation, which may be initiated by only some individuals, ideally increases the trust among others and thus incentivizes them to reciprocate other's efforts. The results are norm-adoption among more individuals, thus higher overall cooperation and higher joint returns for all (Poteete et al., 2010, p. 227). Any institutional undertaking aiming at enhancing cooperation levels in order to overcome a collective action dilemma should therefore firstly enhance trust levels (Ostrom, 2009a, p. 11). For this purpose it is essential *"that the structure of the situation generates sufficient information about the likely behavior of others to be trustworthy reciprocators who will bear their share of the costs of overcoming a dilemma"* (Ostrom, 2010a, p. 661). This general capability to gain a reputation for being trustworthy and reciprocating the efforts of others is thus a structural prerequisite, enabled by the necessary access to information and communication. Further, other actors need to regard the level of their reputation as being

important in order to facilitate the positive correlation leading to increased voluntary contributions (Ostrom, 2009a, p. 12).

Carattini et al. (2015), drawing on Ostrom's findings that the mechanism of trust could also be effective with regard to the global dilemmas of climate change, conducted a large-scale econometric analysis in order to empirically investigate the effect of trust on global greenhouse gas emissions. Their findings suggest that an increase of aggregated trust results in a significant decrease of GHG emissions, which is explained by the fact that higher levels of trust foster new norms of *"pro-environmental behavior"* as well as drive *"local, regional and national environmental policy as it influences collective action"* and therefore drive cooperation on climate change (Carattini et al., 2015, p. 246).

Almost all companies are dependent on the good-will of their stakeholders in order to keep in business, especially on those stakeholder groups *"who control resources that are relatively critical for an organization to reach its objectives"* which subsequently will be prioritized (Kolk & Pinkse, 2007, p. 371). It is thus manifest that a firm must appear as trustworthy in acting *"within the bounds of what society identifies as socially acceptable behavior"* if aiming for maintaining its *license-to-operate* (O'Donovan, 2002, p. 344). From governments, over NGOs and competitors to investors, suppliers and customers, there are various stakeholders that have been exerting pressure on firms to reduce GHG emissions and have thereby already significantly changed the perception of appropriate business conduct. And, even though the amount of total global CO2 emissions is still increasing, the world has in result already seen some noteworthy corporate action on climate change (Cadez & Czerny, 2016). Damert et al. (2017, p. 133) have found an unambiguously positive effect of institutional and stakeholder pressure exerted on the level of implemented GHG reduction activities - even if they are not guaranteed do necessarily financially pay-off in the long-term. This societal pressure on firms to engage in emissions reduction initiatives was shown in numerous studies to be strong and to further be constantly increasing across almost all sectors and regions (Jeswani, Wehrmeyer, & Mulugetta, 2008, p. 47). The intensity of the effect of institutional pressure on legitimacy-seeking behavior among firms can, however, vary across different business sectors (Jeswani et al., 2008, p. 47) as well as the type of most salient stakeholders, which results in substantially different corporate climate strategies (Kolk & Pinkse, 2007). A recently conducted extensive study on large international firms from a variety of different

industry branches has accordingly shown that sustainability management practices such as voluntary climate action is currently mainly driven by legitimacy-seeking (Schaltegger & Hörisch, 2017), which might as well be translated into *"trust-seeking"*. A company which has developed a trustworthy reputation is expected to enjoy several benefits such as obtaining a competitive advantage as it eases long-term contracts, decreases the hereby necessary transaction costs and the formation of alliances (Freeman, Harrison, Wicks, Parmar, & Colle, 2010, p. 97). One of the strongest reasons why firms take voluntary climate action is hence to satisfy the expectations of their stakeholders and anticipate the constantly swelling societal pressure. Interestingly, the influence of NGO's was recently found to be perceived by executive managers all over the world as being the strongest, closely followed by the media and the community, however, considerably stronger than the pressure exerted by rather profit-orientated external stakeholders such as investors and banks (Schaltegger & Hörisch, 2017, p. 266). Due to the increasing general attention on climate change and the resulting societal pressures on firms to take climate mitigation action, companies from all sectors, independently of physically relying on the emission of GHG are constantly facing the risk of losing legitimacy if not complying with the constantly changing societal expectations. This explains why many of the taken climate strategy measures are designed to have the effect of increasing or maintaining legitimacy, further illustrated by *"improving reputation"* being the most prominent cause for sustainability measures among large firms (Schaltegger & Hörisch, 2017, p. 267).

A commonly chosen trust-building measure for firms is to cooperate with NGO's or other *"trustworthy"* stakeholders, such as the government in order to collectively deal with the issue of concern (Kolk & Pinkse, 2007). Accordingly, multi-stakeholder engagement has been substantially increasing over the last years which spurred the foundation of numerous voluntary initiatives, launching new reporting scheme, certification systems, or, in the case of the Science Based Targets initiative: engaging firms to set ambitious emission reduction targets (Allen & Craig, 2016, p. 6).

Against this background, it is fair to assume that those firms setting ambitious emission reduction targets via the SBTi perceive a positive reputation related to climate-activities as important for their overall corporate image and further see the participation in the SBTi as enhancing the firm's reputation as a trustworthy contributor.

This attribute on the importance of reputation as a climate-friendly firm and the following, C3 on the importance of climate leadership, are expected to show substantial overlaps since they are both describing how firms are strategically targeting certain external stakeholders with respective trust-building measures (e.g. participation in SBTi). In order for the later analysis to yield more informative results, it makes sense to differentiate between the two attributes based on the different groups of stakeholders being addressed with the firm's voluntary climate activities. The following hypotheses therefore relate to the role of the general reputation of a firm with regard to *"laypersons"*, thus the general public and the firm's customers - in contrast to C3 which is focusing on knowledgeable *"expert"* stakeholders, such as environmental NGO's, sensitized investors, academia, and governmental bodies, which are expected to be addressed in order to enhance a firm's climate leadership position.

**C2 Hypothesis 1:** *The participating firms care about their reputation among customers as trustworthy contributors to climate change mitigation.*
**C2 Hypothesis 2:** *The participating firms see this reputation enhanced by their voluntary cooperation.*

**C3: The existence of social capital and leadership**

The likelihood of cooperation is increased if *"social capital and leadership exists, related to previous successes in solving joint problems"* (Ostrom, 2009a, p. 12). For this factor to be enhancing the trust that the respective participants are trustworthy contributors, the reputations of participants needs to be known, which again highlights the importance of communication and transparency (Poteete et al., 2010, p. 229). Translated into the context of climate change this relation implicates that cooperation on the reduction of GHG emissions is more likely to be successful if the participating actors have already gained a positive *"reputation for being trustworthy and reciprocate others' efforts to cooperate"* regarding the engagement in other environmental issues that the same group of actors had to face in the past. In fact, leadership is likely to spur cooperation both regarding previous issues as well as regarding the current problem of impending climate change. On the one hand, an actor that showed high voluntary engagement regarding a previous environmental issue, such as recycling, has most likely already obtained a positive, environmentally friendly reputation. He is therefore expected to also engage in climate change mitigation, where this behavior is then likely to further stimulate the emergence

and consolidation of new norms and higher cooperation on the collective reduction of emissions in the long run. Regarding the necessity to reduce today's energy use, the striving for leadership and the development of a competitive setting on who is being the most cooperative and eco-friendly might be a promising mechanism for accelerating collective action among various actors (Ostrom, 2009a, p. 38).

This attribute is closely linked to the attribute C3 on the role of trust and reputation, however, not the same. As explained above, the assumption that the participating companies care about being known for being trustworthy is based on the observation of legitimacy-seeking behavior within most corporate sectors and primarily among customers and the general public. However, while reputation for being a trustworthy contributor is likely to be obtained by meeting the *prevailing* expectations of society in order to stay successfully in business, the striving for leadership implies that firms are *exceeding* existing societal expectations and hence standing out among their peers, being especially visible to knowledgeable stakeholders, such as suppliers, rating agencies and academic research, as well as competing firms.

The pursuit of environmental, in this context climate, leadership is characterized by firms striving to be *"cutting edge pioneers",* leading the way within a particular business context or creating new markets (Kolk & Pinkse, 2007, p. 375). The private sector has indeed been engaging in a competition among companies both within certain sectors as well as across industries as outstanding corporate climate action has been seen as a powerful mean to attract environmentally conscious customers, highly engaged employees and better capital conditions with increasingly risk-sensitive investors (Kolk & Pinkse, 2007, p. 376). Fifteen years ago, Dunn (2002, p. 39) predicted that *"a handful of early movers will seek competitive advantage by shaping the rules of the game"*. Despite potentially high costs and the unclear future benefits, some companies would radically innovate in order to cut emissions and thus, by showing the world what is possible, change societal expectations on the prevailing business practices: *"the role of leadership is to invent actions that naturally have the consequence of transforming people's thinking"* (Dunn, 2002, p. 39). A proactive climate strategy, as opposed to merely adapting to the status quo, is often chosen by large multinational companies in order to anticipate external stakeholder pressure as well as regulatory risks beforehand and subsequently protect the corporate image in the long-run. Further, it is often those

companies pursuing leadership that try to influence policy-making by, for instance, supporting the enforcement of governmental agreements, which stimulates the implementation of stricter environmental regulations that those companies will then have already prepared for (Dawkins & Fraas, 2011). This ideally results in a competitive advantage over firms with rather reactive, *"wait-and-see"* climate strategies. Internally framing climate management decisions as a major strategic pillar and internalizing emission reductions into every strategic decision thereby helps to reduce different kinds of serious risks arising for firms of impending climate change (Boiral, 2006).

Striving for climate leadership can therefore imply setting more ambitious emission reduction targets than share- and stakeholders are demanding. This proactive behavior is likely to motivate others to close ranks as well as on the long run push the laggards to take similar action, and after all, successfully increase overall collective action. Major companies embracing environmental management in their core business strategy and setting long-term emission targets aligned with climate science, that are *"driven from the very top of organizations",* strongly stimulate the low-carbon transition by driving innovation and motivating other companies to take action (CDP, 2017). The emergence of numerous transnational, multi-stakeholder initiatives, such as the global environmental scheme CDP, and the resulting increase of corporate compliance with climate reporting, policy engagement and ambitious emission target-setting over the last two decades have in this context not only driven important legal changes but further a normative shift of environmental business conduct and responsibility (Allen & Craig, 2016, p. 6).

Framing ambitious actions such as emission target-setting though the participation in a global, multi-stakeholder initiative that is practically *"grouping together"* climate leaders by demanding higher-than-average climate action is thus likely to help the respective company to either achieve or maintain corporate climate leadership. The hypotheses are hence that the companies successfully participating in the SBTi are *firstly*, trying to establish or maintain a climate leadership position within their sector, and *secondly*, perceiving the participation in the SBTi as helpful for the success of this endeavor.

**C3 Hypothesis 1:** *The participating firms are striving for climate leadership.*
**C3 Hypothesis 2:** *The participating firms see their climate leadership enhanced by their voluntary cooperation.*

### 4.3 Summary of attributes

Table 1: Attributes for successful cooperation with definitions

| **Attributes** | **Definition** |
|---|---|
| **Organizational Attributes O1-4** | |
| *O1: Information* | - Information on the general issue and the costs/benefits of participation is available<br>- Information is important |
| *O2: Communication* | - Communication to participating firms and other stakeholders is enabled<br>- Communication is important |
| *O3: Monitoring & sanctioning* | - Formal monitoring is not enabled<br>- Informal monitoring is enabled<br>- Informal monitoring is important |
| *O4: Benefits at smaller scales* | - Excludable benefits from participation exist<br>- Excludable benefits are important |
| **Corporate Attributes C1-3** | |
| *C1: Climate risks* | - Climate risks exist for participating firms<br>- Participation guides against the risks |
| *C2: Climate reputation* | - Climate reputation is important<br>- Participation enhances climate reputation |
| *C3: Climate leadership* | - Climate leadership is striven for<br>- Participation enhances climate leadership |

## 5. Methodology

The research objective is to investigate to what extent Ostrom's collective action drivers apply to a successful initiative aiming at increasing voluntary corporate climate action and its participants, the cooperating firms. I have decided to apply qualitative methods of data collection and data analysis, which will be described in this chapter.

### 5.1 Case selection: the firms

Purposeful sampling relies on choosing *"information-rich cases"* that enable new insights and learning *"about issues of central importance to the purpose of the research"* (Patton, 1990, p. 169). Especially with limited resources, it makes sense to choose a relatively small, however, insightful sample of firms. In order to follow this strategy in my research, I developed a simple selection criteria system (table 2) in order to be better able to study the interaction between the Science Based Targets initiative and the participating firms. The study's aim is to shed light on a particularly *successful* interaction, which is why the chosen firms have not only officially committed to the SBTi but have further already developed science-based emission reduction targets that have been officially approved by the initiative. All firms that meet these criteria are in this context regarded as successfully cooperating actors that are voluntarily contributing to the public good of collectively averting massive global warming by taking ambitious corporate mitigation action. Since the research objective is to understand which factors might explain the success of this arrangement, it is suggested to provide for a maximum of heterogeneity within the chosen group of *"successfully cooperating"* firms in order to understand the potential influence of external factors such as specific company characteristics and, most importantly, in order to carve out the common patterns that cut across cases (Patton, 1990).

In order to achieve the desired variation within the sample, the aforementioned system of category selection is based on different characteristics whose differing values are likely to have an influence on the respective research outcome. The following matrix was accordingly developed in order to systemize the selection of the four companies to be studied in depth.

Table 2: Case selection matrix

| **Selection Categories** | General visibility LOW | General visibility HIGH |
|---|---|---|
| Issue visibility LOW | **CEWE Stiftung & Co KGaA** | **SAP SE** |
| Issue visibility HIGH | **VERBUND AG** | **Nestlé S.A.P.** |

The general profiles and climate change strategies of the four selected firms are shortly presented in chapter 7.1.

There has been numerous publications on the influence of factors like company size, business sector, and location on how companies typically respond to climate change (e.g., Jeswani et al., 2008; Kolk & Pinkse, 2007; Okereke, 2007). The differences in the type of strategies taken as well as the overall scope of action is mostly explained by referring to the differing direct business impacts caused by impending global warming which clearly result in substantially different threats and opportunities for the individual companies. As mentioned before, one common external factor that all companies see themselves confronted with, even if to a different extent, is stakeholder pressure which was repeatedly shown to have a substantial influence on corporate climate action (see chapter 4.2 and 4.3). Since public opinion about firms and the resulting stakeholder pressure on companies to take environmental action and to comply with voluntary initiatives is to a large extent dependent on media coverage (Kiousis, Popescu, & Mitrook, 2007), media visibility is a highly decisive variable to take into account (Dawkins & Fraas, 2011). Media coverage has the power to substantially influence public opinion about various events *"through the amount and type of coverage"* as well as to frame certain issues in order to identify problems or accuse potential causers, such as specific company as high-impact environmental polluters. *"Where there is limited visibility, there will be limited concern"* (Dawkins & Fraas, 2011, p. 306) – companies are thus more likely to take environmental action, the more they see themselves scrutinized by the public.

Two dimensions of visibility are being taken into consideration: firstly, the presence of *general visibility*, and secondly, of *issue visibility.* Dawkins & Fraas (2011, p. 306) described a high *general visibility* of a company to derive *"from media coverage of a company on a range of issues including its marketing efforts and product releases",*

which subsequently increases the general societal pressure a company is exposed to. Thus, companies that receive intensive media coverage on their products and various activities due to their large size, market power or proximity to the customer are subsequently monitored more closely by the public. The *issue visibility* of a company typically evolves from the firm's *"proximity to a particular issue"*, since stakeholder target the companies with a potentially high environmental impact to hold liable for (Dawkins & Fraas, 2011, p. 306).

