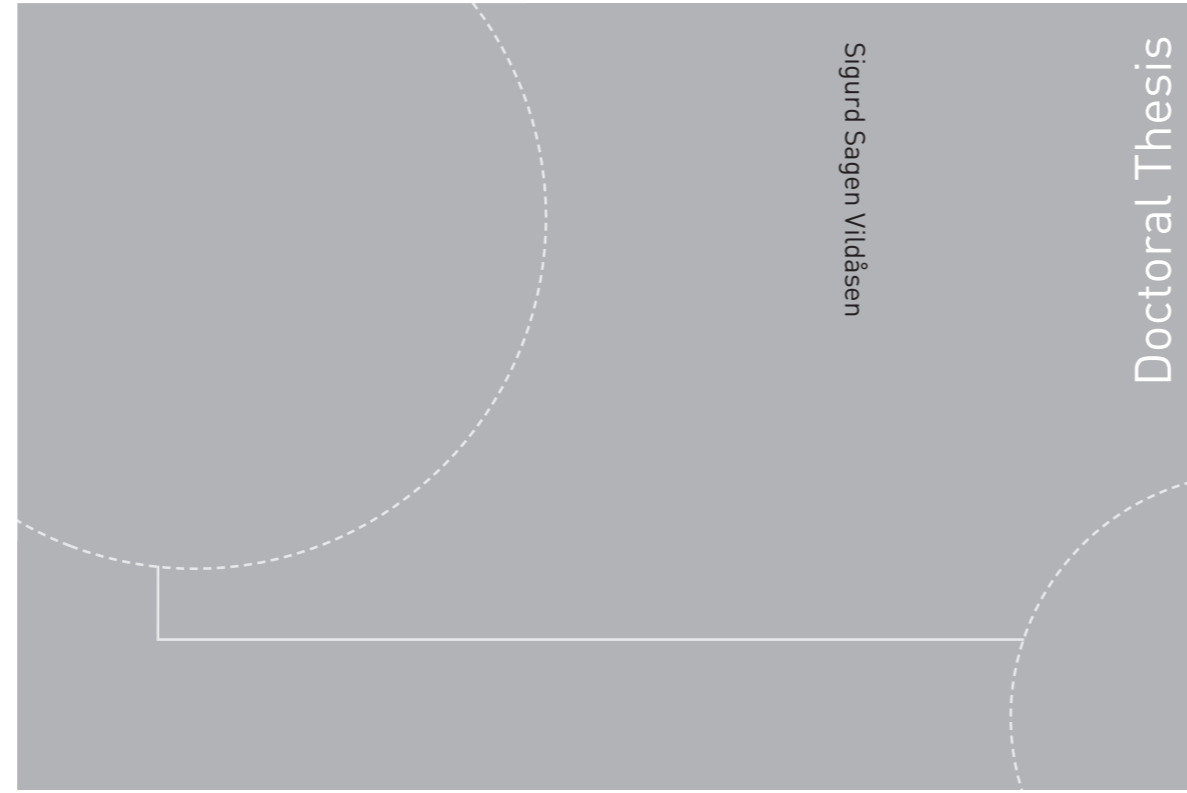


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Sigurd Sagen Vildåsen

Corporate Sustainability

Exploring a Case of Creating Value
from Waste through a Transdisciplinary
Methodology

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NTNU
Norwegian University of
Science and Technology
Faculty of Economics and Management
Department of Industrial Economics
and Technology Management

Sigurd Sagen Vildåsen

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Exploring a Case of Creating Value
from Waste through a
Transdisciplinary Methodology

Thesis for the degree of Philosophiae Doctor

Trondheim, May 2019

Norwegian University of Science and Technology
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Department of Industrial Economics and Technology Management



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Preface

Managers face a vexing reality. They must find a way to do their work even as seemingly rival financial and societal demands intensify (Margolis and Walsh, 2003, p. 295).

The quote suggests a tension between business and society. Such a view has led to my questioning of the popular belief that there is as an inherent win-win relationship between societal concerns and financial objectives. Indeed, one can wonder if there is an intrinsic win-lose relationship in the current system of production and consumption. Nevertheless, the potential for change and innovative solutions seems to lie in the creative space between contradicting demands, which makes the field of corporate sustainability even more intriguing.

Some exciting developments have taken place during the last few years. Thinking back to the year 2013 when I completed my Master's degree, I realize that much has changed. Business actors apply concepts such as 'sustainable development' and 'circular economy' in a more sophisticated and reflective manner, and a shared understanding across different sectors is developing. The UN Sustainable Development Goals show promising potential in this regard. Even though the framework has its limitations, it has the power of a universal language that brings together actors with different interests.

My aim for this thesis has been to explore practical challenges in an industrial context, while at the same time touching upon some more profound questions regarding the role of business in society. The project, "Sustainable Innovation and Shared Value Creation in Norwegian Industry" (SISVI), has provided me a home for pursuing that quest by bringing together academics and practitioners with shared interests. Moreover, the Department of Industrial Economics and Technology Management has secured the administrative support.

I have written the following chapters with the objective to synthesize and reflect upon the specialized contributions on which the thesis is built. Both concerning theoretical debate and empirical insights, Papers 1, 2, 3, and 4 contain essential nuances. Thus, I advise the reader to begin with the papers before embarking on Chapters 1-6. Moreover, I have put particular emphasis on methodological considerations in Chapter 2 so that the reader may critically evaluate my contribution.

Acknowledgments

When I was a little boy, my father used to tell me fairy tales. I remember especially one where the main character, Askeladden, engages with people that his brothers disapprove such as the old woman with her nose stuck in the tree trunk. At the end of the day, this is a test, and she uses her magical powers to help Askeladden defeat the trolls that lurk in the forest.

Working with a PhD thesis has its paradoxical twists and turns as in the fairy tales. What I have learned is that efforts made at the beginning of the process – often on the side of what I “should” be doing – became a valuable investment for the long run. People I thought would have little direct influence on my work proved crucial helpers along the way.

Thinking back on the first meeting with Annik Magerholm Fet during the spring of 2012, I did not imagine that our collaboration would develop as it did. I admire her ability to open doors and always find exciting opportunities for new projects. She has given me the freedom to pursue my own ideas and ambitions. Her friendly attitude and engaging personality have resulted in numerous social events and gatherings that I probably will think back on as the most valuable experiences from these last years.

There several others that deserve acknowledgments. My colleagues in the SISVI project have been a particular source of inspiration. Thanks to Luitzen De Boer and Arild Aspelund for giving support and motivating feedback during crucial stages of the PhD process. Malena Ingemansson Havenvid was an invaluable help when we wrote a paper together, and I am pleased that we managed to publish our common findings developed through SISVI activities. Finally, the company Plasto, and especially Runar Stenerud, deserves a special thank you. Runar has supported all my ideas and academic hunches, and this has been invaluable for my empirical research.

As happens with Askeladden in the fairy tale, I came across two unexpected helpers. Martina Maria Keitsch and I collaborated on the first published paper of the thesis, and this was an essential milestone for me. I am grateful for her insightful and hands-on approach that was paramount at the time to tackle a specific type of trolls (journal editors and reviewers). Jonas Alexander Ingvaldsen has been a supporter from day one and has invested much time in my work. His contributions as a discussion partner, also during the formal midway evaluation, have helped me to structure my arguments and rethink my theoretical positions.

The International Sustainable Development Research Society (ISDRS) deserves a note. Since I attended the first conference in 2014, I have much enjoyed the supportive and inspiring atmosphere at the annual gatherings. A special thanks to the society's

President at the time, Walter Vermeulen, for supporting my research, nominating me for board membership in ISDRS, and inviting me to visit Utrecht University during the spring of 2017. Moreover, my stay in Utrecht would not have been the same without the friendship and kind support of Sjors Witjes and Len Blom.

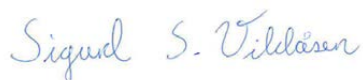
The role of social support is something I underestimated when I started to work at the Department of Industrial Economics and Technology Management back in 2013. I realize now the importance of colleagues, several of whom have become close friends – thank you for all the fun and social activities Dina, Haley, Paritosh, Michael, and Jon. Haley Knudson deserves a sentence of her own since she is the one that has read all of my work and spend several hours to help me – I hope to return the favor.

My family has for many years been wondering - “When are you getting a real job?” I have known, however, that whatever I end up doing would be good enough for them. My mother and stepfather have more than once been proud participants at university events in Trondheim. Thank you, mum, for reminding me not to forget the realities of life, and that with privilege comes the responsibility to help others.

My boyfriend, Benjamin, has been part of my PhD journey from the beginning and to the end. Your encouragements and compliments have probably meant much more than I realize – especially during the final phase that took an unexpected turn. Thank you for showing me that there is more to life than work, for example, our stuffed animals.

16 years ago, the story of my father took an unexpected end. I know you would have loved to hear about the fairy tales of my life in the same you told me stories when I was a little boy. I am grateful that you encouraged me to follow my own path and taught me the value of engaging with the people I meet along the way. I carry with me many of your views and ideas.

Trondheim, December 2018



Sigurd Sagen Vildåsen

Abstract

Grounded in a transdisciplinary (TD) approach, this thesis draws from a longitudinal case study focused on the company Plasto's effort to create value from waste. Taking place from May 2014 to April 2018, the empirical research explores the drivers and barriers of introducing recycled materials in the production of plastic components. The conceptual research has taken place in parallel and aims to engage with the scientific discourse in the field of corporate sustainability (CS).

The case study's unit of analysis is the perceived conflicting requirement between product quality and recycling of materials. This tension has led to a process of organizational learning through which Plasto's representatives have shared experiences in dialogue with actors from other organizations. The practical result is that the primary customer, AKVA group, has agreed to the use of recycled materials in specific product types, and the technical testing indicates that quality requirements can be fulfilled.