Dawkins & Fraas' (2011) variables are generally suitable to base my case selection on since the visibility dimensions integrate a number of company characteristics that are indeed worthwhile to include in order to increase sample heterogeneity, however, otherwise difficult to take into consideration for reasons of limited resources. Some organizations rely more heavily on the social support of society than others due to the degree of their visibility to the public, which suggests that those firms might have to invest more in actions aiming at creating or maintaining legitimacy. In the context of environmental protection activities such as corporate GHG emissions reductions, the firms in carbon-intensive sectors, such as energy production or aviation, are likely to be under higher institutional pressure than, for instance, a software company due to their proximity to the issue of climate change and the resulting high level of *"issue visibility"*. Further, companies that receive intensive media coverage on their products and various activities due to size, market power or proximity to the customer usually have a high *"general visibility"* and are subsequently monitored more closely by the public (Dawkins & Fraas, 2011, p. 306). This leads larger firms to often invest more heavily in legitimating activities than smaller sized companies which are scrutinized less due to lower levels of visibility to the general public (Schaltegger & Hörisch, 2017, p. 274).

All of these corporate characteristics might to some extent influence the corporate attributes C 1-3 (see chapter 4.2.). A firm under high institutional pressure due to high issue or general visibility is further likely to obtain other costs and benefits from reducing GHG emissions (Damert et al., 2017) – in this case: participating in the SBTi, guiding against climate risks as well as striving for climate leadership might yield different perceptions of costs and benefits depending on the visibility of the firm. Media visibility can be approached by searching the internet, using, for instance, Google, since it gives a fast overview of a company's public presence (Dawkins & Fraas, 2011). Derived from

Dawkins & Fraas's method, though simplified, I proceeded as follows: I executed the search command *"company name XY"* to obtain a rough approximation to general visibility and *"company name XY climate change"* for issue visibility to guarantee a reasonable degree of heterogeneity of the chosen firms (the exact numbers are to be found in the appendix). Since the Google search seamed only reliable for obtaining a vague impression of the visibility of a company, the company's business sector and size were additionally taken into consideration in order to guarantee for the difference in the supposable low or high values of issue and general visibility. An energy producer is clearly confronted with higher issue visibility than a software firm due to the sheer proximity to the issue of energy use and GHG emissions (Cadez & Czerny, 2016). With regard to general visibility, smaller firms usually face lower levels of scrutiny from NGOs and the general public (Schaltegger & Hörisch, 2017, p. 276), which is why size was used as additional proxy.

### 5.2 Data collection

After the theoretical embedding, introduction into the specific context and step-by-step derivation of the hypotheses based on the nexus between Ostrom's updated collective action theory and literature on business logic behind corporate environmental action, different types of data are consulted in order to conduct the analysis in the next step. The collection of empirical data was carried out in two consecutive steps in order to test the hypotheses developed in chapter 4. Even though the attributes O1-4 can be to a large extent assessed by using official documents and searching the SBTi's and its affiliated organization's websites, it is worthwhile to verify and extend this externally derived picture by conducting an expert interview with a high-rank representative of the initiative. In order to investigate the role of O1-4 for firms as well as the general applicability of the corporate attributes C1-C3, data on the four chosen firms CEWE, SAP, Nestlé, and VERBUND (for selection criteria see 5.1.2) is gathered by conducting one expert interview per company. The interviewees are chosen based on their role-specific expert knowledge about corporate GHG management – thus, their *"insider knowledge about institutional processes"*, which would be otherwise hard to assess (Helfferich, 2014, p. 571). In this context this implies that the chosen company representative knows about the relationship between his or her company and the SBTi and about the process of GHG emission target setting within the respective firm. The semi-structured interview guidelines for both the SBTi-expert as well as the corporate representatives were

developed based on the priorly acquired theoretical knowledge and literature research. Derived from Helfferich's methods to approach an expert interview, the interview guidelines have been designed to be relatively open, however, thematically structured and rather practically oriented, focusing on obtaining experience-based knowledge (Helfferich, 2014, p. 571). The two interview guidelines can be found in the appendix of this thesis.

After sending out personalized interview requests to one representative of the SBTi that immediately confirmed and, in the next step, gradually reaching out to ten companies meeting the aforementioned criteria, five phone interviews of 35 minutes each were scheduled. The interview with the SBTi expert was conducted in December 2017, the interviews with the four corporate experts were conducted between January and the beginning of February 2018. All interviews were conducted via phone and were, after obtaining approval, recorded for later transcription. To be able to consistently analyze the collected data, it is important to apply the same transcription rules to all conducted verbal material. I chose to produce *"clean read or smooth verbatim transcripts",* which facilitates comprehensive reading by leaving out unnecessary filler words, such as *"ehm", "so",* and *"like"* while at the same time diminishing the risk of losing relevant content (Mayring, 2014, p. 43).

In order to provide for higher data quality, the empirically collected data is extended by official documents of the SBTi's website (e.g. strategy papers, information material) as well as corporate documents of company websites as well as other publications (e.g. integrated annual reports, CSR reports). All collected data is then structured for analysis, the hereby underlying methodological steps are presented in the following.

### 5.3 Data analysis

The methodological steps for analyzing the collected data, most importantly the conducted interviews, are derived from *the qualitative content analysis* according to Mayring (2007, 2014), an interpretative method for analyzing *"fixed communication"* in a systematic, rule-bound, and theory-based manner in order to draw conclusions about certain aspects of the collected material (Mayring, 2007, p. 13). Mayring predefines the steps of the procedure, which can, however, partly be adjusted according to the particular

context as well as the respective research objective and the resulting level of detail (Mayring, 2007).

After *determining the material* (see chapter 5.1), *analyzing the circumstances of origin* as well as *describing the material's formal characteristics* (see chapter 5.2), *defining the direction of analysis* (see research objective 1.2), explaining *the theory-oriented differentiation of the research objective* (see chapter 2 and 4), what follows is *the determination of the specific content-analytical procedure* (Mayring, 2014, p. 58). Mayring differentiates between three basic forms of interpretation: *summary*, *explication*, and *structuring*. The most suitable method for my research endeavor is the conduction of a structuring content analysis which is designed *"to filter out particular aspects of the material, to give a cross-section through the material according to pre-determined ordering criteria, or to assess the material according to certain criteria"* (Mayring, 2014, p. 64). Those criteria (or coding rules) for the structuring process are derived from a category system, consisting of theoretically based dimensions. The category system *"constitutes the central instrument of the analysis"* as it allows intersubjective traceability (Mayring, 2014, p. 40). Since the categories have been developed before coding the material, the procedure of assigning categories and subcategories was carried out primarily in a deductive manner: the *"variables that increase the likelihood of cooperation in social dilemmas"* from Elinor Ostrom's publication *"A Polycentric Approach to Coping with Climate Change"* (2009a) worked as the foundation for the category system and the resulting coding guideline, which will be presented in the following.

The seven categories which were derived from Ostrom's collective action attributes and applied to the corporate context in chapter 4 are the frame for the deductive category assignment, which implies the determination of values per dimension (Mayring, 2014, p. 98). Table 3 shows the differing values of the theory-based sub-categories carved out in chapter 4.

Table 3: Category system with the potential values of collective action attributes

| **Attributes** | **Value 1 (+)** | **Value 2 (~)** | **Value 3 (-)** |
|---|---|---|---|
| Organizational Attributes O1-4 | | | |
| **O1: Information** | | | |
| Availability of information on climate change and costs & benefits of participation | High (+) | Limited (~) | Low (-) |
| Importance of information on costs & benefits of participation | High (+) | Limited (~) | Low (-) |
| **O2: Communication** | | | |
| Opportunity to communicate with participating firms and other stakeholders | High (+) | Limited (~) | Low (-) |
| Importance of communication | High (+) | Limited (~) | Low (-) |
| **O3: Monitoring & sanctioning** | | | |
| Formal monitoring & sanctioning | High (+) | Limited (~) | Low (-) |
| Informal monitoring & sanctioning | High (+) | Limited (~) | Low (-) |
| Importance of informal monitoring & sanctioning | High (+) | Limited (~) | Low (-) |
| **O4: Benefits at smaller scales** | | | |
| Excludable benefits from participation | High (+) | Limited (~) | Low (-) |
| Importance of excludable benefits | High (+) | Limited (~) | Low (-) |
| **Corporate Attributes C1-3** | | | |
| **C1: Climate risks** | | | |
| Climate risks | High (+) | Limited (~) | Low (-) |
| Potential of SBTi participation to guide against these risks | High (+) | Limited (~) | Low (-) |
| **C2: Climate reputation** | | | |
| Importance of reputation as climate-friendly | High (+) | Limited (~) | Low (-) |
| Potential of SBTi participation to enhance climate reputation | High (+) | Limited (~) | Low (-) |
| **C3: Climate leadership** | | | |
| Striving for climate leadership | High (+) | Limited (~) | Low (-) |
| Potential of SBTi participation to enhance climate leadership | High (+) | Limited (~) | Low (-) |

In order to be able to carve out the prevalence of attributes in the text material, a coding guideline with anchor samples, *"prototypical text passages"* taken from the interviews, was developed and is shown in table 4 (Mayring, 2014, p. 97). It was hereby the objective to standardize which verbal signals are indicative of value 1 (+) or value 3 (-). Value 2

(~) is not aligned with a specific argumentative position but is needed for later analysis: Since most of the hypotheses are backed up by at two or more assumptions, the result for the overall attribute accounts as *limited* (~) if the *low* and *high* values outweigh each other. While the analysis is certainly mainly centered on the information obtained in the interviews, the other documents were also categorized according to the category system in order to increase intersubjectivity.

Table 4: Coding guideline with anchor samples

| **Attribute value** | **Anchor samples** |
|---|---|
| **Organizational attributes O 1-4** | |
| **O1: Information** | |
| Availability of information *high* | *"The initiative is positioning itself as providing all the resources, the technical guidance, the criteria […]"* (SAP, par.5) |
| Availability of information *low* | *"[…] a lot of the resources that are available are not necessarily well known"* (SBTi, par.13)<br>*"The process wasn't clear to me […]. We either didn't have this information or didn't find it"* (VERBUND, par.33) |
| Importance of information *high* | *"From my own experience I can say that it was great that if you go on the SBTi-website, they give you a lot of input. […] The best-practices really helped to familiarize oneself. And, of course that triggers SAP if there a many other large companies participating globally […]"* (SAP, par.5) |
| Importance of information *low* | *"It is not like I needed it [the information]"* (VERBUND, par.39) |
| **O2: Communication** | |
| Possibility to communicate *high* | *"They directly send you a newsletter and communication-tool. They do indeed trigger that you deal with it and develop a communication strategy"* (SAP, par.35)<br>*"All the profiling, the case studies, the blogs, and the event invitations that the initiative provides to companies is something that incentivizes them to make a public commitment and to be recognized"* (SBTi, par.19) |
| Possibility to communicate *low* | *"The initiative per se does not facilitate 'peer-to-peer learning"* (SBTi, par.11) |
| Importance of communication *high* | *"To move on with one's work it is good to look for communication with others and their points of view"* (CEWE, par.33) |
| Importance of communication *low* | *"It does not mean anything to a customer"* (VERBUND, par.17)<br>*"It does not have any relevance for our communication management in Germany"* (Nestlé, par.17) |
| **O3: Monitoring & sanctioning** | |
| Formal monitoring & sanctioning *high* | n/a |
| Formal monitoring & sanctioning *low* | *"There are no tools for penalizing companies that do not meet their targets"* (SBTi, par.19) |
| Informal monitoring & sanctioning *high* | *"I think the biggest loss would be from a reputational perspective"* (SBTi, par.19) |

| | |
|---|---|
| Informal monitoring & sanctioning *low* | *"This part is not necessarily something that the initiative is looking after. It is about promoting best practices rather than punishing or shedding light on who is not performing well"* (SBTi, par.25) |
| Importance of informal monitoring & sanctioning *high* | *"It would send a bad signal especially to investors if we set ourselves targets that we cannot meet"* (SAP, par.37) |
| Importance of informal monitoring & sanctioning *low* | *"Nothing happens. You tell the SBTi: 'We're sorry and we will make it in 2 years' "* (CEWE, par.37)<br>*"I don't think there are already investors hinging their investment decisions on SBTi participation"* (Nestlé, par.23) |
| **O4: Benefits at smaller scales** | |
| Excludable benefits *high* | *"I would say the biggest offer is the validation process, so as we speak, and this might change, but as we speak, the initiative provides the entire suite of resources and the validation process are for free."* (SBTi, par. 7) |
| Excludable benefits *low* | *"I am not sure whether it significantly goes beyond it"* (Nestlé, par.19) |
| Importance of excludable benefits *high* | *"It is an important learning process for us – how to reduce GHG emissions in order to align them with the Paris Agreement"* (SAP, par.23) |
| Importance of excludable benefits *low* | *"The individual benefit appears to me as being very low at the moment. But I don't think that is a bad thing."* (CEWE, par.49) |
| **Corporate attributes C 1-3** | |
| **C1: Climate risks** | |
| Climate risks *high* | *"The energy-transition of course hits us hard"* (VERBUND, par. 45) |
| Climate risks *low* | *"We have to be honest here: GHG emissions are not a critical area for us"* (SAP, par.25) |
| Potential of SBTi participation to guide against these risks *high* | *"We also wanted to be among the front in case science-based targets will be mandatory at some point"* (SAP, par.17) |
| Potential of SBTi participation to guide against these risks *low* | *"For that this debate is too trivial"* (CEWE, par.53)<br>*"I don't think that my risks will be reduced once I set myself targets"* (VERBUND, par.46) |
| **C2: Climate reputation** | |
| Importance of climate reputation *high* | *"I would say, it does have a high importance, also for the customer – but it needs to be brought across very sharply" (*CEWE, par.23) |
| Importance of climate reputation *low* | *"For the food-issues climate change is not top-of-mind for consumers, climate change is too abstract to influence specific purchasing decisions"* (Nestlé, par.35) |
| Potential of SBTi participation to enhance climate reputation *high* | *"Maybe it could indeed increase trustworthiness if one would communicate it properly"* (SAP, par.33 |
| Potential of SBTi participation to enhance climate reputation *low* | *"I don't think that the customer even knows that this initiative exists, let alone, being able to imagine what it is about" (*Nestle, par.23) |
| **C3: Climate leadership** | |
| Striving for climate leadership *high* | *"[…] we feel a certain marketing-obligation to implement those things as the first and authoritatively"* (CEWE, par.13) |
| Striving for climate leadership *low* | n/a |
| Potential of SBTi participation to enhance climate leadership *high* | *"If one is taking climate management seriously and doesn`t want to get left behind, one has to take certain measures, where the SBTi participation belongs to"* (CEWE, par.17) |
| Potential of SBTi participation to enhance climate leadership *low* | *"Regarding the SBTi participation, I do not yet see a competitive relevance"* (Nestlé, par.25) |

All interview transcripts were coded based on this guideline, by using the software MAXQDA2018. The subsequent process of analyzing the coded content as well as the respective results are presented in the following.

## 6. Institutional analysis of the Science Based Targets initiative

### 6.1 O1 The availability of reliable information about immediate and long-term costs and benefits of actions

**O1 Hypothesis 1:** *The SBTi offers reliable information on climate change and the immediate and long-term costs and benefits of participation to firms (+).*

Since the initiative's activities are almost exclusively taking place online, the website *sciencebasedtargets.org* is where the initiative has gathered all the information material it has compiled so far. The resources do cover general information on the risks from impending climate change and the resulting call for a transition to a low-carbon economy as well as the quantifiable necessity for corporate emissions targets aligned with the 2°C temperature target, backed by scientific research – to be found in, for instance, the official manual, the report *Mind the Science,* several blog articles as well as presentations (SBTi, 2018e). Prominently located on the top of the website is a box displaying, as for February 2018, *"342 companies taking action"* which functions as a link to the *"companies taking action"*- section, an extended search tool, which shows all of the 342 committed companies sortable by region, status, and business sector (SBTi, 2018c). Hence, website visitors can easily see *"who else has agreed on to change behavior"* as well as the quantity of individual contributions by accessing the respective emission reduction targets of the firms that already have their targets approved (SBTi, 2018c). It is thus the case, that the participating firms can access information about the general issue, why the initiative is calling for action in order to cooperatively approach this issue and how the necessary corporate contributions need to look like in order to collectively contribute to the prevention of massive global warming (+).

When accessing the availability of information on the costs and benefits of participating in the SBTi, it is important to differentiate between immediate and long-term consequences since *"there are some aspects that we cannot really talk about yet"* due to the young age of the initiative. Since firms with approved targets are still seen as *"first movers"*, it is not surprising that they *"don't have clear examples of how science-based targets are impacting companies from a financial perspective, meaning in a positive or negative way"* – analyses like that are being aspired to conduct *"in a couple of years' time"* (Interview SBTi, 2017, par.17). Information about the *long-term* costs and benefits of participating can subsequently not yet be provided (-).

Information about the *immediate* costs of setting science-based targets are, however, to be found on the website. *"The SBTi is really positioning itself as providing all the resources, the technical guidance, the criteria, […], the methodologies as well as the validation"* (Interview SBTi, 2017, par.11). Those resources comprise numerous guidance documents on the target-setting process, such as a complex target setting manual, several documents about the initiative's criteria, the *Sectoral Decarbonisation Approach* and the application of other methods as well as *"detailed guidelines for the four stages of setting your science-based target"* (SBTi, 2018e). Apart from guidance documents, the website is regularly holding webinars and workshops about, for instance, sector-specific methodologies, Scope 3 accounting, or the relationship between science-based target setting and CDP scoring which are uploaded as presentation for later access (Interview SBTi, 2017, par.13; SBTi, 2018e). The immediate costs arising from the setting science-based targets can clearly vary substantially across firms, depending on their size, sector and maturity regarding climate action: a firm never having set emission reduction targets might have to start off from the beginning, hence firstly assessing the status quo of a firm's GHG emissions, while other firms are already having *"pretty advanced data collection for scope 3 emissions […], very clear about their scope 2 calculations and so on",* where *"it is really more just a matter of going through the process and using the tools to calculate the targets"* (Interview SBTi, 2017, par.17). Even though the exact costs related to the target setting process have to be evaluated on an individual firm-level, the initiative does provide a sufficient overview of the above-mentioned criteria to be met and the necessary steps to be taken which is the fundament for individual cost-assessment and immediate decision-making (+).

The initiative is further promoting participation on its website by stating several benefits of participating in the *'Why set a science-based target?'*- section (SBTi, 2018i), which are extended by 13 case studies on participating firms which were asked that same question (SBTi, 2018b). The list of mentioned benefits will be briefly presented in chapter 6.4. Further, both CDP and SBTI repeatedly refer to the possibility of *"being recognized for their efforts"* with leadership points in the CDP rating (SBTi, 2018i). Information on the *immediate* benefits of setting science-based targets thus seems to be sufficiently available (+).

In summary, it can be stated that the SBTi, by offering sufficient information on the general issue as well as the immediate costs and benefits, does appear to have created the necessary fundament for firms to individually deliberate about whether to set science-based targets or not (+).

**O1 Hypothesis 2:** *The provided information is important for the participating firm's voluntary cooperation (+).*

The importance of the above-described information seems to be rather high for firms. The initiative's representative states that *"a lot of companies feel like there isn't enough out there"* since *"it's a matter of time and awareness, so a lot of resources that are available are not necessarily well know"* and *"people just don't have the time to look through all the questions [the FAQs on the website] and find what they are looking for"* (Interview SBTi, 2017, par.13). The companies themselves seemed to have mostly found the information they were looking for, both the representatives of CEWE and SAP specifically mentioned the clarity and transparence of the guiding documents, *"which really helped to familiarize oneself"* (Interview CEWE, 2018, par.43; Interview SAP, 2018, par.5). Specifically the main manual gave a comprehensive overview on the general relevance of science-based target setting, which SAP regarded as crucial in order to obtain internal buy-in: *"[…] it was the essence […], also to be later able to explain this to my colleagues since it was obviously the question 'does it pay off for SAP to develop science-based targets?', and […] to understand that so far we don't have a emission reduction target aligned with science and that it can of course drive innovation"* (Interview SAP, 2018, par.15), which shows the active process of outweighing the costs and benefits of participating based on the provided information. The representative of VERBUND, however, stated that she underestimated the work load of the target setting process, specifically the communication with the initiative's staff was *"laborious"* and time-consuming. She did not expect *"that many enquiries and that [the verification process] had to go through two committees. We did not have any information about this or we did not find them"* (Interview VERBUND, 2018, par.33-35). CEWE's representative added that the aforementioned case studies are too superficial and the information should be more *"project-specific"* and detailed in order to assess whether the participation yields benefits or not (Interview CEWE, 2018, par.55). One argument which was mentioned by all four firms was the important role of the reporting organization CDP, one of the founding members of the SBTi, which incentivizes companies to report a verified

science-based target by awarding *"leadership points"*. All of the investigated firms regarded this *"pressure"* as very strong and named it as the main *"trigger"* to participate in the SBTi (Interview CEWE, 2018, par.7; Interview Nestlé, 2018, par.23; Interview SAP, 2018, par.15; Interview VERBUND, 2018, par.5), which clearly indicates that the information about the immediate benefit of CDP leadership points had a decisive impact. What further seemed to have *"triggered"* action was seeing *"that many other large companies worldwide are participating"* (Interview SAP, 2018, par.5).

Even though the satisfaction with the provided information can be regarded as limited, the information seemed to have played an overall important role for voluntarily taking action (+).

### 6.2 O2 The ability to communicate with others involved

**O2 Hypothesis 1:** *The SBTi enables communication among the participating firms and to other stakeholders (~).*

In the context of communication, the SBTi is in fact providing several components that are assumingly important for collective corporate action. Closely linked to O1 (Information) and thus already partly covered in the previous chapter 6.1, the initiative is taking on two key challenges that in other resource contexts would have to be addressed via communication among the resource users: *firstly*, the SBTi sets the target level of group allocations to the CPR – here the total amount of necessary GHG reductions – by using the *"level of decarbonization required to keep global temperature increase below 2 degrees",* and *secondly*, it provides a strategy for allocating the target input by offering scientifically grounded methodology and verification for setting the corresponding individual corporate emission reduction targets (SBTi, 2018h).

Even though the initiative is demanding the participating firms to communicate the quantity of their promised contribution, which is shown as percentage of the pledged emission reductions on the aforementioned *"companies taking action"*- section of the SBTi-website, *"the initiative per se does not facilitate peer-to-peer learning"*. Communication within the SBTi does, however, serve *"at least two purposes":* knowledge-sharing among companies, for instance by providing the sector-specific methodologies developed by one of the *"front runner"*-firms in order for science-based

target setting to become mainstream business practice as well as celebrating this high ambition and communicating to investors and policy-makers that the private sector is committing itself to large collective contributions (Interview SBTi, 2017, par.11). After having their target officially confirmed, the firms are being *"showcased"* on the SBTi website as well as partner websites and are further being *"sent a communications welcome pack and will be able to liaise with a member of the team",* which also enables them to use the SBTi logo on the company website and other channels (SBTi, 2018g). The initiative's representative highlights this offer by stating that *"all the profiling, the case studies, the blogs, and the event invitations that the initiative provides to companies is something that incentivizes them to make a public commitment and to be recognized"* (Interview SBTi, 2017, par.9).

Since the SBTi does not enable direct contact among the contributing firms (-), does, however, offer the basic prerequisites for the communication with other stakeholders, such as customers, investors, and policy-makers (+), one can evaluate that the overall opportunity for communication provided is merely limited (~).

**O2 Hypothesis 2:** *The provided communication possibility is important for the participating firm's voluntary cooperation (~).*

The provided communication possibility to the general public and the firm's end consumers seems to be of rather low importance to firms. On the contrary, participating firms seem to regard communication about science-based targets to *corporate* stakeholders as rather important. *"I do think that this is a specific expert topic. In the end it does not play any role for the communication. […] Neither CDP nor SBTi are helpful in this context – they are irrelevant for affecting end customers"* (Interview CEWE, 2018, par.21, 23). Almost the same statement was made by SAP: *"This is why I cannot say that it [the communication] is very relevant for us so far. It seems to me like it is an expert field"* (Interview SAP, 2018, par.29), and further by VERBUND: *"To go 'outside' with it to the customer is not an important point for us. […] It does not mean anything to a customer […]. It is too unique and specific"* (Interview VERBUND, 2018, par.15,17). Similarly, Nestlé's representative stated that the SBTi-participation *"does not play any role for the communication work in Germany"* (Interview Nestlé, 2018, par.17). While *"expert groups"*, such as *"analysts, students, thus academia & research",* are important recipients of information about emission reduction targets, end-customers have often not

yet heard about the difference between scope 1,2 and 3 emissions (Interview VERBUND, 2018, par.15, 54). Even though the initiative *"directly sends a newsletter and a communication tool",* which triggers to familiarize oneself and to develop a communication strategy (Interview SAP, 2018, par.35), due to the lack of potential effects of such communication on customers, none of the firms has reported to wanting to make use of it in order to inform them about their science-based targets (-).

While all companies have comprehensive sections on their climate action in their integrated reports, the degree of communicating science-based targets differs among the companies. CEWE is explicitly mentioning the cooperation with the SBTi in the sustainability section on CEWE's website (CEWE, 2018) and will further include the content in the next integrated report (Interview CEWE, 2018, par.19). SAP has already included information about their SBTi participation in their integrated report: *"in 2017, SAP became the first German company to be approved for the Science-Based Targets initiative"* (SAP SE, 2018a). VERBUND has prominently stated the SBTi participation on the sustainability section of their website, including a link to the SBTi website (VERBUND AG, 2018b). In Nestlé's *Shared Value report,* it is written that the reduction of corporate emissions is based on *"science-based 2020 objectives"*, that *"are part of our holistic approach to tackle climate change and contribute to efforts to limit climate warming to less than 2°C"*. Within the *"our climate change initiatives"*-box, the SBTi is indirectly mentioned as one of six initiatives on climate change since they *"adopted evidence-based GHG emission reduction targets"* (Nestlé S.A., 2016, pp. 113–117).

As mentioned above, the companies' responses paint a substantially different picture regarding the importance of communicating their science-based emission reduction contributions to *corporate* stakeholders, such as other SBTi-participants as well as suppliers, investors and corporate business partners, thus, *Business-to-Business*-communication in a wider sense. Even though the SBTi participation does clearly not comprise the majority of this kind of *B-to-B* dialogues, CEWE for instance does *"talk about this topic with [their] main suppliers in order to assess how they prepare themselves, think about it and progress related to their GHG emissions"* (Interview CEWE, 2018, par.35). CEWE's representative further states that *"getting together and communicating"* with other firms about strategies and progress on emission reduction targets was something essential in order to *"move forward"* (Interview CEWE, 2018,

par.33). The SBTi, however, could not meet this expectation since it is *"lacking a local orientation" – "the SBTi might do some work on this online […], but it does not help me to know of Coca-Cola, they stay completely on the surface – an evaluation of good and efficient measures that contribute to a development-catalogue, that could be helpful* (Interview CEWE, 2018, par. 31, 55). Apart from online-communication it would be the *"biggest incentive to go local"*: if the SBTi brought all participating firms in one particular region physically together for a diverse exchange about individual experiences with particular emission reduction measures (Interview CEWE, 2018, par. 55). SAP's representative expressed the same thought: *"It is not like there are organized meetings in order to exchange with one's peers about the targets. Since I managed this project […], I would have liked to hear, not only read, about others, being presented something specific, which is a completely different kind of communication"* (Interview SAP, 2018, par.35).

Against the background that communicating the science-based targets to customers seems to be of very low importance (-) while the external communication to corporate stakeholders seems to be of rather high importance (+), the overall importance of the provided communication can be assessed to be of limited importance (~).

### 6.3 O3 The existence of formal and informal monitoring & sanctioning

**O3 Hypotheses 1***: The SBTi does not enable mechanisms of formal monitoring and sanctioning (-).*

In the context of the SBTi and the participating firms, formal monitoring and sanctioning would imply an institutional mechanism in place that internally tracks the companies' progress and further punishes possible misconduct. On the SBTi's website it is stated that the initiative *"does not currently track companies' progress against the delivery of their targets"*. Although it reserves the right to remove the respective company from the websites as well as other external material, *"there will be no public announcements or related media publications if the SBTi deems it necessary to remove a company from its public lists"* (SBTi, 2018d). There are thus no formal monitoring and sanctioning mechanisms in place and the SBTi's representative does not think that this will change in the future since the initiative is *"about promoting best practices rather than punishing or shedding a red light on who is not performing well. It's about a positive message, rather than a negative one"* (Interview SBTi, 2017, par. 25).

Formal monitoring and sanctioning is subsequently not enabled by the initiative (-).

**O3 Hypotheses 2:** *The SBTi enables mechanisms of informal monitoring and sanctioning within the SBTi (~).*

Even though the SBTi does not track the participating firm's progress itself, one of the initiative's key criteria is that the firms are required to annually report their company-wide GHG emissions inventory, for instance via their CDP reporting scheme, so that the progress against their targets *can* be tracked by the public, which is creating the foundation for informal monitoring and sanctioning by interested parties (+). Apart from having established this reporting duty, enabling informal monitoring is *"not necessarily something that the initiative is looking after"* (Interview SBTi, 2017, par.25) (-).

The SBTi thus enables informal monitoring and sanctioning only to a very limited extent (~).

**O3 Hypothesis 3:** *Being informally monitored is important for the participating firm's voluntary cooperation (~).*

The SBTi representative thinks *"the biggest consequence [from failing to meet one's emission target] would be from a reputational perspective"*, independently of this mechanism deliberately not being enhanced on the part of the SBTi (Interview SBTi, 2017, par.19). In terms of informal monitoring all four firms stated indirectly or rather explicitly that they perceive their progress in terms of GHG emissions reductions as being *"tracked"* to some extent by stakeholders, such as NGOs (VERBUND, CEWE) and investors (SAP, Nestlé), which also explains the recurring comments on the above-mentioned indirect investor pressure via CDP reporting and potential negative effects on *"certain indices, such as the Dow Jones Sustainability Index, […] which could absolutely have consequences for a relevant part of the investors"* (Interview Nestlé, 2018, par.33). CEWE's representative did state that he did not directly feel monitored by external stakeholders and that this was positive since he wanted *"stimuli and discussions"* rather than someone keeping an eye on the firm's behavior. At the other hand, he is, however, admitting that CEWE is reacting to CDP *"tightening the thumbscrews"* when setting science-based targets (Interview CEWE, 2018, par.18,41). Homogenously, almost all expressed aspects seemed to rather refer to being monitored rather than having to fear

potential sanctions when behaving a certain way. The companies accordingly perceive this mechanisms as rather discursive process, which is illustrated by statements like: *"if one can justify why one has not met this target and it is a plausible reason, this does not have any consequences"* (Interview Nestlé, 2018, par.37) and *"nothing happens. One simply tells the SBTi: 'we are sorry and will definitely make it in 2 years"* (Interview CEWE, 2018, par.37).

In summary, this suggests that firms generally do in fact feel informally monitored (+), however, do not have to fear serious consequences from misconducting, which is why the importance of those mechanisms is to be classified as limited (~).

### 6.4 O4 The existence of benefits at smaller scales

**O4 Hypothesis 1:** *The SBTi provides the participating firms with excludable benefits (+).* As mentioned before the initiative does specifically promise benefits that can be exclusively obtained through participation. On the website the following benefits are presented to be the most important: *increasing innovation, reducing regulatory uncertainty, strengthen investor confidence and credibility*, and *improving profitability and competitiveness*, each extended by a brief explanation (SBTi, 2018i). Further benefits, stated by high-rank environmental managers on the SBTi website's case study section, are that the participation triggered a learning process related to internal challenges, improved data quality, significant cost savings from energy use, a higher attraction for suitable staff (Dell); established leadership, created a unique selling point, helped to for the first time assess downstream scope 3 emissions, united different business departments in order *"to drive towards the same target"*, building better relationships with governments, created a *"start-up mentality"* (Kellogg's); as well as helped to *„earning and maintaining the trust of our consumers and our communities"* (Coca-Cola HBC) (SBTi, 2018b). The initiative's representative assumes that the validation process, which can even be done unofficially in order for the firms to be able to adapt their targets and obtain internal buy-in before going public, and is up to this point free of charge, to be the most important offer made exclusively to the participating firms (Interview SBTi, 2017, par.7). She further mentions that the SBTi, by providing a clear and specific structure, can serve as a scientifically-grounded protocol for firms and can hence create *"uniformity in understanding what is an ambitious target"* (Interview SBTi, 2017, par.9). *"An additional benefit"* resulting from the SBTi's work is celebrating corporate climate

leadership by showcasing the committed firms as *"first movers"* (Interview SBTi, 2017, par.11), which is an important aspect that will be analyzed in detail in chapter 7.4.