An essential feature of the methodological approach concerns the role of interaction between practitioners and researchers. The case study exemplifies specific activity links through the relationship development between Plasto and SISVI project researchers. The company's principal representative in the process has openly communicated the lessons learned, reflecting a situation where the central actors of a change process negotiate the underlying tension between quality and circularity.

Positioned in the field of CS, a theoretical implication of the TD findings surrounds the role of different actors in an ongoing change process. The classical stakeholder concept tends to focus on the focal firm, as represented by its managers, which underestimates dynamic relationships between individuals and groups. Thus, the thesis proposes a framework that explains the role of actor interaction and how activity links and resource ties shape realization of social and environmental concerns in business operations.

The thesis asserts a TD methodology where academics and practitioners jointly frame problems and co-create knowledge based on a pluralist epistemology. The resulting insights lay the groundwork for further debates on the role of different actors, for example, those with non-financial purpose in knowledge development for CS. Such an approach places emphasis on the researcher's role as a mediator between the scientific discourse and the actor-specific societal discourse.

List of papers

The thesis contains four independent papers – three journal articles and one book chapter. Together these form the basis of theory development with the purpose of advancing the literature in the field of CS.

The numerical order reflects an inductive logic where each paper increases the level of abstraction. Paper 1 describes real-life phenomena from the case study, Paper 2 provides an empirical foundation for theory development, Paper 3 engages in a theoretical debate and uses the case study findings as illustrations, while Paper 4 is a conceptual contribution to the philosophy of science.

Paper 1 (Vildåsen, S.S., 2018)

Lessons learned from practice when developing a circular business model

Published in: *Designing for the Circular Economy*, Routledge

Paper 2 (Vildåsen, S.S., 2018)

Corporate sustainability in practice: An exploratory study of the Sustainable Development Goals (SDGs)

Published in: *Business Strategy and Development*, 4, 256-264

Paper 3 (Vildåsen, S.S. & Havenvid, M.I., 2018)

The role of interaction for corporate sustainability

Published in: *The IMP Journal*, 12, 1-24

Paper 4 (Vildåsen, S.S., Keitsch, M.M. & Fet, A.M., 2017)

Clarifying the epistemology of corporate sustainability

Published in: *Ecological Economics*, 138, 40-46

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- Table 3: Details on observations of Plasto’s representatives
- Table 4: Details on documents analyzed in the case study
- Table 5: Principal actors in the development process
- Table 6: A framework for actor interaction in the context of CS
- Table 7: Research questions and contributions

B2B	Business-to-business
CBM	Circular business model
CE	Circular economy
CSR	Corporate social responsibility
CS	Corporate sustainability
EU	European Union
HDPE	High-density polyethylene
NGO	Non-governmental organization
RCN	Research Council of Norway
R&D	Research and development
SD	Sustainable development
SDGs	Sustainable Development Goals
SISVI	Sustainable Innovation and Shared Value Creation in Norwegian Industry
TD	Transdisciplinary

1. Introduction

Corporate sustainability (CS) represents both the thesis' conceptual framing, and the broader field of research to which it contributes. Van Marrewijk (2003, p. 102) defines CS as “company activities - voluntary by definition - demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders” (p. 102). I use this definition as a frame of reference for Chapters 1-6.

The thesis complements the emerging research agenda targeting business-level application of the United Nations Sustainable Development Goals (SDGs) (Scheyvens et al., 2016, Howard-Grenville et al., 2017, Fleming et al., 2017, Sullivan et al., 2018). This focus follows the observation that business actors increasingly acknowledge the SDGs as a framework for innovation (Accenture, 2016), and provides exciting avenues for research.

The reader should note that the contemporary CS debate contains differing conceptualizations and, to some degree, conflicting theoretical positions. This means that the chosen definition merely acts as a way to start a conversation about complex phenomena.

1.1. Research motivation and process

Real-life change processes for CS emerge in a particular context (Hahn et al., 2015). This thesis' empirical findings have been drawn from the four-year project, 'Sustainable Innovation and Shared Value Creation in Norwegian Industry' (SISVI), that began in May 2014. The SISVI project was based on a *transdisciplinary* (TD) methodology, in a setting where academics and business practitioners jointly framed problems and co-created solutions.

The motivation behind TD research is to address societal challenges, e.g., social or environmental concerns. For the business actors involved in SISVI, this meant that the issues they wanted to investigate had to consider the societal dimension explicitly. The company Plasto introduced such a problem early in the project. Its CEO suggested that it would be interesting to explore if the company could *create value from waste* through plastic recycling. Since my PhD thesis was anchored in the SISVI project, Plasto's problem became the starting point of my empirical exploration.

During the *first phase* of the research, from May 2014- September 2016, my objective as researcher was to understand possible ways to conceptualize the change process with which Plasto had started to engage. This was driven by epistemological tensions found in the field of CS, e.g., conflicting requirements between traditions of positivism and constructivism (Bansal and Hoffman, 2012). Thus, I experienced the need to establish

and clarify my own role as researcher when interacting with company representatives through the SISVI project.

The insights of the first phase became an important source of methodological inspiration for the *second phase* of research. I realized that a pluralist approach was needed as underlying epistemology (Söderbaum, 2009), which is a core principle for TD research when framing research problems. More specifically, from September 2016, I discussed and developed the focus of the empirical research in dialogue with Plasto's representatives with the exploratory goal of developing new questions along the way.

Table 1 The research process

Research phase	Research questions	Contributions to the scientific discourse
May 2014 - September 2016	<ul style="list-style-type: none"> • How can the epistemology of CS be analyzed? 	Paper 4
September 2016 - April 2018	<ul style="list-style-type: none"> • How can we conceptualize the role of interaction for CS? 	Paper 3
	<ul style="list-style-type: none"> • How has Plasto integrated the selected SDGs in its business operations? 	Paper 2

TD knowledge development requires *reflexivity* (Popa et al., 2015), which can be understood as the researcher's ability combine the need for analytical distance with transformative action. I tried to follow this principle by becoming more involved as the case progressed. Consequently, the central research questions to which I gave attention changed over time. Table 1 summarizes this emergent feature by linking phases, research questions, and the specialized papers.

1.2. Logic and structure

TD knowledge development in the field of CS requires both specialized and integrative approaches because of the complex problems involved (Schaltegger et al., 2013). Therefore, the role of the following chapters is to insure that specialized contributions found in the individual papers coalesce into a coherent whole by applying a set of TD principles.

Research based on a TD methodology needs to engage with both the actor-specific *societal discourse* and generic insights of the *scientific discourse* (Lang et al., 2012). Thus, a key role for the involved researchers is to facilitate this interactive process by applying concepts that communicate with both domains.

The role of CS as a theoretical concept is to bridge the thesis findings with the scientific discourse. This can be seen in the way Papers 2, 3, and 4 utilize CS as conceptual framing

for the scientific contributions. In contrast, I applied the term 'circular business model' (CBM) with the purpose of communicating with the business actors involved in the TD research, and not as a defined scientific construct. This is shown in Paper 1, which is part of a book that aims to address a practice-oriented audience.

The thesis' underlying approach stems from the way in which TD research is grounded in societal problems and real-life phenomena. More specifically, the following chapters apply the CBM term as a proxy for the context-specific phenomenon of creating value from waste that emerged over time through the SISVI project. The line of reasoning is based on *inductive logic*, where I develop the actor-specific case description (Paper 1) into generic insights (Paper 2 and Paper 3) by drawing on CS as a theoretical concept.

Chapter 2 describes and explains the methodology. The purpose is to enable the reader to evaluate the process through which the scientific contributions have developed. Following the inductive logic, the next chapters are based on a structure where empirical insights precede theoretical positioning of the findings.

Chapter 3 summarizes the case study through the main empirical findings as described in Papers 1, 2, and 3. I scope the presentation through the TD methodology by emphasizing how principal actors shaped this process.

Chapter 4 positions the TD findings in the field of CS. First, I clarify basic assumptions to position the theoretical contribution. Next, I conceptually frame change processes for CS before I anchor the debate in the stakeholder concept.

Chapter 5 discusses the underlying tension found in the case study and further develops theoretical implications from Papers 2 and 3. Furthermore, I use insights from Paper 4 to reflect on the epistemological underpinnings of the findings.

Chapter 6 provides concluding remarks and highlights the thesis' contributions to the field of CS. This is done by summarizing the findings related to the guiding research questions that I apply in Papers 2,3, and 4.

2. Methodology

Methodology concerns the “philosophical stance or worldview that underlies and informs a style of research” (Jupp, 2006, p. 175). This chapter describes, explains, and reflects upon the thesis’ methodological backbone. The overall purpose is to be explicit about the strengths and dilemmas of the chosen approach so that other researchers can make independent quality judgments of the research results.

In section 2.1, I describe the core principles of transdisciplinary (TD) research before I explain why this approach aligns with the field of CS. Next, in section 2.2, I describe how the TD principles unfolded in practice in the context of this thesis. In the final section, 2.3, I reflect upon the methodological tensions in light of TD principles.

2.1. The principles of transdisciplinary research

TD research is driven by real-life phenomena and complex societal problems, in contrast to theory-driven research (Shrivastava et al., 2013). In general, the methodology invites inductive and exploratory research approaches (Elliot, 2013) since specific and context-dependent issues form the starting point for debating universal claims about reality.

In essence, exploratory TD research rests on a flexible design with a continuous interplay between empirical discoveries and theory generation (Jupp, 2006). This in turn leads to the development of new research questions (Yin, 2014). However, as underlined by Robson (2011), flexible research designs also need a set of principles to frame and guide methodological choices.

Lang et al. (2012, p. 27) describe the principles of TD research as:

- (a) focusing on societally relevant problems;*
- (b) enabling mutual learning processes among researchers from different disciplines (from within academia and from other research institutions), as well as actors from outside academia; and*
- (c) aiming at creating knowledge that is solution-oriented, socially robust (...), and transferable to both the scientific and societal practice (p. 27).*

Ideally, principles (a), (b), and (c) correspond to three phases in the research process, see Phase A, B, and C in Figure 1. Lang et al. (2012, pp. 28-29) describe the content of these phases in more detail, which I summarize in the following.

Phase A aims to translate societally relevant problems into an object that is researchable and enables knowledge implementation. This entails problem framing and team

building involving actors from both societal and scientific practice. *Phase B* is based on the principle of mutual learning and conducting research activities through co-creation of knowledge. In other words, the involved actors interact through goal-oriented collaboration. In the final *Phase C*, the objective is to integrate the created knowledge in both societal and scientific practice. This is achieved through multi-actor learning processes.

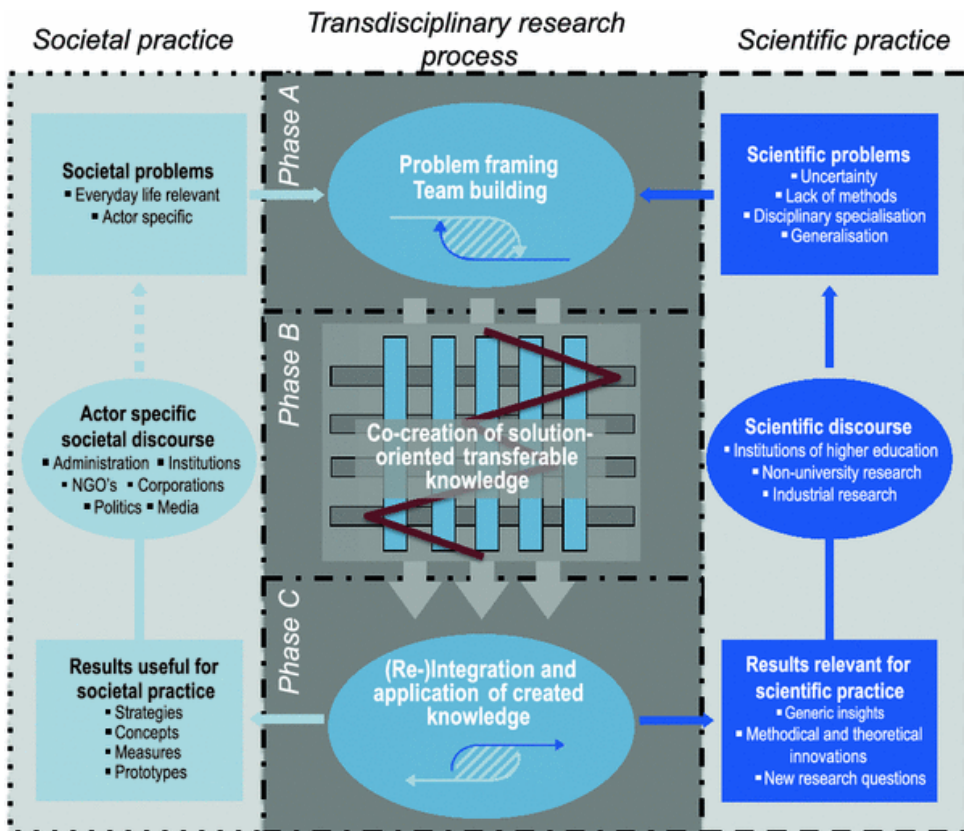


Figure 1 Ideal-typical TD process; source: Lang et al. (2012, p. 28)

TD methodology has become an established approach in the broader field of sustainability science (Brandt et al., 2013, Fischer et al., 2015). Principle (a) corresponds to societal problems, such as the tension between planetary boundaries and economic growth (Rockström et al., 2009b, Griggs et al., 2013, Steffen et al., 2015). Moreover, principles (b) and (c) reflect the need for sustainability science to create real-life solutions, in collaboration with various actors that can improve the social and environmental conditions of society.

The methodology responds also to the body of CS literature that advocates the need to develop concrete solutions for practitioners based on collaborative learning and

experimentation (e.g., Engert and Baumgartner, 2016, Vermeulen and Witjes, 2016, Bocken et al., 2018). For example, Witjes (2017) proposes a method based on TD principles on how to design research projects that involve scholars, university students, and company representatives. Moreover, Schaltegger et al. (2013) argue that both the fields of CS and management research, in general, are based on a tradition containing several elements of the TD principles, e.g., the role of academia-industry collaboration.

Conclusively, there is a growing call for TD research in the field of CS (Witjes, 2017, Breitbarth and Herold, 2018). The underlying logic is that interaction between academia and practice is a way to *operationalize change for CS* by means of self-reflection, learning, and collaboration between scholars and practitioners (Vermeulen and Witjes, 2016). The TD methodology was a guiding principle throughout the SISVI project, and in the following I will explain the approach.

2.2. Transdisciplinary research in practice

The SISVI project allowed me the opportunity to investigate and interact with a change process over time and in its real-life context. More specifically, my access to Plasto, a partner company of the SISVI project, reflects a situation where “(...) a researcher has an opportunity to observe and analyze a phenomenon previously inaccessible to social science inquiry” (Yin, 2014, p. 52). In line with Yin's (2014) recommendation, I chose to conduct a single case study.

The case study was realized through an inductive and exploratory approach grounded in Plasto's objective to create value from plastic waste. The data collection took place over a period of four years (May 2014- April 2018) following the course of the SISVI project. As explained in Chapter 1, my direct interaction as researcher with Plasto's project increased over time. The following sections describe the main elements of the case study concerning process and methods¹.

2.2.1. The SISVI project

An important contextual element in this thesis' research activities has been the SISVI project, which has funded the work. The Research Council of Norway (RCN) defines SISVI as a “Knowledge-Building Project for Industry” (RCN, 2018a). This means that the research questions target both scientific debates and the needs of industrial partners. Moreover, the knowledge created should be shared with societal stakeholders, and the RCN expects the publication of results in academic journals.

¹ The reader will find further methodological considerations in Papers 2 and 3, which present empirical findings based on the case study.

Together with a lead researcher, i.e., the main supervisor of the PhD thesis, I had an active role developing the SISVI application for funding that was submitted to the RCN in November 2013. In March 2014, the RCN awarded the SISVI project NOK 17,2 Million (RCN, 2018b). This monetary support represents 80% of the total project costs, while the remaining 20% is financed by a set of Norwegian companies.

The purpose of SISVI is to enhance Norwegian industry's competitive capabilities in a way that "meets both financial and societal needs where the latter typically encompasses environmental and social aspects" (SISVI, 2014a). Four professors from NTNU, supported by researchers from the private research institution SINTEF, have been responsible for the research outputs. Company representatives have been an integrated part of research activities.

In other words, SISVI has aimed to follow the TD principles by focusing on societally relevant problems that enable mutual learning processes between academics and industry actors and integrate the created knowledge in both societal and scientific practice.

2.2.2. The case company

The case company in the thesis is Plasto, a small family-owned company that supplies plastic products to a variety of industries. It was founded in 1955, is based in the city of Åndalsnes in the west part of Norway, and produces plastic components in the business-to-business (B2B) market. Plasto's business strategy is centered on research-based innovation with a particular emphasis on networks and collaboration with external actors. The company is renowned for its open attitude and willingness to commit resources to research and development (R&D) projects in collaboration with universities and research institutions. The SISVI project is one example.

Figure 2 shows a trend of employee reduction at Plasto from 50 in 2003 to 30 in 2017. The underlying driver for this change was beginning of automated production processes (Finansavisen, 2017). Figure 2 also shows a severe change in market conditions from 2014 to 2015 following the downturn in the oil & gas industry on which Plasto was dependent. As a result, the aquaculture industry has become increasingly important. In fact, in 2016, approximately 50 percent of Plasto's market was deliveries to their customer AKVA group, a supplier of equipment for fish farming operators.

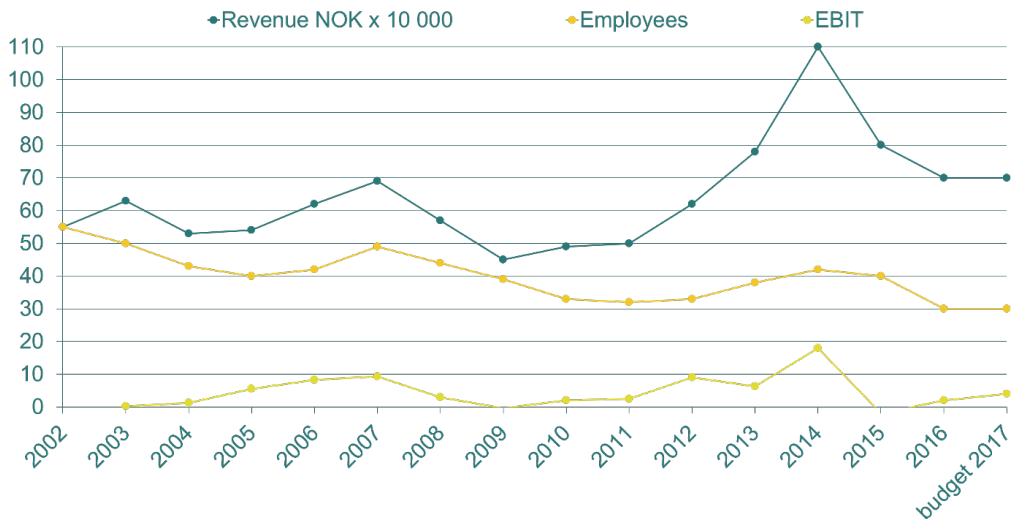


Figure 2 “Revenue” in Million NOK, “Earnings before interests and taxes (EBIT)” in Million NOK, and “Employees” in numbers; Source: Plasto

The products that Plasto supplies to the aquaculture industry are manufactured from high-density polyethylene (HDPE), which is a commonly recycled material. Thus, since the beginning of SISVI in May 2014, Plasto has investigated how it can use recycled plastic materials in its production of components for AKVA group. In April 2018, Plasto made a public statement in a regional newspaper (Otterlei, 2018) that it would implement the new production process during the Fall of 2018.