Assuming that the benefits stated by the SBTi are realistically obtainable through participation, the initiative does seem to provide significant excludable benefits to participating firms (+).

**O4 Hypothesis 2:** *The provided excludable benefits are important for the participating firm's voluntary cooperation (~).*

The statements by the firms in the sample suggest that excludable benefits are perceived to exist to a certain extent while their importance is being regarded as rather limited. The latter is well underlined with the following statement: *"The individual benefit seems to me to be rather low at the moment. But I don't think that is a bad thing"* (Interview CEWE, 2018, par.49). Likewise, VERBUND's representative does not see any significant individual benefits apart from obtaining a higher CDP score: *"for us it was all about the [CDP] leadership points. […] I didn't even know the initiative before"* (Interview VERBUND, 2018, par.29,7,5). Several benefits of those promoted by the initiative in advance were autonomously mentioned by firms, yet, apart from *"being among the front runners",* never unitarily among a majority of the sample. SAP's representative states that the initiative is driven by *"collectively working together"*, that it *"can certainly drive innovation"* and further presents *"an important learning process regarding aligning GHG emissions with the Paris Agreement"* (Interview SAP, 2018, par.7,15,19).*"My understanding is that it helps to enhance the substance, the validity and accordingly also the performance against the targets",* however, followed by: *"I am not sure whether it significantly goes beyond it"* (Interview Nestlé, 2018, par.19). The verification process hence does indeed seem to play an important role since it is further regarded as *"very reasonable, factual and substantiated"* (Interview CEWE, 2018, par.17) and further as a *"quality criterion because a superficial [GHG] inventory cannot pass"* (Interview VERBUND, 2018, par.27), which does, however, not necessarily imply that the firms perceive the verification process as real benefit.

Despite several beneficial aspects having been mentioned, there is no clear convergence of the perception of the benefit's role in the collective action process, which is why their importance has to be evaluated as limited (~).

## 6.5 Summary SBTi analysis

Table 5: Summary of results for the organizational attributes

| **Organizational Attributes O1-4** | **Value** |
|---|---|
| **O1: Information** | |
| Availability of information on climate change and costs & benefits of participation | (+) |
| Importance of information on costs & benefits of participation | (~) |
| **O2: Communication** | |
| Opportunity to communicate with participating firms and other stakeholders | (~) |
| Importance of communication | (~) |
| **O3: Monitoring & sanctioning** | |
| Formal monitoring & sanctioning | **(-)** |
| Informal monitoring & sanctioning | (~) |
| Importance of informal monitoring & sanctioning | (~) |
| **O4: Benefits at smaller scales** | |
| Excludable benefits from participation | (+) |
| Importance of excludable benefits of SBTi participation | (~) |

## 7. Institutional analysis of the corporate cooperation

### 7.1 A glance at the firms under study

**CEWE Stiftung & Co. KgaA**

The German photo and online print services company CEWE Stiftung & Co. KgaA (in the following referred to as "*CEWE"*) is, with around 3.500 employees, the smallest among the four firms in the sample. CEWE is, nevertheless, active in 24 European countries, listed on the SDAX and further accounts as both market and technological leader within the photo service and online printing sector (CEWE, 2017).

The company defines its core priorities to be *"brand awareness, innovation and sustainability"* with climate change playing an overall *"dominant role"*. The entire product range, such as photo books and instant prints, is visibly promoted to be *"climate neutral"* since CEWE is offsetting the corresponding $CO_2$ emissions by investing in a forestation project in Kenya (CEWE, 2017). In July 2017, CEWE has set their first science-based emission reduction target by committing to reduce absolute scope 1 and 2 emissions by 50% and scope 3 emissions by 25% until 2025, using the base-year 2015. This is planned to be achieved by a variety of measures, such as purchasing carbon neutral electricity, reducing fuel consumption from up- and downstream transport as well as increasing logistical efficiency (SBTi, 2018c).

**SAP SE**

Founded in 1972, SAP SE (in the following referred to as *"SAP"*) is the largest supplier of corporate software in the world with almost 80% of all global business transactions touching an SAP software system. The software giant employs more than 85.000 employees and is present in over 180 countries (SAP SE, 2018c, 2017).

SAP sets a strong focus on sustainability and has been rewarded as the leading software company by the Dow Jones Sustainability Indices for ten years in a row. GHG emissions form a notable share of their sustainability presence with, for instance the advertisement of carbon-neutral cloud services and the objective to cut emissions to zero by 2025. The firm further reports to have saved over €155 million by reducing $CO_2$ emissions over the last three years which was achieved by purchasing low carbon energy and e-cars for the transportation fleet, launching a company bicycle initiative, reducing business flights and

other measures. Overall, SAP describes its GHG related approach as following the mantra *"avoid – reduce – compensate"* (SAP SE, 2018b, 2018a, 2017). The SBTi approved the firm's science-based targets in June 2017, committing to cut total scope 1, 2 and 3 GHG emissions by 40 % between the base year 2016 and the target year 2050 (SBTi, 2018c). The target is, however, clearly quantitatively exceeded by the aforementioned zero emissions target for 2025.

**VERBUND AG**

The stock corporation VERBUNG AG (in the following referred to as *"VERBUND")* is the largest Austrian electricity-producer, employs over 3.000 people and is, with 51% of the share capital owned by the Austrian state, for the most part in public hands. VERBUND's electricity is to almost 100% produced by hydroelectric power plants located in Austria as well as Bavaria, Germany, complemented by a small share of wind and thermoelectric power. The electricity is sold to Austrian customers and further exported to other European countries, such as France and Germany (VERBUND AG, 2018a).

VERBUND's position as a renewable energy producer is naturally transmitting awareness for climate change and the necessary mitigation actions. The firm was ranked first among 14 large European electricity-companies and thus recognized to be best prepared for the transition to a low-carbon energy. VERBUND further publically states its ambitions to further reduce its GHG emissions: they have reduced their direct emissions by 63% between 2011 and 2017 and announced right at the start of the SBTi to participate and align their reduction targets with the Paris trajectory (VERBUND AG, 2018b). In October 2016, among the first firms globally, VERBUND's science based targets to cut GHG emissions by 90% by 2021 from a 2011 base-year was approved by the SBTi (SBTi, 2018c).

**Nestlé S.A.**

The Swiss Nestlé S.A., in the following referred to as "*Nestlé"*, is currently the largest food and beverage company in the world. The firm was founded in 1866 as a producer of infant alimentary products and has been growing ever since: today Nestlé consists of more than 2.000 associated brands and is present in more than 190 countries (Nestlé S.A., 2018).

Nestlé states that *"creating shared value"* was their overarching principal for taking business-decisions. The responsibility for environmental sustainability and climate change lies with executive vice president of operations, hence at the second highest firm level. In order to reduce GHG emissions, the company implemented numerous monetary award systems to reward *"energy outstanding consumption reduction projects"* and other internal efforts. Apart from GHG reduction efforts, Nestlé reported its ambition *"to strive for zero environmental impact in our operations"* by 2030 (Nestlé S.A., 2017). Their climate change strategy generally comprises buying renewable electricity, increasing logistical efficiency to reduce transport emissions, using natural refrigerants as well as proactively engaging with climate polity via stakeholder dialogues and the participation in numerous multi-stakeholder initiatives, such as CDP Climate Action, where the SBTi is grounded in (Nestlé S.A., 2016). By joining the SBTi, Nestlé has committed to cut absolute scope 1 and 2 emissions by 12%, and scope 3 emissions by 8% for the period between 2014 and 2020 (SBTi, 2018c).

### 7.2 C1 The role of climate risks

**C1 Hypothesis 1:** *The participating firms see their business model in the long run to be at physical, regulatory or market risks caused by climate change (+).*

Assessing the responses to the CDP information request 2017 as well as the interview content collected of the four firms under study, the companies do identify multiple inherent climate change risks to their business. CEWE reported in 2017 that the firm is seeing itself confronted with regulatory risks in the form of a further increase in electric energy prices (of around 50 % over the last 5 years) due to energy taxes and regulations and potentially increasing purchasing costs of water, chemicals and other fundamental production materials due to *"general environmental regulations"*. They further identified the physical risks of changes in temperature and precipitation extremes as this could lead to higher energy expenses for air conditioning, supply-chain and logistical problems and thus to potential *"losses of turnover"*. Lastly, CEWE reports that *"climate change might change consumer behavior very severely"* since photography is a *"joy-driven non-necessity consumer demand"* that might theoretically decrease due to a changing climate, even though *"the awareness of climate change of CEWE customers is still low"* (CEWE, 2017). SAP SE reported that, in 2016, they have conducted a comprehensive analysis of climate change risks and their potential impact on their business operations with regard to regulatory, physical as well as market changes which resulted in the identification of

several risks. However, *"due to the management systems already in place and the way SAP is organized"*, numerous already implemented measures *"that have been designed and implemented to minimize such adverse effects",* and SAP demonstrating climate leadership to customers, investors, and NGOs, they conclude that all of those risks are *"unlikely"* to generate substantive changes to SAP's business operations, revenue or expenditure *"in the foreseeable future"* (SAP SE, 2017). VERBUND AG as an electricity producer with a 95 % high share of hydropower is naming a risk resulting from the national implementation of the EU Water Framework Directive which could obligate to implement costly measures, such as building fish passes which, against the background of currently very low electricity prices, lead to *"lower revenues and reduced capital for new investments"*. Physical risks could potentially arise from extreme weather conditions (e.g. floods, higher temperatures) resulting in damages to transmission lines or hydropower plants as well as changing water availability. Market risks are posed by a combination of an increase of *"society's consciousness regarding energy efficiency",* generally higher energy efficiency of end consumer devices and stronger energy efficiency regulations, that could lead to *"a reduction of energy sales to end customers"* and consequently lower revenues for the company. Another market-related risk could arise from a loss of VERBUND's competitiveness on the German energy market caused by high subsidies for domestic renewable energy producer that could *"distort competition"* since the majority of their own operations are not subsidized *(VERBUND AG, 2017)*. Due to Nestlé's vast diversity of business activities, naming all the regulatory, physical and market-related risks reported in their CDP response would go beyond the scope of this research context which is why only a small selection can be presented here. Regulatory risks such as having to purchase more EU ETS carbon certificates, or the potential *"introduction of mandatory requirements for food manufacturers to provide access to detailed and in-depth product environmental information – including carbon footprint […] may lead to a significant operational cost increase"*. Clearly, Nestlé is facing substantial physical risks posed by climatic changes that could cause *"damage to economic assets, such as industrial infrastructure, agriculture and key global supply chains"*, with, for instance, *"more than 170 Nestlé factories located in areas of potential flood hazard"*. Additionally, Nestlé has identified *"changing consumer behavior"* due to a growing environmental awareness among customers and the resulting risk of a decreased reputation *"if stakeholders perceived that Nestlé is not living up to their expectations"* and might consequently turn *"towards competitors companies that are*

*perceived as products having lower carbon footprint than Nestlé"* as substantial market-related risks (Nestlé S.A., 2017).

In the conducted interviews, the companies' representatives from the two low-carbon firms, stated: *"after all we don't have a product where one has to constantly be thinking about the climate"* (Interview CEWE, 2018, par.49) and *"we have to be honest, emissions are not a critical area for us"* (Interview SAP, 2018, par.25). The two firms in typically rather carbon-intensive sectors, however, said *"the energy transition naturally affects us strongly […], we are depending on the [legislative] external conditions"* (Interview VERBUND, 2018, par.45) and *"since the food sector indeed plays a very big role, it is an important complex of targets. Not only GHG emissions, but also the related operative targets like energy input, […] It is an important field of action"* (Interview Nestlé, 2018, par.13,15).

Even though to varying extents across the different business sectors, the companies' statements clearly indicate that all of the firms face risks resulting from climate change (+).

**C1 Hypothesis 2:** *The participating firms guide against their climate risks by their voluntary cooperation (-).*

Even though the SBTi promotes the potential to mitigate corporate climate risks by setting science-based targets, the participating firms seem to not understand their voluntary action within the initiative as a direct measure in order to guide against the respective climate risks. As stated, the initiative clearly advertises participation by promising effective climate risk mitigation: Observing the aforementioned benefits promoted on the SBTi website, they can be interpreted as promises for diverse risk mitigation: *"leading innovation"* instead of lagging behind could reduce the risk of market changes through innovation, "*staying ahead of future policies"* and influencing policy making could guide against regulatory risks, *"strengthening credibility*" potentially helps to protect against reputational risks, and *"improving profitability and competitiveness"* in a time of increasing resource prices could guide against physical risks (SBTi, 2018i).

Within the risks and opportunities section of the CDP information request, firms are asked to explain which exact management methods were implemented in order to anticipate

each risk driver stated as well as which methods are planned to be implemented in the future. While answers included the implementation of diverse monitoring and documentation strategies, investing in new technologies and higher energy efficiency, public disclosure of environmental information, stakeholder dialogues and collaboration, implementing and operating a pandemic plan, local crisis management, educating employees, funding research organizations, and cooperating with environmental NGOs, none of the firms named GHG emission target setting in this section (CEWE, 2017; Nestlé S.A., 2017; SAP SE, 2017; VERBUND AG, 2017). Nestlé, for instance, reported that they *"actively engage"* with NGOs, such as *Caring for Climate* and in this context *"participated at several high-profile events around Global Compact +15 on business commitment to furthering climate change action"*. Even though this management method might theoretically comprise the SBTi participation, science-based targets, or any GHG emission reduction targets for that matter, were not mentioned (Nestlé S.A., 2017).

The content obtained in the interviews yielded a rather homogenous picture across the firms, with only one statement breaking ranks: *"we also wanted to be among the first in case science-based targets will be mandatory at a later stage",* which indicates that SAP regards the SBTi participation as helpful in order to mitigate regulatory risks (Interview SAP, 2018, par.17). VERBUND's representative expressed: *"I think that those risks will maybe not be reduced by me setting targets […]. The physical risk of climate change will of course only partially be reduced at a global level"* (Interview VERBUND, 2018, par.46). Similarly, CEWE's representative perceives the approach and requirements of the SBTi as *"too trivial"* to have a risk-mitigation effect (Interview CEWE, 2018, par.53).

In summary, it can be stated that the setting of science-based emission reduction targets does not seem to play a big role for the participating companies regarding their risk-mitigation strategies (-).

### 7.3 C2 The importance of climate reputation

**C2 Hypothesis 1:** *The participating firms care about their reputation among customers as trustworthy contributors to climate change mitigation (~).*

The firms seem to perceive their climate reputation among customers as being of limited importance. Even though the climate related importance of the paper and print sector was not to be neglected from a physical point of view, customers did not automatically

associate CEWE with an above-average environmental responsibility: *"When I am taking photos, I think about my journey – not the climate"* (Interview CEWE, 2018, par.51). And, even those conscious customers that nevertheless did care tend to solely react to easily accessible information, such as the information about the $CO_2$-neutrality of a product: *"those that did have a problem, they see 'they have solved the problem' and those that didn't have a problem anyway, they simply overlook it"* (Interview CEWE, 2018, par.25). *"We positively charge our brand of CEWE photobooks by saying that all photobooks are climate-neutral. Whether the customer is wanting that or not, whether he thinks that's right or wrong – we think it's right"* (Interview CEWE, 2018, par.15), which again illustrates the low importance of the customers' perception. The electricity-producer VERBUND is promoting the offer of *"zero CO2-electricity"* to *"conscious customers that do want the electricity exactly like that"* since *"this is already unambiguously connected with our corporate positioning"* as a hydropower-producer, which indicates that the company does indeed try to satisfy specific customer preferences. However, similarly to the case of CEWE, it was stated that it is crucial to transmit information that is easily comprehensible, such as a newsletter to end-customers with tips on how to reduce individual electricity use – thus, *"practical things that are of course useful to the people"* (Interview VERBUND, 2018, par.50). SAP's representative assumes that *"it is not number one for customers how many emissions we cause by running our software, it will rather be the value-for-money aspect"* – if customers do care, they pay attention to the increasingly important issue of *"carbon-neutral"* cloud-systems offered by SAP (Interview SAP, 2018, par.41). For Nestlé the issue of GHG emissions *"does not play a superior role for the reputation […] which at the moment is dominated by other issues",* such as water use, palm oil production or child labor – issues that, in contrast to global warming, easily create an emotional bond. *"Nestlé is not attacked because of conflicts with climate change"* since climate change is *"too abstract to influence specific purchasing decisions"* (Interview Nestlé, 2018, par.13,15,35).