AKVA group’s decision to allow the use of non-virgin materials is the result of step-by-step learning in the context of the SISVI project. The following section provides more detail on the process.

2.2.3. The research process

As shown in Table 1 on page 2, the *first phase* of the research process took place from May 2014 to September 2016. I had two priorities. One was my focus on conceptual clarification since discussions with SISVI colleagues, along with literature reviews, made me realize that the field of CS draws on different disciplinary traditions with conflicting epistemological assumptions². Paper 4 is a result of this effort.

The other priority was my participation in SISVI seminars that gathered academics and practitioners with the purpose of jointly formulating plans for future activities. More

² Several authors have discussed conceptual tensions and unclear boundary conditions in the field of CS (see, e.g., Bansal and Song, 2017).

specifically, these seminars made it possible to understand the industrial context of Plasto and related practical challenges of its CBM project.

The first influential event in the research process was a SISVI ‘industry seminar’ that took place in November 2014. SINTEF was the host, and emphasis was placed on linking research questions suggested by the academic partners to the practice needs of the involved companies (SISVI, 2014b). Plasto’s CEO emphasized the logic behind the CBM project in the discussion, and Plasto’s CBM project manager was also present at the seminar.

In September 2015, Plasto hosted the second SISVI industry seminar (SISVI, 2015). The CBM project manager organized the event, and SISVI researchers presented preliminary findings and ideas for further research. For me, this was an essential means to understand the business operations of Plasto and its practical challenges. Several Master's students participated as well, many of whom became important contributors later in the process.

The *second phase* of the research process began in September 2016 and lasted until April 2018. Most of the empirical data gathering was conducted in this period. The starting point was an international conference where Plasto’s project manager presented the conceptual idea of the CBM project. Through networking at the conference, the project manager was introduced to the company Containerservice, which has unique technical capabilities related to the recycling of materials.

Moreover, in the same month, the project manager committed to an initiative regarding the application of the SDGs to the company’s strategies and operations. This was organized by the Polytechnic Society Norway, a non-profit organization that facilitates multi-disciplinary and cross-sectoral activities for societal purposes. The project manager attended three workshops on this topic in the period from September 2016 to May 2017.

In addition to the application of the SDGs, another essential SISVI activity over the period was efforts to develop the CBM project further. Paper 1 provides detail on this activity. In general, the paper’s purpose is to explore how Plasto communicates its challenges to external actors, and how the resulting discussions would inspire the company to continue its development process.

An essential feature of the research process has been the ongoing interaction between Plasto’s project manager and external actors. I facilitated most of the activities as part of the SISVI project. The following section describes the data collection methods.

2.2.4. The data collection

The scope of the case study has been Plasto’s ongoing business operations from May 2014 to April 2018, as represented by its CBM project. I selected the perceived conflicting requirement between product quality and recycled materials as the *unit of analysis*, including the activities initiated by involved actors to resolve this tension.

The data collection is based on 30 *interviews* with actors connected to the main events of the CBM project; 17 *observations* made during company visits, project meetings and industry seminars/conferences; and three *company documents* that describe the CBM activities. I collected most of the data, although another SISVI researcher (co-author of Paper 3) conducted 13 interviews. Together we also supervised two Master’s students that conducted eight of the interviews. In general, the interviews lasted between 30-60 minutes, while observations typically lasted 3-6 hours. Tables 2, 3, and 4 summarize the data collected, and further details can be found in Papers 2 and 3.

Table 2 Details on interviews with case study actors

Date	Type	Interviewee(s)	Interviewer(s)	Details
December 10, 2014	Open-ended	Project manager and Engineer	Co-author Paper 3	Two separate interviews with Plasto representatives
February 8, 2015	Open-ended	Purchasing manager	Co-author Paper 3	Plasto representative
April 16, 2015	Open-ended	CEO, Project manager, R&D manager, and Engineer	Co-author Paper 3	Four separate interviews with Plasto representatives
October 27, 2015	Open-ended	Purchasing manager and R&D Manager	Co-author Paper 3	Two separate interviews with AKVA group representatives
February 19, 2016	Open-ended	Project manager	Co-author Paper 3	Plasto representative
March 7, 2016	Open-ended	Technical sales manager	Co-author Paper 3	Representative of AKVA group subsidiary
March 9, 2016	Open-ended	R&D manager	Co-author Paper 3	Representative of AKVA group subsidiary
June 10, 2016	Open-ended	Project manager	Co-author Paper 3	Plasto representative
September 19, 2016	Open-ended	CEO, Project manager, Engineer and CFO	Master's students	Four separate interviews with Plasto representatives

October 27, 2016	Semi-structured	Project manager	Master's students	Plasto representative; transcriptions available
November 8, 2016	Semi-structured	CEO	Master's students	Containerservice representative; transcriptions available
November 10, 2016	Semi-structured	Business developer	Master's students	AKVA group representative; transcriptions available
November 22, 2016	Semi-structured	Project manager	Master's students	Plasto representative; transcriptions available
April 5, 2017	Semi-structured	Project manager	Thesis author	Plasto representative, approx.. 60 minutes
June 6, 2017	Semi-structured	CEO and Project manager	Thesis author	Plasto representatives, approx. 90 minutes in total
November 23, 2017	Semi-structured	CEO and CTO	Thesis author	Two separate interviews with the owners of Plasto, approx. 120 minutes in total
November 23 / 24, 2017	Semi-structured	Project manager	Thesis author	Plasto representative, approx. 120 minutes in total
January 19, 2018	Open-ended	Business developer	Thesis author	AKVA group representative, approx. 20 minutes
January 22, 2018	Open-ended	CEO	Thesis author	Plasto representatives, approx.. 20 minutes
April 19, 2018	Open-ended	Quality manager	Thesis author	Containerservice representative; informal setting
April 19, 2018	Semi-structured	Project manager	Thesis author	Plasto representative, approx. 60 minutes

Table 3 Details on observations of Plasto's representatives

Date	Role of the researcher(s)	Company actors at Plasto	Details
May 28, 2014	Passive participant	CEO	First formal meeting in the SISVI project; written minutes available
November 28, 2014	Passive participant	CEO Project manager	First research seminar in the SISVI project; written summary and company slides available
March 19, 2015	Passive participant	R&D manager	Company presentation in SISVI research seminar; slides available
May 21, 2015	Passive participant	Project manager	Discussions at SISVI research seminar; written summary available

September 28, 2015	Passive participant	Project manager COO	SISVI research seminar at Plasto's facilities; written summary and company slides available
February 22, 2016	Passive participant	R&D manager Engineer	Interactive SISVI workshop; written summary and company slides available, approx. 6 hours
March 8, 2016	Passive participant	CEO	Company presentation at research seminar
May 18, 2016	Passive participant	Project manager	Discussions at SISVI research seminar; written summary available
September 2, 2016	Active participant	Project manager	Company presentation at circular economy conference; company slides available
September 23, 2016	Active participant	Project manager	Presentation and discussion at an industrial networking event
December 16, 2016	Active participant	Project manager	Presentation and discussion at an industrial networking event
March 24, 2017	Active participant	Project manager	Interactive SISVI workshop; written summary and company slides available , approx. 6 hours
May 23, 2017	Passive observation	Project manager	Presentation and discussion at an industrial networking event
June 2, 2017	Active participant	Management group	Interactive workshop; written summary available , approx. 5 hours
June 8, 2017	Passive participant	Project manager	Presentation and group discussions at an industrial networking event
September 28, 2017	Passive participant	Project manager	Discussions at SISVI research seminar; written summary and company slides available
April 18, 2018	Passive participant	Project manager	Company presentations at circular economy conference; written summary and company slides available

Table 4 Details on documents analyzed in the case study

Type	Date retrieved	Relevance for the CBM case
Strategy document	November 7, 2017	Shows Plasto's strategic priorities for 2017 and 2018.
Application for funding	October 3, 2017	An application for funding that applies the SDGs in the context of the CBM process.

Plan for a research project	April 7, 2017	The R&D project MegaMould deals with core activities of the CBM project.
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The reader should note that I have utilized qualitative methods throughout the case study. This stems from the exploratory nature of the study, which means that the purpose is not to test hypotheses through quantitative techniques (Jupp, 2006), but to describe processes and dynamic phenomenon in their real-life contexts.

2.3. Methodological reflections

The underlying methodological approach of this thesis adheres to the principles depicted in section 2.1. As explained, the approach can be structured according to three phases. In the following, I use Figure 1 as a framework for methodological reflections by structuring the text according to Phases A, B, and C.

The TD principles are challenging to apply in real-life projects, and the methodology gives rise to several tensions in practice (Thompson et al., 2017). The interests of the involved actors are likely to differ. Moreover, the role of the researcher becomes less clear compared to traditional disciplinary approaches because of the need to be a "participant in development dialogue and action" (Söderbaum, 2009 ,p. 73). As depicted in Figure 1, one needs to communicate with both practitioners and the scientific community.

Given the challenging task of combining the need for analytical distance with transformative action, insights into the reflexive process to conduct TD research is needed (Popa et al., 2015). Thus, I discuss Phases A, B, and C from the perspective of my research process as subjectively experienced when developing this thesis. In the following, I treat the activities of the SISVI project as the central context through its boundary conditions and central actors.

2.3.1. Problem framing and team building

Phase A of Figure 1 addresses the activities needed to establish a team that can translate societally relevant problems to an academic context that enables valid and reliable knowledge generation. This requirement means that practitioners and researchers must work together in a project and agree on the problems and activities that will receive attention and resources. As explained in section 2.2.3, the research process followed two phases. The first phase, i.e., the period from May 2014 – September 2016, contained several features that resemble the ideal-type Phase A. Three essential boundary conditions shaped the process.

The first boundary condition is the formal project description of SISVI, which includes several academic disciplines within the management field of research, implying ample

space for theoretical grounding and conceptual framing. Second, the project description defined the broader team of actors with which I interacted. This included university professors, researchers from a private research institution, and representatives from seven companies. Third, the formal plan did not specify in detail how the actors should collaborate and prioritize resources, leaving room for individual initiative and creativity. These three boundary conditions shaped the interaction between the involved actors, giving rise to methodological reflections.

One of the underlying tensions of the research process stems from the multi-disciplinary design of SISVI. A symptom was how the leading researchers had different theoretical interpretations of central concepts. For example, the term “sustainable innovation” was featured in the project title but was not defined explicitly. Observing these discussions in project meetings, I realized that some interpreted the concept considering CS principles, while others saw this as innovation activities with the purpose of securing the continued survival of a company. Therefore, I experienced conflicting requirements when selecting the theoretical base for my research. This led to a process that resulted in the need for philosophical clarification and debate, as discussed in Paper 4.

I experienced conflicting requirements when planning and designing the empirical part of my research. During the first six months, I felt pressure to involve all SISVI’s company actors given their different expectations for results from being partners in the project. However, as the project developed, other SISVI researchers began to collaborate with the different companies through concrete activities, which gave me the opportunity to step back and focus on the conceptual clarification and establishment of an overview of ongoing debates in CS literature. In fact, the problem framing and team-building phase of my research process lasted approximately two years, and it was after my ‘midway seminar’ (SISVI, 2016) that I decided to focus on Plasto through an in-depth case study.

2.3.2. Co-creation of knowledge

Phase B of Figure 1 targets the actual generation of knowledge relevant for both scientific and societal discourses. In other words, this concerns collaborative activities where researchers and practitioners aim to solve agreed-upon problems. Concerning the research process described in 2.2.3, the period between September 2016 and April 2018 is relevant for discussion.

It should be noted that several other SISVI researchers collaborated with Plasto, and I discussed the CBM project with company representatives at different seminars from the beginning of the project. However, in September 2016, I began to focus the data collection in line with the unit of analysis, i.e., the perceived conflict between product quality and recycled materials.

One fundamental tension connected to Phase B concerns the contradicting goals of daily operations and R&D. I provide an example of this tension in Paper 2 by describing how I linked the CBM project to a multi-actor process of implementing the SDGs in Norwegian industry. The decision by Plasto's management group to spend time on this activity demanded considerable effort from both the project manager and me. This tension was especially salient at the time because the company experienced a challenging market situation (see Figure 2). However, the CEO was convinced that the long-term benefits of involvement would outweigh the short-term costs.

In general, Plasto's project manager has invested time and effort in collaborative activities, for example by attending an international workshop in Utrecht, the Netherlands (SISVI, 2017). Moreover, the entire management group attended a workshop on June 2nd of the same year, co-chaired by the CBM project manager and me. We applied the "value mapping tool" by Bocken et al. (2013), which is designed to analyze and discuss the company's business model and value-creation process in the context of social and environmental concerns.

Figure 3 illustrates the application of this tool in practice. The four squares illustrate the different stakeholder groups represented in the workshop, namely "Owners and Employees," "Society and Environment," "Customers," and "Networks" (suppliers and other partners). The circles describe the value creation process of a business model, i.e., starting from the center is the "Purpose," then "Value Captured," "Value Missed, Destroyed or Wasted," and "Value Opportunities" in the outer shell.



Figure 3 The tool by Bocken et al. (2013) as applied in the workshop. The original model from p. 491 was translated into Norwegian text.

The tool prescribes that external stakeholders should attend the workshop and represent “Society” and “Environment” in the workshop-setting. I communicated this to the project manager in the workshop planning, and my experience was that the company regarded this as a challenging requirement. The project manager ended up inviting representatives from two external organizations with both interest and knowledge about the role of business in society, but not having this as their primary role in daily activities.

The example of the ‘value mapping tool’ points to a deeper tension in CS change processes. Indeed, the leading actor, e.g., company managers, must prioritize attention to a selected group of actors (Mitchell et al., 1997), but at the same time consider that normative CS principles state that “all” stakeholders’ needs (Dyllick and Hockerts, 2002, Stubbs and Cocklin, 2008) should be taken into account, for example, those of NGOs.

In fact, I experienced this as a general tension when designing the research since the SISVI project description defined company representatives to be the relevant actors in societal practice. This situation follows the typical approach for management research, and as pointed out by Schaltegger et al. (2013, p. 227), the challenge for CS scholars is to make sure that the TD approach integrates viewpoints of actors other than managers in change processes.

2.3.3. Integration of created knowledge

Phase C of Figure 1 is essential for TD research since the aim is to apply and use created knowledge, which in turn, should target social and environmental concerns of society. At the same time, this is one of the most challenging aspects because the knowledge must meet both practical and academic requirements. Witjes (2017, p. 152) discusses this as a tension of validity since the knowledge in an academic sense should be generalizable to a significant number of cases, i.e., external validity, and at the same time be seen as relevant for practical decision making in a specific context, i.e., field validity.

As indicated by Lang et al. (2012, pp. 28-29), the way to resolve the validity tension lies in the dynamics of learning through empowering stakeholders and enabling them to become contributing actors in the integration process. However, this principle is challenging to realize in practice because multi-actor collaboration “is resource intensive, may create friction, causes transaction costs and requires time” (Schaltegger et al., 2013, p. 227). In the context of the thesis’ research process, the required time and resources have been the primary challenge.

As mentioned, Plasto’s representative and the CBM project manager, in particular, have been committed to the learning process by investing time and sharing ideas. That being said, I had an active role in taking the initiative and proposing different activities. For example, I suggested to follow-up the workshop based on the “value mapping tool” in the decision-making process of Plasto by presenting the results to the Board of Directors. One of the reasons this did not take place was an unforeseen change of Chairperson of the Board, but I did also perceive a tension concerning whether to prioritize time on this activity.

A practical tension was how I should divide my own time between follow-up activities with Plasto and publication processes of academic papers. Being a PhD student, I am expected to publish in academic journals by both the university and the reporting requirements of the RCN for SISVI. Additionally, Plasto had expectations concerning the use of concrete measures relevant to their daily operations. In practice, this tension was resolved through the longitudinal research design, which enabled an ongoing process of data collection relevant for academic publication.

The essential aspect was to conduct data collection through activities with practical value for Plasto. For example, as described in Paper 1, the seminar in Utrecht, the Netherlands was experienced by the project manager as both inspirational and of practical use because of the insights shared by external actors, i.e., the company Interface, and the NGO Ocean Cleanup. Therefore, the data collection was also a process of ongoing learning between actors.

2.3.4. Final reflections

In essence, the TD methodology is about developing *knowledge for societal change*. As argued by Schaltegger et al. (2013, p. 227), this requires an actor-oriented approach to understand how individuals and groups become contributors to the change process for CS.

A feature of the TD methodology is the role of the researcher as an actor embedded in the change process. This approach facilitates collaboration between the researcher and practitioners, which enables knowledge transfer in the societal and scientific discourses. It seems reasonable to assume that this is mutually beneficial for “both sides.” On the other hand, the interaction between social actors tends to create mutual dependencies that reflect underlying power relations (Emerson, 1962). As a result, social structures that develop over time in TD projects may challenge the independence of the researcher, for example in terms of asking critical questions regarding an actor’s contribution to environmental concerns.

In the context of the SISVI project, some remarks can be made on the interaction between academic and societal actors. An important structural feature lies in the governance model defined by the RCN. The university, NTNU, owns and manages the project. This model secures academic freedom of the involved researchers. In practice, I have experienced a high level of autonomy related to the design and execution of the activities on which this thesis is based. The choice to focus on a case study of Plasto’s CBM project was something I regarded as a research opportunity, and not something required by any actor in SISVI. In contrast, I initiated the activities based on ongoing learning and application of theoretical concepts in a real-life context.

The relation between theory and the empirical domain deserves some final reflections when discussing the thesis’ methodology. Indeed, a common criticism of single case studies is that they lack generalizability and thus, validity for scientific discourse (Eisenhardt, 1989, Robson, 2011). However, as argued by Yin (2014), the essential element lies in how the specific insights are related to already existing concepts in the literature. In this thesis, the concept of CS, as defined in Chapter 1, is paramount and frames the scientific contribution. Moreover, the TD principles have secured a methodological backbone to bridge theoretical and empirical domains.

3. Summarizing the empirical findings

Following the inductive logic of TD research, the purpose of this chapter is to lay the groundwork on which the theory-oriented discussion in the next chapters draws. Phase B in Figure 1 represents the scope where the goal is to co-create knowledge through mutual learning processes among researchers and actors from societal practice

Section 3.1 describes the principal actors of TD process and their different roles. Next, section 3.2 explains the empirical phenomenon, namely the perceived conflicting requirement between product quality and recycled materials. Finally, 3.3 summarizes how this underlying tension has been a source of learning over time for the involved actors.

3.1. Principal actors

As depicted in Table 1 and explained in Chapter 2, the second phase of the development process that began in September 2016 is the basis for the main empirical findings of this thesis. This was the period where the manager of the CBM project began to interact with new actors in addition to those from AKVA group. This increased momentum in the process, but also made the underlying tension salient.

Table 5 presents an overview of the principal actors of the transdisciplinary development process, i.e., groups or individuals that affect Plasto's objective of creating value from plastic waste. Since early 2018, Plasto has been preparing a new production process that will result in products based on recycled plastics. The products, i.e., walkways on top of the fish farming cages, will be supplied to AKVA group. Containerservice is a possible supplier of the recycled materials. Polytechnic Sustainability has acted as a network arena for Plasto's project manager, in which he could share his experiences of applying the SDGs in an industrial context.

Table 5 Principal actors in the development process

Actor at the group level	Example of individual actors	Role in the process
<i>Plasto</i>	The CBM project manager	Project coordinator
<i>AKVA group</i>	Business developer	Customer representative
<i>Containerservice</i>	CEO	Supplier representative
<i>Polytechnic Society</i>	Polytechnic Sustainability members	Facilitators
<i>NTNU</i>	SISVI researchers	Facilitators

The following sections explain the underlying tensions that emerged during the process. This concerns the conflicting requirements discovered in the CBM project as discussed

in Papers 1, 2, and 3, i.e., the technical issue of product quality when using recycled material in the production of plastic components.