The statements indicate that, independently of the carbon-intensity of the sector, the customers - if they do at all - sensitively react to easily comprehensible product-related information on climate change, rather than having a deep interest in the company's overall carbon performance. The firms consequently care about their reputation as a climate-friendly firm among customers only to a limited extent (~).

**C2 Hypothesis 2:** *The participating firms see this reputation enhanced by their voluntary cooperation (-).*

The firms do not seem to see their reputation enhanced by participating in the initiative. As briefly discussed above, three out of the four firms emphasized the importance of communicating climate related content in an easy, clear and articulate manner instead of reasoning with complex scientific background information, such as the relation between business and the 2°C temperature target (Interview CEWE, 2018, par.23; Interview SAP, 2018, par.41; Interview VERBUND, 2018, par.52). The statement: *„we participate in CDP or SBTi"* is *"meaningless to the customer"* since it was a specific expert topic that was lacking tangibility for the consumers. Further it was stated that *it is not important for us to go outside with this [the SBTi participation] […] a customer cannot progress information like this. […] It is too unique and specific"* (VERBUND AG, 2017, par.15,17), and that *"[…] it appears to me like an expert field"* (Interview SAP, 2018, par.29). In contrast, the communication of the carbon-neutrality of CEWE's products was in fact recognized by end-customers (Interview CEWE, 2018, par.21), which is supported by VERBUND's and SAP's aforementioned statements that the carbon-neutrality of household electricity and software cloud-services was allegedly well perceived among customers.

The second pattern of statements were on the low degree of popularity of the SBTi, especially outside of professional circles: *"My impression is that the name recognition of the initiative is still low outside the community"* (VERBUND AG, 2017, par.13). Likewise, CEWE's representative doubted the benefit of public disclosure for customers: *"if one of our 17 million customers is going to see it [the SBTi website], this would be a lot. This is why it is irrelevant regarding the marketing of our products"* (Interview CEWE, 2018, par.21, 47). For SAP, since very little requests regarding their SBTi participation have been addressed to the firm, the interviewee *"cannot say that it is very relevant"* for increasing trust levels with customers (Interview SAP, 2018, par.29). Finally, Nestlé's representative found the following plain words: *"I don't think that the end customer even knows that this initiative exists, let alone being able to imagine what's behind it"* (Interview Nestlé, 2018, par.23).

The answers clearly as well as quite uniformly show that, due to the complexity of corporate GHG emissions, the science-based character of the SBTi as well as the lack of

name recognition of the initiative, the importance of the SBTi participation for the firms' climate-reputation among customers is being regarded as rather low (-).

### 7.4 C3 The striving for climate leadership

**C3 Hypothesis 1:** *The participating firms are striving for climate leadership (+).*
All of the investigated firms with approved science-based emission reduction targets perceive themselves as having been striving for climate leadership. The SBTi representative's statement about those firms already having science-based targets in place that *"[…] of course there are all companies that are leaders"* (Interview SBTi, 2017, par.9) was supported by the interviews with the four firms. *"I think we are already advanced in many respects"*, as market leader in Europe CEWE feels *"a certain marketing obligation to implement the things as the first company and authoritatively"* (Interview CEWE, 2018, par.13). Likewise, SAP expressed that it was important for the company *"to aim for swimming along the cutting edge when it comes to sustainability"* (Interview SAP, 2018, par.17). *"We have been reporting on non-financial indicators for a very long time – not only since it has become mandatory recently"* - the electricity-producer VERBUND AG is perceiving itself as *"very big regarding green certificates etc., which is directly related to out positioning. […] I am seeing very strongly that we have been very active for years and now are also known for it"* (Interview VERBUND, 2018, par.15,50). Lastly Nestlé's confirmed that the company was *"definitely"* striving for climate leadership: *"because we have been working continuously and over a long period of time on issues like energy efficiency and specifically the reduction of GHG emissions. We made good, fast progress at the transition to renewable energies. […] I would say that we are by all means among the top level group within the sector"* (Interview Nestlé, 2018, par.27). Another indicator that the four firms have been striving for climate leadership is the analysis of their respective CDP climate scores, which shows that all companies have at least been awarded *"leadership status"* (score of A or A-) twice within the three reporting years 2015, 2016, and 2017 (CDP, 2018).

It can thus be stated that the four participating firms, independently of the differing sectors, have not only striving for climate leadership, but further perceive themselves as already having obtained such as position due to their proactive climate strategies (+).

**C3 Hypothesis 2:** *The participating firms see their climate leadership enhanced by their voluntary cooperation (+).*

The striving for corporate climate leadership is uniformly perceived to play an important role for the participating firm's voluntary cooperation in the form of setting science-based emission reduction targets. The SBTi itself describes celebrating climate leadership as one of the core objectives of the initiative: since the implementation of science-based targets sets *"a very, very high level of ambition and it takes internal resources and time, […] it is just more about profiling and celebrating this ambitious commitments and start building this narrative of 'yeah, this is what the private sector is actually doing […]' "* as a direct message to investors, peers and policy-makers. Hence, *"[…] the entire philosophy here is […] to have companies stepping up with their ambitions and creating this movement of the private sector setting ambitious emission reduction targets"* (Interview SBTi, 2017, par.11,19).

This understanding of the SBTi as a *"movement of ambitious action"* is clearly visible within the firm's statements. *"It's like this: accepting the objectives from Paris and implementing them belongs to a reasonable climate management. […] If one is taking climate protection serious and does not want to be left behind, one has got to take certain measures, where the SBTi participation forms one part of"* (Interview CEWE, 2018, par.5,17). For SAP, sustainability leadership was the *"largest individual objective"* when choosing to set science-based targets: *"even if we don't communicate it externally that heavily – we did it to able to ride along at the front",* thus to avoid being left behind in the view of increasingly strong competition (SAP SE, 2018a, par.17). VERBUND was primarily aiming for the CDP leaderships points when deciding to commit to the SBTi. However, while the initiative is, as mentioned before, not perceived to have a high level of recognition among laypersons, VERBUND does, *"without a doubt",* see a high importance *"within the community"* (Interview VERBUND, 2018, par. 11), which is undermined by the following statement by the expert for CEWE: *"Someone who engages in climate protection but does not participate in CDP, and SBTi respectively, is doing something wrong. This is why they are of course important partner for a reasonable climate management. But this applies more to the people with expert knowledge",* which comprises large suppliers, environmental NGOs and other firms (Interview CEWE, 2018, par.27,29). Nestlé's representative understands the SBTi participation in this context as helpful in order to *"bolster the substance, the validity and, accordingly, also the*

*performance against those targets",* something that was typically important to investors. It was about *"staying up-to-date and defining targets according to the state of research and societal demands"* (Interview Nestlé, 2018, par.19,23,31). Nestlé is further mentioning its SBTi participation within the climate leadership sub-chapter of their creating shared value report: accordingly, one part of pursuing climate leadership was a *"proactive, long-term engagement in climate policy"* through partnerships with stakeholders in order to *"see the best results through collective action with industry, governments and NGOs"* (Nestlé S.A., 2016, p. 117).

In conclusion, it became clear that all of the investigated firms see a potential of the SBTi participation in order to enhance and maintain their climate leadership position (+).

### 7.5 Summary corporate analysis

Table 6: Summary of results for the corporate attributes

| **Corporate Attributes C1-3** | **Value** |
|---|---|
| **C1: Climate risks** | |
| Climate risks | (+) |
| Potential of SBTi participation to guide against these risks | (-) |
| **C2: Climate reputation** | |
| Importance of reputation as climate-friendly firm | (~) |
| Potential of SBTi participation to enhance climate reputation | (-) |
| **C3: Climate leadership** | |
| Striving for climate leadership | (+) |
| Potential of SBTi participation to enhance climate leadership | (+) |

The results obtained in the above displayed analysis will be interpreted and put into context in the following discussion.

## 8. Discussion

The aim of the study was to increase the understanding of how institutions can drive successful collective climate action among firms. In line with Hannam et al. (2017), the results confirm that institutions really do have the potential to increase collective climate action levels among diverse actors and contributed to the debate by shedding light on how this mechanism can look like in the case of firms voluntarily setting science-based targets. Despite serious collective action barriers to collective action, such as the risk of free-riding, corporate climate cooperation at different scales, resulting from the presence of heterogeneous, both excludable and non-excludable benefits, does exist. Against the background of corporate GHG reductions having to be accelerated quickly, the findings of this study shed light on how climate initiatives and firms can achieve effective results and further vaguely indicate a path how this small-scale success could be scaled up in order for voluntary business initiatives to become impactful polycentric organizations as well to significantly contribute to closing the emissions gap.

By investigating to what extent Ostrom's institutional attributes, that have proven to be successful in other social dilemmas, are valid as success factors for voluntary *corporate* contributions in the shape of firms setting science-based emission reduction targets, the analysis has yielded the following findings: Having sufficient information about costs and benefits of the necessary GHG reductions, being able to communicate to expert stakeholders, such as peers, suppliers, investors and NGOs, as well as being informally monitored by those expert stakeholders, are structural attributes that are likely to drive the voluntary reduction of GHG emissions among firms. For firms to be able to enhance their position as climate leaders among knowledgeable stakeholders in consequence of taking highly ambitious climate action is the fourth, and in this study the most unambiguous, collective action driver to be found. Surprisingly, the results do not support the hypothesis that the participating firms' reputation as trustworthy contributors among their customers played an important role for voluntary emission reductions. In line with this finding, the role of customers and generally lay persons, was found to be of rather low importance as informal monitors as well as potential target audience for corporate communication about climate mitigation actions. Further, guiding against climate risks does not appear to be a relevant driver for voluntarily reducing corporate emissions. The organizational attributes O1–O3: *the availability of information*, *the ability to communicate*, and *the existence of informal monitoring and sanctioning* can hereby be

understood as tools that are ideally provisioned by a voluntary business initiative in order to enable the participating firms to pursue their strategic objectives (C1-3), such as obtaining a climate leadership position.

Against the background of the need for a better understanding of *"what makes a successful initiative"* (UNEP, 2015, p. vi), these are valuable findings: To better understand the underlying mechanisms of voluntary multi-stakeholder initiatives is crucial in order to enable those arrangements to develop their full potential and become powerful polycentric organizations. Finke et al. (2016, p. 100) have found that the firms' *"goals, motivations and interests"* have to be, at least to a certain extent, become congruent in order to overcome barriers and enable collective action. My findings indicate that for firms to cooperate by participating in an initiative that can provide the informal exchange of information and communication among certain stakeholders as well as the accompanying learning process, does indeed drive collective action. With respect to Finke's results this might partly be explained by these mechanisms actually resulting in a gradual convergence of the participating companies' *"goals, motivations and interests"*. To what extent this relation is observable in practice states an interesting future research endeavor. Even though clearly more future research is needed to better understand the circumstances under which firms voluntarily contribute, it can already be said that corporate voluntary cooperation *can* be institutionally enhanced without necessarily adapting legislation which is line with the findings of others (e.g., Sullivan & Gouldson, 2017). Assuming that a polycentric approach to climate change has important advantages over merely waiting for a global agreement, namely that it provides for more opportunities for experimentation and learning and further increases formal and informal communications and interactions (Cole, 2015), the results suggest that firms are indeed more likely to successfully cooperate in such an arrangement. It is therefore justified to assume that by developing and enhancing sub-global bottom-up climate mitigation initiatives that are driving corporate cooperation, the polycentric governance system will be strengthened and the different actors within will ideally become more effective in closing the emissions gap.

In the following, each of the aforementioned findings and their implications will be discussed in greater detail.

Ostrom's "*availability of reliable **information** on the costs and benefits of actions"* does in fact appear to be a driver of voluntary corporate climate action. The SBTi does offer sufficient information on the general issue of the corporate responsibility to reduce GHG emissions and the necessity of setting emission reduction targets aligned with the Paris trajectory. Firstly, by aligning emission reductions with the necessary decarbonization to keep global warming below 2°C, the initiative creates the necessary condition for collective action by informing the firms about *"the target level of group allocations to the CPR"* (Poteete et al., 2010, p. 157). Secondly, *"participants know who else has agreed to change behavior"* (Ostrom, 2009a, p. 13), since all participating companies as well as their quantifiable targets are made public on the SBTi website. Further, even though information on the long-term consequences are not yet available, the initiative does appear to provide sufficient information on the short-term costs and benefits of setting science-based targets. The short-term costs from measuring and reducing emissions vary substantially across firms, however, knowing about the requirements and criteria for implementing a certain measure is the fundament for starting to assess the respective individual costs. The findings vaguely support the statements of numerous researchers highlighting the necessity of scientifically-grounded information on climate measures that can subsequently be adjusted to the individual firm (e.g., Hoffman, 2016). Interestingly, the firms did generally not seem specifically aware or interested in this kind of information, which might be explained by the circumstance that all of the firms already having rather advanced climate strategies in place, hence being assumingly less dependent on general content about climate change and the necessity to act. SAP was the only company that stated the provided information was particularly used for the internal decision-process, and that it was a *"trigger"* to see other large firms participating. All four firms, however, repeatedly stated that CDP awarding them for their SBTi participation was a highly important driver to participate in the initiative. This clearly shows that the availability of information on the relevant consequences of action is in fact crucial for the individual cost-benefit analysis.

While the results indicate that **the ability to communicate** about corporate emissions to customers and lay persons are of very low importance to firms, the ability to communicate about their ambitious GHG reduction strategies to and with expert stakeholders, appears to be a potentially effective collective action driver. After having their science-based targets approved, firms have sufficient material at their disposal, in order words: have the

ability to communicate their participation to external stakeholders – an offer that the firms appear to not make intensive use of. This might be explained by the very low impact the firms are expecting this information to have on their customers and other lay person stakeholders. According to the firms, the communicated content of corporate GHG emissions is simply too abstract, unemotional and scientific for customers to grasp, which is in line with previous studies (e.g. Hoffman, 2005, p. 34) and further explains why the participating companies would want to avoid spending resources on communicating their progress on GHG emissions. Interestingly, all four firms do seem to seek the dialogue with expert and "corporate" stakeholders, such as peers, investors, suppliers or NGOs and thus appear to perceive the communication-aspect and the resulting collective learning process in this regard as important. This is in line with Allen and Craig's (2016) findings that communication among various *corporate* actors is crucial for *"interorganizational collaboration"* as the collectively growing knowledge about different strategies and their expected benefits is crucial for more collaborative decision-making. Accordingly, all firms seem to perceive peer-to-peer learning as a powerful mechanism – a mechanism that is, however, not directly enabled by the SBTi. The results further indicate, that the three mechanisms of how communication is driving collective action found by Shankar and Pavitt (2002), are indeed suitable to analyze this institutional arrangement: *Firstly*, the disclosure of corporate GHG emissions and respective reduction targets which enables external tracking of the companies' progress, for instance via CDP and SBTi, is clearly likely to *enhance trust* among those stakeholders accessing this information, which are mostly experts. *Secondly*, the fact that firms do already set themselves emission reduction targets and further, perceive engaging with peers and other corporate stakeholders as important, indicates that those actions can indeed be of *constitutive nature*: a group of powerful firms demonstrating ambitious climate leadership, learning from as well as teaching others, is likely to stir the development of new corporate norms, which is in line with the findings of others (Crane & Glozer, 2016; Okereke et al., 2012). *Thirdly*, the firms participating in the SBTi *publicly commit* to reduce the amount of GHG emissions that represent their share to limiting climate change to below 2°C. This is essential in order to at some point collectively agree on a common climate mitigation target and to increase trust levels since this is already incentivizing others to take similar actions, thus accelerating the process.