3.2. The tension between quality and circularity

This section focuses on the requirements of value-chain actors involved in the CBM project. Papers 1, 2, and 3 exemplify the tension by emphasizing the technical issues of using recycled material in the production of components for AKVA group. In practice, this implementation implies an altered supply chain structure through, for example, introducing Containerservice as a supplier.

Plasto's primary motivation for creating value from waste is to decrease dependency on its current supplier of virgin plastic materials for the production of 'brackets' and 'walkways' for AKVA group, see the illustration in Figure 4. The possibility to use recycled materials leads to increased flexibility in sourcing options. Moreover, replacing virgin materials with recycled plastics leads to cost savings for Plasto. Lastly, commitment to using recycled materials, signals to external stakeholders that the company takes responsibility for its environmental impact.



Figure 4 Illustration of brackets and walkways supplied to AKVA group; Source: Wittmann-Battenfeld

Containerservice is an actor that recently invested in technology that it can use to supply recycled materials to Plasto. Moreover, it focuses on the aquaculture sector, which means that it is possible to develop a 'closed loop' as shown in Figure 5. In principle, Containerservice can now handle discarded fish farming cages produced by AKVA group, including components produced by Plasto, which can be transformed into raw materials for Plasto's production process. Since June 2017, Plasto has been testing the materials supplied by Containerservice with satisfactory results in the production of walkways.

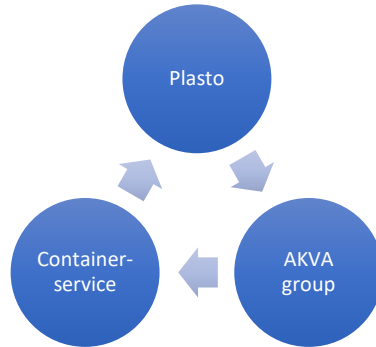


Figure 5 The value chain actors in a closed loop

The technical challenge of Plasto’s CBM project is the varying quality of products made from recycled materials. Since the raw materials come from different sources, e.g., discarded brackets or walkways of the fish farming cages, differing properties result in the new product. A possible solution is to use a supplier of recycled plastics that can guarantee the range within which the input quality will vary. However, as of April 2018, Containerservice is not able to document the quality of its supply, which has led Plasto to consider other suppliers to overcome the conflicting requirement between quality and circularity.

3.3. The learning process

As seen from the perspective of the actors described in Table 5, Plasto’s underlying tension relates to the conflicting requirements between quality and circularity, i.e., the case study’s unit of analysis. This has been the recurring topic for discussion throughout the four-year SISVI period, and especially after Containerservice came into the picture as a possible supplier to Plasto.

Plasto’s perception of the tension has changed over time³. The project manager describes the introduction to Containerservice as a milestone of the process because it enabled Plasto to learn and gather experience from an already existing supply chain of recycled materials. Another learning example was the international workshop in March 2017 where Plasto’s project manager received feedback on the CBM project from two experienced industrial actors.

Plasto’s application of the SDGs has been an important learning source when working with the underlying tension. Figure 6 illustrates the choice to prioritize a selected set of

³ Paper 1 exemplifies and describes this process.

the goals. The logic applied by Plasto's management group is to link the SDGs to ongoing business operations with an emphasis on the CBM project. Plasto's project manager frames the selection as a dilemma since the company in principle affects and is affected by all the goals, however, operationalization through an organizational process requires prioritization. Indeed, the reason to engage with the SDGs in the first place stems from to possibility to focus efforts on the ongoing CBM project.

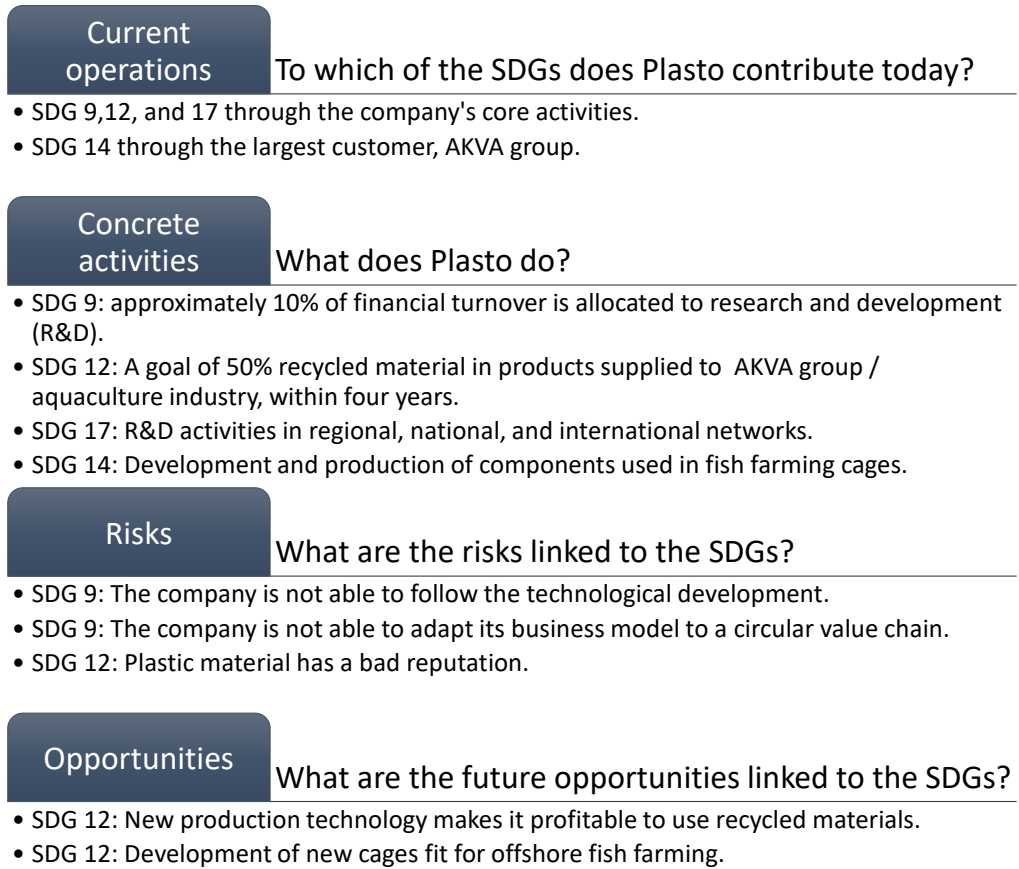


Figure 6 Plasto's prioritization of the SDGs; Content source: Plasto

The application of the SDGs has had a facilitating effect on the CBM project through the workshops of Polytechnic Sustainability⁴. One of the concrete outputs was the Plasto management group's decision to establish a goal of 50% recycled plastics in the aquaculture business area within the year 2020. Moreover, the project manager underlines the SDG framework's role in facilitating internal communication and collaboration between the R&D unit and those responsible for daily operations.

⁴ Paper 2 exemplifies and describes this process.

A central actor of the CBM process is Plasto's customer. AKVA group's business developer emphasizes that a creative process of creating new solutions for a specific industry must build on the insights and knowledge already existing among established actors. She argues that actors who aim to influence aquaculture companies by using the SDGs as a means, tend to focus on superficial aspects at the level of communication and generic strategies. Moreover, she indicates that individual actors, e.g., consultancies, use social and environmental concerns as a platform for self-promotion and positioning, undermining the credibility of the process.

Internal actors at Plasto also perceive a tension when applying the SDGs as part of a development process. To some extent, this concerns prioritization of resources and the need to limit the time spent on the process initiated by Polytechnic Sustainability. Moreover, Plasto's CTO argues a conflict between selecting a few of the SDGs, and disregarding others. Indeed, he argues that this would leave the company open to 'attacks' from external stakeholders if the company actively promotes its application of the SDGs.

To summarize, the principal CBM actors have reinterpreted the tension between quality and circularity throughout the process. In particular, the interaction between the project manager and external actors has accelerated the process and led to top management commitment. Moreover, what started as technical issue surrounding properties of recycled materials developed into strategic management tensions linked to the SDGs.

4. Theoretical positioning

The next step of the inductive logic is to introduce a conceptual starting point on which a theoretical debate can draw. This step is an important part of Phase C of the TD approach, as shown in Figure 1, where one aims to integrate developed knowledge into the scientific discourse. Thus, the purpose of this chapter is to position the scientific contribution of the TD research presented in the thesis.

Section 4.1 clarifies basic assumptions, enabling theoretical engagement with the empirical phenomenon at hand. Section 4.2 introduces a conceptual framework that captures the multi-level nature of change processes for CS. Finally, section 4.3 provides an analytical scope through the stakeholder concept.

4.1. Clarifying basic assumptions

I ground the discussion in the assumption that CS activities found in practice include tensions for the involved actors. This view is supported by the emerging literature that discusses the nature of such tensions (Van der Byl and Slawinski, 2015, Hahn et al., 2018), along with strategies chosen by firms and their managers to resolve them.

Since ‘tension’ is a core construct, I define it explicitly as the following:

A tension signifies actors' felt or experienced level of difficulty in pursuing conflicting requirements simultaneously.

This definition is inspired by Bengtsson and Raza-Ullah (2017, p. 301), but I emphasize the concept of actors, while they focus on managers. Indeed, Paper 3 discusses the difference between these two perspectives and asserts the argument by Johnsen et al. (2017) that a management-oriented approach to analyze and discuss CS phenomenon is a weakness of classical stakeholder theory. In order to introduce this debate, I define ‘actor’ in the following way:

An actor is any group or individual that affects the achievement of the organization's objectives.

The reader will note that the difference of an actor compared to that of a stakeholder is that an actor always affects, as opposed to stakeholder terms “can affect” or “is affected” (Freeman, 2010, p. 46). The theoretical implication for the CS discourse is that actors are the ones influencing social and environmental concerns, e.g., a chemical company’s CEO, while stakeholders include passive individuals or groups, e.g., local communities experiencing adverse effects of industrial pollution.

The logical starting point for applying the concepts of actor and stakeholder is that ‘no business is an island’ (Håkansson and Snehota, 1989). More precisely, an organization is a system of ‘coalitions’ (Cyert and March, 1992), and coalition members represent various actors including employees, customers, suppliers, and regulatory agencies (p.31). This ontology reflects the dynamic and boundary-spanning nature of organizations. Thus, processes through which individual actors enter or leave the system of coalitions, are a central domain for CS scholars aiming to understand how social and environmental concerns are included in everyday business operations.

The methodological framework of the thesis assumes that the CS scholar is an actor when conducting research. This means that researchers influence the objectives of the firm when collaborating with its representatives, for example by suggesting to the management ways through which a firm can improve its environmental impact. Arguably, this involvement should not be seen as an unintended consequence or as a failure to be “objective.” On the contrary, co-creation of knowledge is the purpose of conducting CS research in the first place (Schaltegger et al., 2013, Witjes, 2017).

The thesis’ epistemological worldview follows the TD perspective on knowledge development (Lang et al., 2012, Brandt et al., 2013). This view suggests an exploratory attitude towards disciplinary differences among academics, along with respect and valuation of practitioners’ experience. As argued by Schaltegger et al. (2013), a TD methodology promotes research projects that aim for both theoretical discourse among academics and practical change in business organizations.

4.2. Conceptualizing change for corporate sustainability

Our planet’s fundamental role for societal and economic development is reflected by Griggs et al.’s (2013) definition of sustainable development (SD): “Development that meets the needs of the present while safeguarding Earth’s life-support system, on which the welfare of current and future generations depends” (p. 306). However, the challenge for both academic and societal actors is to translate this universal principle to the level of individuals and groups in practical settings.

The SDG framework⁵ consists of 17 goals that address social and environmental concerns such as hunger (goal 3) and climate change (goal 13). The SDGs are a result of political negotiations, and many societal actors regard the framework as a promising and inspiring consensus on grand societal challenges. Applications at both the national (Weitz et al., 2018) and company levels (Fleming et al., 2017) are promising examples of

⁵ On September 25th 2015, the United Nations adopted the SDGs as part of the “2030 Agenda for Sustainable Development” <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

concrete change and progress. Thus, the SDGs show a potential avenue for translating the universal SD principle through their popularity in ongoing societal discourse.

Scholars have pointed to inherent weaknesses of the SDGs, such as trade-offs between the goals (Nilsson et al., 2016, Pradhan et al., 2017) and a superficial understanding of the role of Earth's life-support system for societal development (Reid et al., 2017, Sjøfjell, 2018). These criticisms indicate a tension between the creative potential of bringing actors with different interests together under a frame of generic terms, and the need for precise concepts, e.g., the planetary boundaries (Rockström et al., 2009a, Steffen et al., 2015), that scientific methods can verify. In other words, there is a risk that societal actors negotiate an understanding based on the SDG framework that is decoupled from the objectified reality advocated by natural science.

A change process for CS is likely to cause tensions for the involved actors, e.g., when applying the SDGs in a practice. The first step to analyze such phenomena is to establish the boundary conditions. Referring to Van Marrewijk (2003)'s definition, one should focus on company activities that include social and environmental concerns. The classical way to conceptualize this situation is through three dimensions that address economic, environmental, and social values simultaneously (Elkington, 1997). These change dimensions are thus the core of the phenomenon at hand, as shown in the framework proposed by Hahn et al. (2015) (Figure 7).

The framework also depicts the multi-level nature of CS. This ontology follows from the ecological system in which company activities take place (Gladwin et al., 1995, Whiteman et al., 2013). In general, change processes for CS at the organization level interact with social and environmental concerns at the systemic level (Aguilera et al., 2007, Slawinski et al., 2017, Williams et al., 2017). At the individual level, actors have different preferences on organizational goals (Cyert and March, 1992). According to Margolis and Walsh (2003, p. 288), this potential conflict is crucial for the study of change for CS because individuals are likely to perceive a tension between social/environmental concerns and economic value creation.

Besides 'change' and 'level,' the framework underlines 'context.' This construct concerns the spatial and temporal elements given by SD's emphasis on intra- and inter-generational equity (WCED, 1987, Griggs et al., 2013). Overall, it is evident that change processes for CS target boundary-spanning and value-laden phenomena that result in a theoretical challenge for scholars. Interestingly, the stakeholder concept underpins contemporary debates (Johnsen et al., 2017, Lüdeke-Freund and Dembek, 2017), and seems to be a theoretical mediator between the organizational and systemic levels that is worth exploring in more detail.

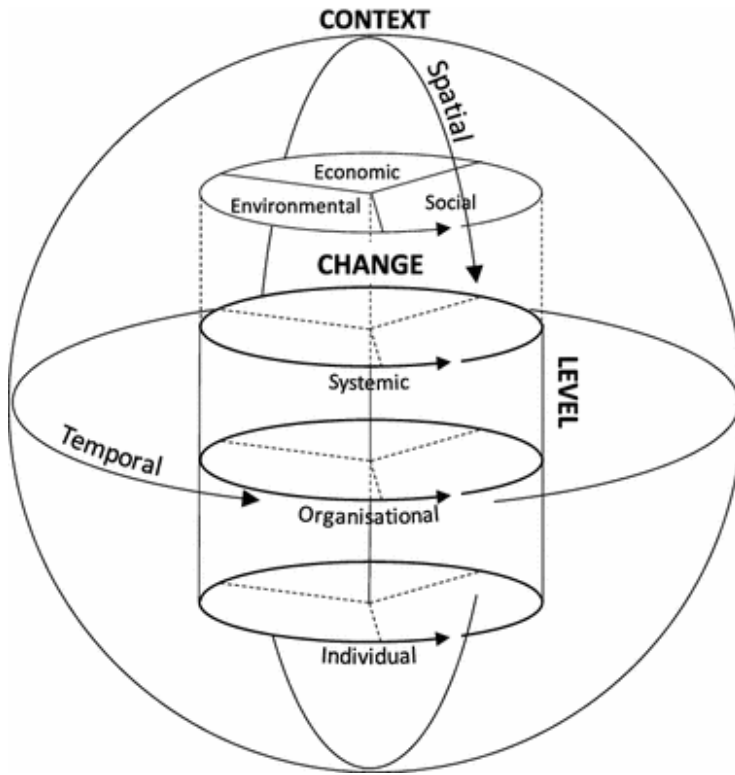


Figure 7 A conceptualization of change for CS; source: Hahn et al. (2015, p. 301)

4.3. Drawing on the stakeholder concept

The stakeholder concept is central for understanding change for CS because it addresses the individuals and groups “who can affect or is affected by the achievement of the organizations’ objectives” (Freeman, 2010, p. 46). In other words, stakeholders are latent contributors to the change process with the potential to realize social and environmental improvements.

Freeman's (2010) theoretical propositions target a managerial audience as signaled by the book’s title, “Strategic management: A stakeholder approach.” A typical focus area in the field of strategic management is understanding the relationship between the firm’s capabilities and its competitive advantage (e.g., Eisenhardt and Martin, 2000). This instrumental line of reasoning is therefore evident in the application of the stakeholder concept (Clarkson, 1995, Post et al., 2002). However, several scholars (Donaldson and Preston, 1995, Margolis and Walsh, 2003) challenge the instrumental assumption that stakeholders matter when they lead to increased economic performance.

If we adopt the logic of Figure 7, it becomes clear that firm-stakeholder relationships must target the three change dimensions and not only economic value creation⁶. This ideal principle leads to the fundamental issue of “who and what really counts” (Mitchell et al., 1997), implying a situation of negotiation between the firm’s representatives, e.g., managers, and other stakeholders, e.g., non-governmental organizations (NGO)s. According to Mitchell et al. (1997), the result of this process depends on the ‘power,’ ‘legitimacy,’ and ‘urgency’ of the respective stakeholders.

Not all of the firm's stakeholders become contributing actors in a change process for CS. This theoretical boundary condition is crucial because the interaction between a firm's managers and other stakeholders does not guarantee improvements in social and environmental conditions. Change for CS is possible as long as certain individuals and groups argue the case of social and environmental concerns. For example, in TD projects, the researcher has an important role as an advocate for systemic concerns when discussing salient problems of a local actor.

CS in practice is realized when certain stakeholders become actors. This will emerge over time (Neugebauer et al., 2015), reflecting a process of organizational learning (Siebenhüner and Arnold, 2007). The next chapter discusses such dynamics by drawing on the case study findings.

⁶. This normative assumption is the point of tension in the field of CS since mainstream economic theory posits that the firm should prioritize profit maximization for its shareholders. I will return to this debate in Chapter 5.

5. Discussion

This chapter aims to further develop the theoretical implications of the individual papers of the thesis. As described in Chapter 4, the purpose is to address Phase C in Figure 1, i.e., the process of integrating the developed knowledge into the scientific discourse.

Papers 2, 3, and 4 contain avenues for theoretical debate, which are the scope of this chapter. The analytical starting point is the conceptual framing introduced in Chapter 4. Insights from ongoing debates in the literature are added to increase theoretical relevance.

Section 5.1 elaborates on the position that CS in practice leads to tensions for the involved actors. Section 5.2 discusses the framework proposed in Paper 3 and emphasizes the role of actor interaction for addressing tensions. In section 5.3, the implications of an interactive TD approach are discussed by drawing on the insights from Paper 4. Finally, section 5.4 reflects upon the underlying epistemological tensions surrounding the CS concept in light of the TD principles.

5.1. Tensions in CS

Normative theories in the field of CS (e.g., Lozano et al., 2015) assert that related activities should take into account the requirements of all stakeholders, for example, local communities and non-governmental organizations (NGOs). However, this normative premise gives rise to tensions for business operations in practice because attending to multiple requirements demands time and resources for the focal firm.