The study indicates that neither **formal monitoring and sanctioning** nor **informal monitoring** by customers and the general public is driving voluntary corporate emission reductions in this context. Informal monitoring by expert stakeholders, however, can clearly function as a collective action driver in order to increase ambitious GHG target setting. The SBTi is neither tracking the companies' progress against their targets nor sanctioning firms that fail to meet their targets and has hence clearly not enabled formal monitoring and sanctioning. Since the SBTi's strategy is to highlight successful companies instead of pointing up misconduct, it is not surprising that the initiative does not specifically support the existence of informal monitoring and sanctioning either. However, obliging participating firms to publicly report on their progress does still provide external stakeholders with the necessary prerequisite in order to at least *be able* to monitor the firms' performance against their targets. This option is, however, so far only being anticipated by expert stakeholders, whose monitoring efforts were also noticed by all of the firms. Even though virtually everyone could monitor as well as sanction a particular company for their climate-(un)friendly behavior, firms do not at all feel monitored by customers, which is in line with the other insights of the analysis: Since the issue of corporate GHG emissions seems to be too scientific and complex for lay persons, they are, at least so far, neither demanding nor accessing information about the particular state of a firm's GHG emissions. On the contrary, firms do in fact to a certain extent feel monitored by expert stakeholders, such as NGOs, investors, and partner firms, which is further illustrated by the strong pressure the climate-reporting organization CDP is exerting on the firms to participate in the SBTi, which was perceived as being the most decisive factor to set science-based targets. Those findings partly contradict a recent study on the influence of different stakeholder groups on sustainability measures, conducted by Schaltegger and Hörisch (2017, p. 267) that has found *"legitimacy-oriented stakeholders (i.e., community; media/public; NGOs)"* to be perceived as far more promoting than *"profit-oriented external stakeholders (banks; rating agencies, investors/owners)"*. The divergence of the findings might be explained by the type of corporate environmental measure under study since emission reduction do not seem to be a typical legitimacy-seeking measure. There are certainly corporate climate measures that have a potentially large effect on customers and, generally, public opinion. It is likely that, for instance, product-related information, such as a carbon-footprint, or the information about carbon-neutrality of a particular product, is substantially more effective for reaching customers than the information about, for instance, the companies' progress on their overall scope

3 emissions. This product-focus might at least partly reduce the intangibility and insecurity about GHG emissions and thus, enable sensitized customers to take, what is perceived as, "informed" purchasing-decisions. The nature of the SBTi, on the contrary, is focusing on the companies' activities as a whole, asking them to include scope 1,2 and 3 emissions, hence, to take both direct and indirect emissions into account and to align them with recent climate science, hence the 2°C temperature target. Against the background of the intangibility and complexity of a firm's GHG performance, let alone the global temperature target, as well as the sheer abstractness of emissions and carbon sinks as such, it is hardly surprising that the average consumer cannot yet grasp this issue and consequently does not directly pressure firms to collectively reduce their overall GHG emissions.

While monitoring mechanisms appear to be important when the influence is exerted by certain groups of stakeholders, **sanctioning mechanisms** seem to *not* play a significant role in this context. The prevailing monitoring process is further being regarded as discursive process: Getting in dialogue with the monitoring stakeholders about the reasons behind the firm's progress is enough to avoid any serious consequences from failing to meet their emission targets. This is not surprising when taking into consideration that the ambitious requirements of the SBTi are exceeding existing legal standards by far, which is again underlining the voluntary character of setting highly ambitious GHG emission targets.

Ostrom's attribute of **the existence of benefits at smaller scales**, did not play a crucial role in this study due to its overarching character that hampers operationalization and the depth of the resulting insights. The fact that the SBTi does indeed promote several profound benefits, such as the reduction of regulatory uncertainty and the increase of credibility, allegedly made exclusively available to participating firms, does not come as a surprise taking into consideration the initiative's objective to grow in size and impact. The firms referred to the benefits obtained from the SBTi participation in a very diverse manner, which indicates that they do not explicitly regard them as valuable. The interview answers hardly show any convergence in perception of the potential benefits and further, if even, indicate a rather low perceived importance of excludable benefits resulting from the firms' SBTi participation. However, it must not be forgotten that every firm under study *has* eventually decided to set science-based targets. Based on an individual costs

and benefits analysis that is impossible to trace back from outside, each firm must have at some point valued the benefits from participating as being higher than the expected investments necessary in order to participate. The reason that they did not seem to value those benefits as much in the interviews as expected, might have been that when asked directly about the SBTi, they seemed to have not considered the benefits they have been obtaining by generally having highly ambitious GHG reduction targets which in most cases had been in place before participating in the SBTi. The existence of individual benefits is clearly not only a driver but a prerequisite for voluntary corporate action since firms are unlikely to take costly actions that are not offset by benefits. This dependency caused skeptics to warn of the limited overall potential of voluntary corporate initiatives since firms were *"most likely to be able to realize only those emission reductions that will yield cost savings",* which would result in a milestone in reductions, however, not enough to avert massive global warming (Paavola, 2012, p. 427). From a business-rationale point of view, this concern may be appropriate and makes a powerful argument in favor of stricter additional government regulations – nevertheless, it does not apply to the particular case of the Science Based Targets initiative. Since the SBTi is actually obliging all participating firms to align their targets with the global progress on climate mitigation in order to secure the 2°C target, this particular mechanism does not seem to *"be constrained by the 'business case'"*(Sullivan & Gouldson, 2017): The more companies will eventually align their absolute GHG emissions targets with the Paris trajectory, the more reliable and extensive will the overall private sector's contribution to the emission gap become.

As expected, all of the firms under study see their business models in the long run to be at **physical, regulatory, and/ or market-related risks resulting from climate change**. Participating in the SBTi, thus setting GHG reduction targets, does, however, not seem to be perceived as a potential measure to guide against those risks, which is disproving the hypothesis that guiding against climate risks could function as a collective action driver for overall GHG reductions. Even though the perception of risks varies substantially across sectors, with SAP in the software sector as being at rather low risks, and Nestlé as a large food-producer seeing rather high as well as diverse risks, the findings support the literature stating that every company will eventually be confronted with at least some kind of climate-related risks (e.g. Okereke et al., 2012). The fact that the firms, regardless of being confronted with serious risks, do not see potential to directly against

those risks by reducing their emissions is likely to be caused by the measure being take here is a *mitigation* action which is consequently mainly impacting the physical risk, however, in a global dimension. One firm did mention the potential to guide against regulatory risks in case science-based target setting would get obligatory at some point, but this is at this point of time certainly not foreseeable in the near future and hence not likely to be in the mind of most companies. It would have been conceivable to receive statements about the potential to improve competitiveness among corporate stakeholders, thus to guide against certain market-related risks, such as losing investor credibility. However, since the SBTi participation is still by far exceeding industry-standards, the firms seem to currently not see their competitiveness at stake, but rather the contrary: the visibility as leaders among their industry branch is likely to be perceived as a benefit, rather than a risk-mitigation measure. Lastly, guiding against reputational risks with a measure that does not have any reputational value (reducing corporate emissions) states a contradiction at its own.

The results for the **importance of reputation as a trustworthy contributor**, in this context: as a climate-friendly firm, integrates homogenously with the previous ones. The firms' statements made repeatedly clear that overall corporate GHG emissions are an issue of very low concern to the vast majority of customers, which explains why the firms regard their SBTi participation as well as communicating their GHG targets as meaningless to their customers. This neglects the initial hypothesis that climate reputation had a large impact on voluntary emission reductions and suggest that the 2005 statement that *"gaining reputational advantage from climate change is difficult given the public's uncertain thinking on the issue"* is seemingly still applicable today (Hoffman, 2005, p. 34). Strikingly, there seems to be a correspondence of perception across the different sectors that the communication of climate-relevant information *can* in fact be influencing specific purchasing decisions in the case of sensitized customers and under certain circumstances: if the communicated content is a) *product-related*, and b) *easily comprehensible* – two criteria perfectly met by $CO_2$-compensation and the resulting *"carbon-neutrality"* of a product which was shown to be well received. On the contrary, the information about science-based targets is clearly neither product-related nor easily comprehensible. Even though the percentage of environmentally-aware consumers is constantly increasing, the level of education related to GHG emissions appears to be rather low, which is why it is not only seemingly enough to "please" those aware

consumers with superficial information such as carbon-neutrality, they are further likely to be overwhelmed by information that is too scientific, unemotional and intangible. It can therefore be carefully assumed that the firms regard the climate-friendly reputation of their products (at least those in visible markets) as more important than their overall climate reputation among customers. This mechanism in order to improve one's reputation, which was in fact found to be the most prominent cause for implementing sustainability measures in general (Schaltegger & Hörisch, 2017, p. 268), is thus unfortunately not likely to work in the context of voluntary GHG emissions: if firms are applauded for short-lived, attractive measures, such as offsetting GHGs which does not require the firm to effectively reduce any company-own emissions, while drastic strategy changes stay unnoticed, the firms might not perceive efficient climate collaboration as rewarding as it would be necessary in order to fuel the necessary transformation of business conduct.

The results of my study identify the **striving for corporate climate leadership** as the most powerful collective action driver for ambitious voluntary GHG reduction targets. Climate leadership, which can be understood as exceeding the prevailing expectations of expert stakeholders as well as standing out among other pro-active peers, is being striven for by the participating firms – independently of their sector. More importantly in this context, the firms clearly see their position as climate leaders enhanced by setting science-based targets as it adds substance, validity, and overall trustworthiness among expert stakeholders, to their climate strategy. Dunn predicted in 2002 that *"a handful of early movers will seek competitive advantage by shaping the rule of the game"* (Dunn, 2002, p. 39) – which is corresponding with the results that the firms are feeling *"positively"* monitored, as in being awarded certain benefits by corporate stakeholders when performing extraordinarily well. Obtaining and maintaining leadership can therefore state benefits from reducing emissions that are, due to the lack of consumer awareness and consequently, reputational effectiveness, otherwise missing in order to offset the individual investments needed. Once the firms have obtained this position, they report to feel under the obligation to implement new ambitious measures, such as setting science-based targets, among the first and respectably – this is then likely to, firstly, drive other firms striving for climate leadership to follow up before eventually changing mainstream business conduct, either in a bottom-up manner or due to regulatory changes after policy-makers have seen what is possible. Lastly, even dragging laggards will be either strongly

incentivized or legally obliged to close ranks. The large potential of this mechanism, which has been described by many researchers (Boiral, 2006; Crane & Glozer, 2016; e.g., Dunn, 2002; Kolk & Pinkse, 2007) was clearly shown to be in place as collective action driver for firms voluntarily setting emission reductions targets aligned with climate science.

**Directions for future studies**

The analysis and discussion has given rise to several interesting future research objectives which will be shortly discussed in the following. Even though the analysis yielded insightful results with respect to institutional attributes driving voluntary corporate emission reductions, the need for more interdisciplinary research in this new field of literature is undeniable. Ostrom's findings have shown to serve as a useful starting point when aiming at structuring and investigating an institutional setting within the context of voluntary corporate climate action. While they have often been used to analyze other resource dilemmas, the applicability to the issue of climate change has not been empirically tested enough – so far research referring to her call for a polycentric climate governance system has been evolving around normative debates. In order to use her work to better understand physical circumstances as well as business conduct, it would, however, be important to empirically dive deeper into the specific attributes. This could be done by conducting large-scale quantitative studies on different sub-global governance entities enhancing voluntary corporate climate action. Interestingly, it became clear during the analysis that all attributes *can* be applied to this specific context and are further *likely* to *all* function to some extent as collective action drivers for *other* types of corporate climate action. To test the validity of this thought, it would make sense to conduct a similar analysis, however, focusing on either a climate adaption measure, or a measure that already has a higher consumer-accessibility, and consequently higher relevance to customers and the general society. This would also help to place those results into a wider context and to generate more generally valid statements. It can, for instance, be expected that the same analysis could yield substantially different results when investigating the validity of *guiding against climate risks* as a collective action driver of implementing a voluntary *adaptation* measure instead of *mitigation* measure. Another interesting future research question could thus be, to what extent the objective to guide against one's individual climate risks is influencing the respective climate strategy, hence how the type and severity of the climate risks a firm is facing, is related with the choice between, for

instance, an adaptation or mitigation measure, or alternatively between taking a rather public-oriented or internally driven approach.

**Limitations of the study**

Although the study increases the understanding of potential drivers for voluntary GHG emissions, the results have to be viewed in the context of the study's limitations. First of all one has to reflect on Ostrom's and others' warning that, due to the diversity of micro-settings, *"it is practically impossible to isolate the effects of any single condition"* and hereby using them as the only fundament for making alleged general statements about success factors (Poteete et al., 2010, p. 353). Instead one has to regard the importance of broader contextual variables which can strongly influence cooperative behavior and collective group outcomes (Poteete et al., 2010, p. 231). Sullivan and Gouldson have likewise found that it is crucial to understand *"external pressures, internal governance conditions and corporate actions on climate change"* as interacting and influencing each other (2017, p. 423). This is certainly a legitimate objection since the broader context of national and international legislation and the recent developments in this regard generally clearly influence corporate behavior. However, since the study is focused on the *voluntary* activities of multinational companies that are operating in numerous countries with different legislative settings, the impact of specific national legislation is likely to not be too distorting. Repeating the study in order to observe how other variables had an influence would nevertheless be worthwhile (Poteete et al., 2010, p. 229): in this case this might imply asking which specific legislative changes, such as the introduction of a cap-and-trade system, have an incentivizing impact on *voluntary* corporate behavior. A second limitation concerns the small sample and partial arbitrariness regarding the selection of the firms. The selection of firms was firstly already limited by the type of firms participating in the SBTi which mostly are rather large and publicly visible companies that consequently already have a considerable climate management strategy in place. This is not a surprise since the objective was to investigate a *successful* collective action arrangement. It would nevertheless be highly insightful to conduct a similar study asking which institutional attributes could drive voluntary corporate action among firms that have so far not been "contributing" at all, hence do not yet have any emission reduction measures or targets in place. Independently of the prerequisite of the firms' climate strategies, it is important to examine the direct or indirect influence of diverse corporate characteristics, such as company size or industry sector, on the effectiveness of

the different drivers found in this study. Secondly, among the suitable participating firms, those four that had responded were selected. Even though the selected firms do cover the four values within the developed category system, an even larger heterogeneity within the sample would have been desirable. Especially the perspective of a company in one of the archetypical carbon-intensive sectors, such as oil and gas or the automotive industry, could have yielded further interesting insights. Another limitation concerns the selection of interview partners within the firms: since all of them deal with sustainability and legitimacy issues on a daily basis, this might have led them to be highly sensitized for the issue of climate change and the resulting measures. One might expect them to consequently perceive the importance of corporate GHG emissions as substantially higher than, for instance, a financer officer within the same company. Even though this might have been the case to a certain extent, the company representatives did not seem to value the issue of corporate emissions as particularly high and the prevailing obligation of profit-orientation did certainly shine through in every interview. For the sake of validity, a future study design should nevertheless include more companies as well as a bigger variety regarding the maturity of their climate management and further, conduct more interviews with different positions per firm.

Since the SBTi does present a rather unique case, it is at this point difficult to draw conclusions to, as mentioned above, less environmentally-active firms as well as to other climate initiatives that are demanding substantially different climate measures of their participating firms. However, after having conducted this study, I am regarding the specific case of the SBTi as even more insightful and important than initially expected. Especially since the results are highlighting the severe risk of the current institutional landscape to promote and further enhance corporate climate measures that can fittingly be labelled as *greenwashing*, understanding those mechanisms that are at least well-equipped to increase effective emissions reductions appears to be more crucial and important than ever.

## 9. Conclusions and recommendations

In consideration of the enormous emissions gap hampering the achievement of the necessary 2 °C temperature target agreed in Paris, this study was aimed at increasing the understanding of how institutions can boost voluntary GHG emission reductions of non-state actors in order to bridge this alerting gap. In order to approach this objective, it was investigated which institutional factors are likely to drive successful climate mitigation action among companies by studying the specific context of the Science Based Targets initiative and its participating firms, which has spurred ambitious corporate commitments to substantially reduce voluntary GHG emissions by aligning emissions targets with the Paris trajectory. To approach this endeavor, Elinor Ostrom's attributes, that have proven to function as collective action drivers in other resource contexts, are tested for applicability as drivers of voluntary GHG emissions within the arrangement of a multi-stakeholder initiative engaging firms to take collective action. This was done by firstly consulting literature on corporate environmental and climate action which resulted in the formulation of 15 hypotheses about how and why Ostrom's attributes have the potential to explain the success of this particular collective action situation. The data for the analysis of the case of the initiative consisted of diverse documents and five expert interviews, conducted with representatives of the SBTi as well as of four firms that have already approved science-based emission reduction targets in place.

The analysis yielded interesting contributions to the new juncture of literature on collective action, voluntary climate mitigation and firms. In fact, all of Ostrom's attributes have shown to be suitable for analyzing corporate climate action – however, only some of them appear to function as collective action drivers of ambitious mitigation activities, such as the setting of science-based GHG targets: The availability of reliable information about the costs and benefits of the respective climate action is clearly important for decision-making. The ability to communicate about a firm's climate strategies with other contributing companies and partners is seen as prerequisite in order to learn from each other and collectively act on climate change while the communication on the firm's GHG reduction targets to expert stakeholders can increase trust and competitiveness. Firms are likely to be awarded those benefits if they are informally monitored by those stakeholders. Along those potential benefits is obtaining a climate leadership position, which appears to be the most unambiguous collective action driver to voluntarily reduce GHG

emissions. Surprisingly, customers were perceived to have a very low interest in corporate GHG emission reductions due to the scientific complexity and intangibility of the issue, which explains why gaining a positive reputation among consumers and other laypersons does not appear to drive collective action in this context.

In view of the large collective action potential of enabling corporate climate leadership, it is clearly desirable to enhance this mechanism by grouping those *"climate leaders"* within a multi-stakeholder initiative, such as the Science Based Targets initiative. While this study was focused on a particular case of companies taking *highly ambitious* climate action, the collective action mechanism found to be in place is likely to differ from that within other climate initiatives. The results, however, do indicate that the interaction and exchange with corporate stakeholders through an initiative that is channeling the stakeholder's environmental expectations, is a promising mechanism in order to align societal pressures with corporate identity. This mechanism was found by others to be necessary in order to overcome collective action barriers in the future (Finke et al., 2016; Sullivan & Gouldson, 2017). The participation in such an initiative can substantially contribute to the corporate objective of building or maintaining environmental leadership which is supported by highly trustworthy founding organizations, such as the WWF and the UN adding credibility to the initiative. The SBTi has accordingly positioned itself as an organization whose main objective is to celebrate leadership in order to incentivize more firms to align their targets with the 2°C target. A recommendation to the SBTi that resulted from the analysis is that interorganizational collaboration and communication seems to have the potential to function as a powerful collective action driver, which is not sufficiently in place in this arrangement yet and thus, should be structurally enabled. This could be done *digitally*, by, for instance, providing more detailed information on other firm's experiences with certain emission reduction measures, or *physically*, by organizing regional gatherings with the environmental managers of the participating and interested firms, in order to increase peer-to-peer learning.

As discussed, it can be concluded that *"expert"* stakeholders (e.g., investors, suppliers, NGOs) at this point in time play a substantially larger role in this collective action situation than *"lay person"* stakeholders, i.e., most importantly consumers. However, since GHGs are emitted at all scales, a successful polycentric governance system requires actors at *all* scales to participate in the collective task of reducing GHG emissions. The

results contribute to the understanding of why the progress made so far by firms is still frustratingly slow, and not exclusively promising. From a physical perspective there is no doubt that the private sector has the potential to contribute substantially to bridging the emissions gap, which should ideally result in a collectively acknowledged responsibility to do so. Corporate responsibility does, however, necessarily comprise the responsibility of all individuals contributing capital as well as licensing them to operate: a successful collective action process is thus *dependent* on the engagement of polycentric actors, such as customers, investors, and policy-makers.

It was shown that there is a serious lack of awareness and understanding of the issue of corporate GHG emissions that necessarily led to a lack of interest. The fact that the small but increasing number of sensitized consumers seems to be pleased by easily accessible product-related information gives rise to concern: if this is even further enhanced by obscure legislation, the supply and demand mechanism could result in an indirect incentivisation of short-lived greenwashing practices instead of promoting the private sector to rise up to its full potential by effectively contributing to filling in the emissions gap. One might argue that every step is a good step, positively remarking that customers have started to care about corporate climate management practices at all. However, if measures, such as external $CO_2$-offsetting, justifiably criticized for a lack of transformative potential and global effectiveness, are found to be the most attractive to customers, they are likely to be increasingly adopted by firms. This could substantially hamper the private sector's potential to collectively contribute to climate change mitigation. The direction of policy-making in the near future is thus of directive nature: incentivizing or obliging large firms to inform stakeholders about the climate-relevance of their products without setting further standards (e.g., the EU non-financial reporting initiative) is likely to foster the alarming trend of greenwashing.

Based on the results of the analysis, two recommendations are arising in order to enhance corporate climate cooperation: *Firstly*, the level of scientific awareness and education about GHG emissions needs to be substantially increased in order to make customers and the general public effective monitors of corporate climate action. Policy-makers at different levels as well as civil society need to increase the level of education among the general public about GHG emissions, by, for instance, integrating this content into the curriculum of secondary schools in order to empower consumers to take informed

purchasing-decisions and demand the change in business conduct that is needed. *Secondly*, policy-making should further ease and support the transformative potential of corporate climate leadership by supporting initiatives like the SBTi in order to make them grow in size to unravel their full potential as well as through bold policy measures specifically directed to showcasing and recompensing cutting-edge pioneers with, for instance, tax breaks. In addition, the fundament for the mechanism of the discussed collective action drivers could be improved by, for instance, specifying CSR reporting obligations more stringently by explicitly including obligatory information about overall GHG emissions (both direct and indirect emissions). This would not only help the firms themselves to increase long-term planning security, but further enable interested stakeholders to engage in large-scale informal monitoring. Ambitious corporate climate action is a reality that quickly needs to be driven out of the marginal corner in order to achieve the emission reductions necessary to achieve the 2 °C target. The concern that corporate climate actions are constrained by the "business case" (see Sullivan & Gouldson, 2017) is valid – companies are not likely to voluntarily safe the world by carrying the individual cost without the corresponding benefits. Following a "carrot and stick" approach by combining baseline state-based measures with incentives for voluntary contributions to trigger the win-win paradigm within companies could thus be an effective approach. If we want to safeguard the 2°C target, it is not least on every single one of us to contribute: Being empowered consumers consciously demanding as well as awarding bold climate action is the first step to foster change. This process will, just as well as a global solution, not come around easy. The fact that business conduct, societal expectations, the resulting bottom-up governance pressure as well as governmental action are deeply intertwined, should not discourage us, but rather give rise to optimism: Collectively acting on climate change is feasible, and embracing polycentricity does not least implicate embracing complexity.

## 10. Bibliography


Aggarwal, R., & Dow, S. (2012). Corporate governance and business strategies for climate change and environmental mitigation. *The European Journal of Finance*, *18*(3–4), 311–331. https://doi.org/10.1080/1351847X.2011.579745

Allen, M. W., & Craig, C. A. (2016). Rethinking corporate social responsibility in the age of climate change: a communication perspective. *International Journal of Corporate Social Responsibility*, *1*(1), 1. https://doi.org/10.1186/s40991-016-0002-8

Backman, C. A., Verbeke, A., & Schulz, R. A. (2017). The drivers of corporate climate change strategies and public policy: A new resource-based view perspective. *Business & Society*, *56*(4), 545–575.

Bator, F. M. (1958). The anatomy of market failure. *The Quarterly Journal of Economics*, *72*(3), 351–379.

Blok, K., Höhne, N., Leun, K. van der, & Harrison, N. (2012). Bridging the greenhouse-gas emissions gap. *Nature Climate Change*. https://doi.org/10.1038/nclimate1602

Boiral, O. (2006). Global warming: should companies adopt a proactive strategy? *Long Range Planning*, *39*(3), 315–330.

Bulkeley, H., Andonova, L., Backstrand, K., Betsill, M., Compagnon, D., Duffy, R., & Kolk, A. (2012). Governing climate change transnationally: assessing the evidence from a database of sixty initiatives. *Environment and Planning C: Government and Policy*, *30*(4), 591–612.

Cadez, S., & Czerny, A. (2016). Climate change mitigation strategies in carbon-intensive firms. *Journal of Cleaner Production*, *112*, 4132–4143.

Cambridge University Press. (2014). *Climate change 2013 - The physical science basis: working group I contribution to the fifth assessment report of the intergovernmental panel on climate change*. Cambridge. https://doi.org/10.1017/CBO9781107415324

Carattini, S., Baranzini, A., & Roca, J. (2015). Unconventional determinants of greenhouse gas emissions: the role of trust. *Environmental Policy and Governance*, *25*(4), 243–257.

CDP. (2017). Learning from the leaders - CDP Europe natural capital report 2017. Retrieved January 22, 2018, from https://www.cdp.net/en/research/global-reports/europe-report-2017

CDP. (2018). Search and view past CDP responses. Retrieved March 6, 2018, from

https://www.cdp.net/en/responses

CEWE. (2018). Umweltschutz und Ressourcenschonung. Retrieved March 5, 2018, from https://company.cewe.de/de/nachhaltigkeit/umweltschutz.html

CEWE, C. (2017). Climate Change 2017 Information Request CEWE Stiftung & Co. KGaA. Retrieved March 1, 2018, from https://www.cdp.net/en/responses

Cogan, D. G. (2006). Corporate governance and climate change: Making the connection. CERES investor resbonsibility research center. Retrieved November 10, 2017, from http://purochioe.rrojasdatabank.info/corpgov2006.pdf

Cole, D. H. (2011). From global to polycentric climate governance. *Climate Law*, (3), 395–413.

Cole, D. H. (2015). Advantages of a polycentric approach to climate change policy. *Nature Climate Change*, *5*(2), 114–118.

Crane, A., & Glozer, S. (2016). Researching corporate social responsibility communication: themes, opportunities and challenges. *Journal of Management Studies*, *53*(7), 1223–1252.

Crawford, S. E. S., & Ostrom, E. (1995). A grammar of institutions. *American Political Science Review*, *89*(03), 582–600.

Damert, M., Paul, A., & Baumgartner, R. J. (2017). Exploring the determinants and long-term performance outcomes of corporate carbon strategies. *Journal of Cleaner Production*, *160*, 123–138.

Dawkins, C., & Fraas, J. W. (2011). Coming clean: the impact of environmental performance and visibility on corporate climate change disclosure. *Journal of Business Ethics*, *100*(2), 303–322.

Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: social values and organizational behavior. *The Pacific Sociological Review*, *18*(1), 122–136.

Dunn, S. (2002). Down to business on climate change: an overview of corporate strategies. *Greener Management International*, (39), 27–41.

Finke, T., Gilchrist, A., & Mouzas, S. (2016). Why companies fail to respond to climate change: Collective inaction as an outcome of barriers to interaction. *Industrial Marketing Management*, *58*, 94–101.

Fran, S., P., W. C., Anne, G., Fran, S., P., W. C., & Anne, G. (2014). Challenges in applying the paradigm of welfare economics to climate change. *Journal of Benefit-Cost Analysis*, *5*(3), 347–376.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & Colle, S. de. (2010).

*Stakeholder theory: the state of the art*. Cambridge: Cambridge University Press.

Gasbarro, F., Iraldo, F., & Daddi, T. (2017). The drivers of multinational enterprises' climate change strategies: A quantitative study on climate-related risks and opportunities. *Journal of Cleaner Production*, *160*, 8–26.

Gouldson, A., & Sullivan, R. (2013). Long-term corporate climate change targets: What could they deliver? *Environmental Science & Policy*, *27*, 1–10.

Hannam, P. M., Vasconcelos, V. V., Levin, S. A., & Pacheco, J. M. (2017). Incomplete cooperation and co-benefits: deepening climate cooperation with a proliferation of small agreements. *Climatic Change*, *144*(1), 65–79.

Hardin, G. (1968). The tragedy of the commons. *Science*, *162*(3859), 1243–1248.

Hare, W., Stockwell, C., Flachsland, C., & Oberthür, S. (2010). The architecture of the global climate regime: a top-down perspective. *Climate Policy*, *10*(6), 600–614.

Hausfather, Z. (2017, November 13). Analysis: global CO2 emissions set to rise 2% in 2017 after three-year 'plateau.' Retrieved February 12, 2018, from https://www.carbonbrief.org/analysis-global-co2-emissions-set-to-rise-2-percent-in-2017-following-three-year-plateau

Heede, R. (2014). Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010. *Climatic Change*, *122*(1–2), 229–241.

Helfferich, C. (2014). Leitfaden- und Experteninterviews. In J. Blasius & Baur, Nina (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 559–574). Wiesbaden: Springer.

Hickmann, T. (2017). Voluntary global business initiatives and the international climate negotiations: A case study of the Greenhouse Gas Protocol. *Journal of Cleaner Production*, *169*, 94–104.

Hoffman, A. J. (2005). Climate change strategy: The business logic behind voluntary greenhouse gas reductions. *California Management Review*, *47*(3), 21–46.

Hoffman, A. J. (2016). Communicating about climate change with corporate leaders and stakeholders. In Nisbet, M (Ed.), *Oxford encyclopedia of climate change*. Oxford: Oxford University Press. Retrieved from https://ssrn.com/abstract=2767545

Interview CEWE. (2018). Interview with representative of CEWE. Conducted January 19, 2018.

Interview Nestlé. (2018). Interview with representative of Nestlé Germany. Conducted January 12, 2018.

Interview SAP. (2018). Interview with representative of SAP. Conducted January 18, 2018.

Interview SBTi. (2017). Interview with representative of SBTi. Conducted December 15, 2017.

Interview VERBUND. (2018). Interview with representative of VERBUND. Conducted February 5, 2018.

IPCC. (2014). *Climate change 2014: synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the intergovernmental panel on climate change* (p. 151). Geneva, Switzerland: IPCC. Retrieved from http://www.ipcc.ch/report/ar5/wg1/

Jeswani, H. K., Wehrmeyer, W., & Mulugetta, Y. (2008). How warm is the corporate response to climate change? Evidence from Pakistan and the UK. *Business Strategy and the Environment*, *17*(1), 46–60.

Jones, C. A., & Levy, D. L. (2007). North american business strategies towards climate change. *European Management Journal*, *25*(6), 428–440.

Jordan, A. J., Huitema, D., Hildén, M., & van Asselt, H. (2015). Emergence of polycentric climate governance and its future prospects. *Nature Climate Change*, *5*(11), 977–982.

Kiousis, S., Popescu, C., & Mitrook, M. (2007). Understanding influence on corporate reputation: an examination of public relations efforts, media coverage, public opinion, and financial performance from an agenda-building and agenda-setting perspective. *Journal of Public Relations Research*, *19*(2), 147–165.

Kolk, A., & Pinkse, J. (2007). Towards strategic stakeholder management? Integrating perspectives on sustainability challenges such as corporate responses to climate change. *Corporate Governance: The International Journal of Business in Society*, *7*(4), 370–378.

Krabbe, O., Linthorst, G., Blok, K., Crijns-Graus, W., & van Vuuren, D. P. (2015). Aligning corporate greenhouse-gas emissions targets with climate goals. *Nature Climate Change*, *5*(12), 1057–1060.

Levy, D., & Rothenberg, S. (2014). The role of corporate scientists and institutional context: Corporate responses to climate change in the automobile industry (pp. 101–126). https://doi.org/10.1057/9781137319890_5

Mayring, P. (2007). *Qualitative Inhaltsanalyse: Grundlagen und Techniken* (9. Aufl.). Weinheim: Beltz.

Mayring, P. (2014). Qualitative content analysis: theoretical foundation, basic procedures and software solution. Retrieved November 14, 2017, from http://nbn-resolving.de/urn:nbn:de:0168-ssoar-395173

Nestlé S.A. (2016). Nestlé in society. Creating Shared Value and meeting our commitments 2016. Full report. Retrieved March 5, 2017, from https://www.nestle.com/asset-library/documents/library/documents/corporate_social_responsibility/nestle-csv-full-report-2016-en.pdf

Nestlé S.A. (2018). About us. Retrieved April 9, 2018, from https://www.nestle.com/aboutus

Nestlé S.A., C. (2017). Climate Change 2017 Information Request Nestlé. Retrieved March 1, 2018, from https://www.cdp.net/en/responses

O'Donovan, G. (2002). Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. *Accounting, Auditing & Accountability Journal*, *15*(3), 344–371.

Okereke, C. (2007). An exploration of motivations, drivers and barriers to carbon management. *European Management Journal*, *25*(6), 475–486. https://doi.org/10.1016/j.emj.2007.08.002

Okereke, C., Wittneben, B., & Bowen, F. (2012). Climate change: challenging business, transforming politics. *Business & Society*, *51*(1), 7–30.

Olson, M. (1967). *The logic of collective action: public goods and the theory of groups* (21. printing). Cambridge: Harvard University Press.

Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge ; New York: Cambridge University Press.

Ostrom, E. (2000). Reformulating the commons. *Swiss Political Science Review*, *6*(1), 29–52.

Ostrom, E. (2009a). *A polycentric approach for coping with climate change* (Policy Research Working Paper No. WPS5095). Washington, DC: The World Bank. https://doi.org/10.1596/1813-9450-5095

Ostrom, E. (2009b). *Understanding institutional diversity*. Princeton: Princeton University Press.

Ostrom, E. (2010a). Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review*, *100*(3), 641–672.

Ostrom, E. (2010b). Polycentric systems for coping with collective action and global

environmental change. *Global Environmental Change*, *20*(4), 550–557.

Ostrom, E. (2012). Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales? *Economic Theory*, *49*(2), 353–369.

Paavola, J. (2008). Governing atmospheric sinks: the architecture of entitlements in the global commons. *International Journal of the Commons*, *2*(2), 313.

Paavola, J. (2012). Climate change: the utimate tragedy of the commons? In *D. Cole & E. Ostrom (eds). Property in Land and Other Resources.* (pp. 417–433). Cambridge: Lincoln Institute of Land Policy.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd edition). Newbury Park, Calif: Sage Publications.

Pineda, A. C. (2018). Science-based targets becoming business norm as companies aim to align climate plans with Paris goals. Retrieved January 23, 2018, from http://sciencebasedtargets.org/2017/12/12/science-based-targets-becoming-business-norm-as-companies-aim-to-align-climate-plans-with-paris-goals/

Poteete, A. R., Janssen, M., & Ostrom, E. (2010). *Working together: collective action, the commons, and multiple methods in practice*. Princeton: Princeton University Press.

Qian, W., & Schaltegger, S. (2017). Revisiting carbon disclosure and performance: Legitimacy and management views. *The British Accounting Review*, *49*(4), 365–379. https://doi.org/10.1016/j.bar.2017.05.005

Reid, E. M., & Toffel, M. W. (2009). Responding to public and private politics: corporate disclosure of climate change strategies. *Strategic Management Journal*, *30*(11), 1157–1178.

Rogelj, J., den Elzen, M., Höhne, N., & Fransen, T. (2016). Paris Agreement climate proposals need a boost to keep warming well below 2 °C. *Nature*, *534*(7609), 631–639.

Samuelson, P. A. (1954). The pure theory of public expenditure. *The Review of Economics and Statistics*, *36*(4), 387–389.

SAP SE. (2018a). Environmental highlights. SAP Integrated Report 2017. Retrieved March 5, 2018, from https://www.sap.com/integrated-reports/2017/en/environmental-highlights.html

SAP SE. (2018b). SAP führt erneut die Dow Jones Sustainability Indices (DJSI) an. Retrieved April 5, 2018, from https://news.sap.com/germany/sap_zehn-jahre-in-

folge-fuhrend-bei-djsi/

SAP SE. (2018c). Wer wir sind. Retrieved April 5, 2018, from https://www.sap.com/germany/about/careers/who-we-are.html

SAP SE, C. (2017). Climate Change 2017 Information request SAP SE. Retrieved March 1, 2018, from https://www.cdp.net/en/responses

SBTi. (2015a). Sectoral Decarbonization Approach (SDA) - A method for setting corporate emission reduction targets in line with climate science. Science Based Targets initiative. Retrieved from http://sciencebasedtargets.org/wp-content/uploads/2015/05/Sectoral-Decarbonization-Approach-Report.pdf

SBTi. (2015b, May). A Quick Guide to the Sectoral Decarbonization Approach. Science-Based Targets initiative.

SBTi. (2017a). Science Based Targets Call to Action Commitment Letter - Version 1.5. Science Based Targets initiative. Retrieved from http://sciencebasedtargets.org/wp-content/uploads/2016/12/SBT-Commitment-Letter.pdf

SBTi. (2017b, February). SBTi Criteria and Recommendations - Version 2.0. Science Based Targets initiative.

SBTi. (2018a). About the Science Based Targets initiative. Science Based Targets initiative. Retrieved October 18, 2017, from http://sciencebasedtargets.org/about-the-science-based-targets-initiative/

SBTi. (2018b). Case studies. Science Based Targets initiative. Retrieved February 21, 2018, from http://sciencebasedtargets.org/case-studies/

SBTi. (2018c). Companies Taking Action. Science Based Targets initiative. Retrieved February 20, 2018, from http://sciencebasedtargets.org/companies-taking-action/

SBTi. (2018d). FAQ. Science Based Targets initiative. Retrieved December 5, 2017, from http://sciencebasedtargets.org/faq/

SBTi. (2018e). Resources. Science Based Targets initiative. Retrieved February 20, 2018, from http://sciencebasedtargets.org/resources/

SBTi. (2018f). Science-based targets becoming business norm as companies aim to align climate plans with Paris goals. Science Based Targets initiative. Retrieved January 10, 2018, from http://sciencebasedtargets.org/2017/12/12/science-based-targets-becoming-business-norm-as-companies-aim-to-align-climate-plans-with-paris-goals/

SBTi. (2018g). Take action. Science Based Targets initiative. Retrieved January 26,

2018, from http://sciencebasedtargets.org/step-by-step-guide/

SBTi. (2018h). What is a science-based target? Science Based Targets initiative. Retrieved January 24, 2018, from http://sciencebasedtargets.org/what-is-a-science-based-target/

SBTi. (2018i). Why set a science-based target? Science Based Targets initiative. Retrieved February 21, 2018, from http://sciencebasedtargets.org/why-set-a-science-based-target/

Schaltegger, S., & Hörisch, J. (2017). In search of the dominant rationale in sustainability management: legitimacy- or profit-seeking? *Journal of Business Ethics*, *145*(2), 259–276.

Schellnhuber, H. J., Rahmstorf, S., & Winkelmann, R. (2016). Why the right climate target was agreed in Paris. *Nature Climate Change*, *6*(7), 649–653.

Shankar, A., & Pavitt, C. (2002). Resource and public goods dilemmas: a new issue for communication research. *Review of Communication*, *2*(3), 251–272.

Slawinski, N., Pinkse, J., Busch, T., & Banerjee, S. B. (2017). The role of short-termism and uncertainty avoidance in organizational inaction on climate change: a multi-level framework. *Business & Society*, *56*(2), 253–282.

Stern, N. (2007). *The economics of climate change: the stern review*. Cambridge: Cambridge University Press. Retrieved from http://ebooks.cambridge.org/ref/id/CBO9780511817434

Stewart, R. B., Oppenheimer, M., & Rudyk, B. (2013). A new strategy for global climate protection. *Climatic Change*, *120*(1–2), 1–12. https://doi.org/10.1007/s10584-013-0790-8

Sullivan, R., & Gouldson, A. (2017). The governance of corporate responses to climate change: an international comparison. *Business Strategy and the Environment*, *26*(4), 413–425.

UNEP. (2015). Climate Commitments of Subnational Actors and Business: A Quantitative Assessment of their Emission Reduction Impact. United Nations Environmental Programme. Retrieved February 7, 2018, from http://wedocs.unep.org/handle/20.500.11822/9618

UNEP. (2017). The emissions gap report 2017: a UN environment synthesis report. United Nations Environmental Programme. Retrieved March 14, 2018, from http://www.unenvironment.org/resources/emissions-gap-report

UNFCCC. (2015, May). Adoption of the Paris Agreement. Report No.

FCCC/CP/2015/L.9/Rev.1. United Nations Framework Convention on Climte Change. Retrieved December 2, 2017, from http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf (UNFCCC, 2015).

VERBUND AG. (2018a). Über VERBUND. Retrieved April 6, 2018, from https://www.verbund.com/de-at/ueber-verbund

VERBUND AG. (2018b). Unser Beitrag zum Klimaschutz. Retrieved March 5, 2018, from https://www.verbund.com/de-at/ueber-verbund/verantwortung/umwelt/klimaschutz

VERBUND AG, C. (2017). Climate Change 2017 Information Request VERBUND AG. Retrieved March 1, 2018, from https://www.cdp.net/en/responses

We Mean Business, CDP. (2016). The business end of climate change - how bold corporate action supported by smart policy can keep temperature rise below 2°C. Retrieved January 15, 2018, from http://www.businessendofclimate.org

Zhang, H.-B., Dai, H.-C., Lai, H.-X., & Wang, W.-T. (2017). U.S. withdrawal from the Paris Agreement: reasons, impacts, and China's response. *Advances in Climate Change Research*, *8*(4), 220–225.

## 11. Annex

### I. Interview guideline for SBTi representative

| Central questions | Check for mention of important aspects/ Memo for additional questions |
|---|---|
| **Part I (General questions)** | |
| - *Can you briefly explain what makes the SBTi unique?*<br>- *Which function do you have in the SBTi?* | → very short answers! |
| - *What does the SBTi offer to firms once they have committed to the initiative?* | Forms of assistance/ support, monitoring? |
| - *Which characteristics/ properties of the SBTi drive firms to set science-based targets? / How does the SBTi facilitate firms to take action?* | **Use her/his words to go into detail:** Specific strategy/ instruments/ institutional factors/ information channels etc. used? |
| **Part II (O1: Information)** | |
| - *The SBTi seemingly offers a lot of information directed to firms. For what purpose is it provided?* | → *What kind of information is provided?*<br>1. On climate change in general?<br>2. On costs and benefits of mitigation action/ setting sbt's?<br>→ *How do you think the firms make use of it?* |
| **Part III (O2: Communication)** | |
| - *Can you briefly talk about the role of communication within the SBTi?* | → *How do the firms make use of it?*<br>- Examples? Expression of commitment/ Creation of norms? |
| - *To what extent does the SBTi enable communication among firms? If yes: how and why?* | |
| - *To what extent does the SBTi enable communication between firms and their stakeholders? If yes: how and why?* | → *Does it enhance trust among firms and other stakeholders?*<br>- Examples? |

| | |
|---|---|
| **Part IV (O3: Monitoring & Sanctioning)**<br><br>- *What happens if a firm fails to reach its target?*<br><br><br><br><br><br>***If possible, in her words if mentioned:***<br>- *To what extent does the SBTi enable "informal monitoring"?* | *The SBTi does officially neither track the firm's process on GHG emission reductions against their targets nor does it publicly announce a firm's failure to meet their target → Do you think, higher monitoring and sanctioning efforts would lead to more engagement of firms?/ Is the SBTi aiming for more?*<br><br>= reputational loss, scrutiny by media, customers, investors etc. and economic/ social sanctioning |

## II. Interview guideline for company representatives

| **Central questions** | **Check for mention of important aspects/ Memo for additional questions** |
|---|---|
| **Part I (General questions)** | |
| *- Can you briefly explain in what position you are working in and to what extent you have been working with the SBTi?* | → very short answers! |
| *- What makes the cooperation between [company name] and the SBTi successful?* | |
| *- Which characteristics of the SBTi drive firms to participate and set ambitious GHG reduction targets?* | *Forms of assistance/ tools/ support etc.?* |
| *- What does the SBTi offer to the already participating firms?* | → **Use her/ his words to switch to part II and III:** Characteristics/ "Success factors"/ Benefits, etc. |
| *- What is the initiative lacking?* | |
| **Part II (C2 Reputation)** | |
| *- How important is the reduction of greenhouse gases for [company name]'s overall image?* | → *which stakeholder are you addressing? Customers, Investors etc., and other firms? How much do stakeholder care about GHG emission reduction targets?* |
| *- Which role does the participation of [company name] in the SBTi play in the reputational work/ interaction with stakeholders?* | |
| *- Does the setting of science-based targets help [company name] to increase trust?* | → *If yes, among whom?* |
| **Part III specifying O1- 4** | |
| ***1. Benefits at smaller scales (O4)*** | |

| | |
|---|---|
| *- What are the most attractive things the SBTi offers to [company name] as participating firm?*<br>*- What are most important individual advantages/ benefits of participating?*<br>*- Have there been any challenges/ internal barriers related tot he SBTi participation?* | → **benefits: communication, information, monitoring?** If one mentioned, ask for more detail/ go to 2.-4. |
| ***2. Information (O1)***<br>*- How does [company name] make use of the offered information? Of which kind?* | → *What kind of information is provided?*<br>3. On climate change in general?<br>4. On costs and benefits of setting sbt's? |
| ***3. Communication (O2)***<br>*- What role does communication play in this context?*<br>*- How are you communicating the GHG reduction targets?*<br>*- Is it used to build trust?* | → *And to whom?*<br>→ *to other firms, too?* |
| ***4. Monitoring (O3)***<br>*- What would happen if [company name] would fail to meet their science-based targets?* | → *Do you feel informally monitored by your stakeholders? If yes, by which group the most/ the least?* |
| ***5. Climate risks (C1)***<br>*- To what extent does the SBTi participation help to reduce climate risks for [company name]?* | → *If yes, against which kinds of risks? Physical? Regulatory?* |
| **Part V (C3: Leadership)**<br><br>*- To what extent is [company name] striving for a climate leadership position within its sector?*<br><br>*- To what extent does the SBTi participation helps to obtain or maintain this position?* | |

## III. Case Selection Process

The numbers were derived on January 2th, 2018 from Google.de as well as the official company websites.

| Selection Categories | **General visibility** LOW<br><br>In addition: Number of employees<br><br>LOW | **General visibility** HIGH<br><br>In addition: Number of employees<br><br>HIGH |
|---|---|---|
| **Issue visibility** LOW<br><br>In addition: typically, carbon-intensity sector LOW | **CEWE Stiftung & Co KGaA**<br><br>*Sector: Photo-finishing*<br>*Employees: 3.300*<br><br>*Google search "CEWE": 16.200.000 results*<br><br>*Google search "CEWE Climate Change": 61.700 results → 0,4 %* | **SAP SE**<br><br>*Sector: Software*<br>*Employees: 88.500*<br><br>*Google search "SAP": 75.400.000 results*<br><br>*Google search "SAP Climate Change": 785.000 results → 1%* |
| **Issue visibility** HIGH<br><br>In addition: typically, carbon-intensity sector HIGH | **VERBUND AG**<br><br>*Sector: Electricity-producer*<br>*Employees: 3.000*<br><br>*Google search "Verbund AG": 799.000 results*<br><br>*Google search "Verbund AG Climate Change": 92.400 results → 12 %* | **NESTLÈ S.A.P.**<br><br>*Sector: Food processing*<br>*Employees: 323.000*<br><br>*Google search "Nestlé": 42.100.000 results*<br><br>*Google search "Nestlé Climate Change": 484.000 results → 1%* |