Smith and Lewis (2011) frame multiple requirements from stakeholders as a tension of 'performing' because organizational decision makers face multiple goals, e.g., social, environmental and economic value creation. Thus, when it comes to change processes for CS, an interesting topic to explore is how firms and their managers resolve these tensions in practice, i.e., which stakeholders are given attention and why (Mitchell et al., 1997). Moreover, the definition by Van Marrewijk (2003) highlights an interactive process, which shows that the relationship between the focal firm and its stakeholders is dynamic by nature.

Plasto's management group chose a strategy where four of the 17 SDGs became a priority based on their links to ongoing business operations. The motivation was to align the societal concerns reflected in the framework with the company's existing business strategy. As shown in the review by Van der Byl and Slawinski (2015), such a 'win-win' perspective resonates with the principal body of literature in CS. However, this instrumental logic tends to simplify or ignore the tension inherent in CS phenomena

(Gao and Bansal, 2013, Hahn et al., 2015). For example, by selecting a few SDGs, one could argue that a company will ignore social and environmental concerns advocated by the remaining goals.

Paper 2 suggests that Plasto's SDG decision can be seen as a paradox. A paradoxical tension entails a process based on "contradictory yet interrelated elements that exist simultaneously and persist over time" (Smith and Lewis, 2011, p. 382). An essential analytical implication of this definition is that attempts from involved actors to eliminate the paradox are likely to have adverse effects on the achievement of the organization's objectives. Following this line of reasoning, Smith and Lewis (2011, p. 389) distinguish 'vicious' and 'virtuous' cycles of organizational dynamics, following different responses by involved actors, e.g., through management strategies.

Plasto's perceived need for consistency and alignment between a new activity and existing business operations (the CBM project) is a factor that is likely to reduce the creative potential for reaching social and environmental concerns. As a paradoxical example, the wish to increase credibility by strategically selecting a few of the SDGs runs the risk of hurting the company's credibility in the long run. As argued by the CTO, specific stakeholders may "attack" the company for not giving attention to the other SDGs.

Organizations' responses to paradoxical tensions are inherently linked to the individuals that, in a certain context, are activated (Cyert and March, 1992). Moreover, the cognitive frames through which individuals make sense of tensions play a decisive role (Daft and Weick, 1984). In general, actors employing a business case frame will make efforts to eliminate tensions by aligning social and environmental concerns with economic objectives, while those employing a paradoxical frame juxtapose the three dimensions (Hahn et al., 2014). As mentioned, the instrumental business case logic is evident in the management group's response to the complexity found in the SDG framework.

The project manager indicates a willingness to adopt a more paradoxical perspective by arguing that the company affects and is affected by all the goals. He was the one to follow-up the management group's decision through a set of workshops. One of the stated results was the way the SDG framework facilitated internal communication between organizational functions. Moreover, the project manager received feedback from external stakeholders. This points to the 'emergent' nature of organizational actions (Mintzberg and Waters, 1985, Neugebauer et al., 2015).

A dynamic perspective is at the heart of paradox theory because the contradictory yet interrelated elements persist over time (Smith and Lewis, 2011). Furthermore, the CS

literature discusses strategies employed by firms when trying to manage paradoxical tensions (Hahn et al., 2015, van Bommel, 2018). Emphasis is placed on means to ‘integrate’ the economic, environmental, and social change dimensions as opposed to the instrumental strategy of prioritizing the economic dimension through a win-win logic. Following a dynamic perspective, interesting questions arise around how firms choose strategies and whether the employment of integrative versus instrumental strategies changes over time.

A topic for debate concerns the actors that affect the organizational strategies towards paradoxical tensions. Often the formal manager is seen as the pivotal actor (e.g., Hahn et al., 2014); however, several other groups and individuals will influence the organization’s objectives through the formation of ‘coalitions’ (Cyert and March, 1992). It is therefore necessary to discuss how actors interact in change processes for CS, including those outside the legal boundaries of the focal firm.

5.2. The role of actor interaction in change processes

This section aims to theorize on the conceptual framework suggested in Paper 3, and takes into account the paradox perspective introduced in section 5.1. Moreover, the tension between quality and circularity is used as empirical inspiration.

Adopting a paradox perspective on CS means the accommodation of “interrelated yet conflicting economic, environmental, and social concerns with the objective of achieving superior business contributions to sustainable development” (Hahn et al., 2018, p. 237). A principal question for debate is how such superior business contributions come about, and especially how stakeholders that represent environmental and social concerns become contributing actors in ongoing business operations. According to Sharma and Vredenburg (1998), the starting point for such a change process is trust-based relationships, which is also the premise of the conceptual framework provided in Paper 3.

The framework is shown in Table 6 and conveys the importance of actor interaction for achieving “Substantial CS” results through the inclusion of social and environmental concerns in decision-making processes⁷. This is premised on the logic of the stakeholder concept by asserting that social and environmental concerns at the systemic level need a mediator, i.e., individuals and groups, to affect the focal organization. This logic can be analyzed through the concepts of actor bonds, resource ties and activity links, which I will illustrate using the quality-circularity tension in the following.

⁷ The original framework in Paper 3 also includes situations of “Limited CS” and “Potential CS”.

Table 6 A framework for actor interaction in the context of CS

	Actor bonds	Resource ties	Activity links
<i>Interaction elements: Networking</i>	Know how to systematically relate to several parties in co-managing resources and activities.	Mutual changes in relation to several parties in several types of resources.	Mutual changes in relation to several parties in joint and related activities.
Substantial CS	<i>Third-parties are an integrated part of the firm-stakeholder relationship and decision-making processes are based on contributions from coalitions of actors. Employees from more than two organizations work together in cross-functional groups.</i>		

In the center of the tension stands the relationship between AKVA group and Plasto, which has developed over several years. The relationship is anchored in resource ties that have formed around processes of production and product development. When Plasto introduces circularity as a new concept, the tension becomes salient because of the need to alter both material and immaterial resources. Moreover, this creates implications for existing activity links, e.g., the focus of ongoing R&D projects, but also new activities such as the collaboration with the supplier, Containerservice.

The case study example illustrates how the CBM project challenges the existing business relationship between Plasto and AKVA group by creating a demand for new actor bonds, e.g., with suppliers and R&D partners. Ideally, as depicted in Table 6, the involved actors know how to relate to several parties in co-managing resources and activities, thereby ensuring contributions to CS objectives based on cross-functional groups. However, as argued by Andersson and Sweet (2002), tensions will arise along the way through both existing and new relationships. Moreover, the conflict is likely to intensify if non-business actors are introduced to an existing network since such actors represent a fundamentally different logic compared to traditional business operations.

Paradoxically, even if they may be a source of tension in traditional business networks, non-business actors, such as NGOs, are seen as paramount contributors in CS change processes (Upward and Jones, 2016, Lozano, 2018). Thus, the interaction process itself is vital since it enables mutual learning between individuals and groups with differing worldviews. Indeed, actor interaction is the logic behind the TD methodology (Lang et al., 2012, Schaltegger et al., 2013), which depicts CS as a process of mutual problem framing, co-creation of knowledge, and application of that knowledge through actor-oriented learning.

"[No] single actor can win the race against unsustainability" (Schaltegger et al., 2013, p. 221). However, a process of actor interaction does not automatically lead to the

realization of CS objectives. The result depends on the involved actors and their interests. The CS literature tries to resolve this issue by normatively placing social and environmental concerns as a boundary condition for analyzing business operations. I use the next section of this chapter to reflect upon some paradoxical features of such a theoretical approach.

5.3. Rethinking social and environmental concerns as theoretical constructs

In this section, I draw on the philosophical analysis presented in Paper 4. I emphasize the theoretical premise of integrating social and environmental concerns through the concept of CS and reflect upon epistemological implications.

The premise of the paradox perspective on CS is the interrelated yet conflicting natures of economic, environmental, and social concerns (Hahn et al., 2018). However, an interesting question is whether related tensions stem from ontology, i.e., the nature of reality itself, or epistemology, i.e., the ways through which we try to make sense and develop knowledge about the phenomena at hand. Paper 4 contributes to this fundamental issue by discussing the elements of Figure 7 from a philosophy of science perspective. I draw on these insights in the following.

If one takes a closer look at the environmental dimension of CS, it is ontologically anchored at the systemic level of analysis, as explained by natural science disciplines such as ecology (Whiteman et al., 2013, Isil and Hernke, 2017). Following this line of reasoning, tensions will emerge when systemic properties, such as climate change, are adversely affected by company level impacts, such as CO₂ emissions. In other words, actors can challenge a company's business operations based on measurable environmental values (see e.g., Manninen et al., 2018), and the tensions stem from the nature of reality itself.

A competing logic addresses the epistemological insight that actors socially construct knowledge about reality (Berger and Luckmann, 1991). The discourse on corporate social responsibility (CSR) (Carroll, 1999) is an interesting example in this regard. Closely related to the CS debate, CSR emphasizes the social dimension of business operations. In particular, the CSR discourse is anchored in normative theories on what constitutes "good" business conduct (Bansal and Song, 2017). In other words, from this logic, the tensions stem from conflicting values and the process through which actors debate knowledge about reality.

One can place the social responsibilities of a business in one hand and the environmental systems in which it operates on the other. In general, the former draws on ethics, while the latter can be analyzed by scientific methods (Bansal and Song, 2017). This insight points to a deep theoretical tension in the field of CS and may explain the

competing conceptualizations that exist. For example, Murray et al. (2017) criticize the contemporary circular economy (CE) debate because of “an absence of the social dimension inherent in sustainable development that limits its ethical dimension(...)”(p. 369). However, the question is whether a conceptual integration of the social and environmental dimensions is a fruitful scholarly goal in the first place.

Adopting a TD perspective may provide a productive avenue to explore further. As shown in Figure 1, an essential part of the TD process deals with problem framing among involved actors. Theoretically, this reflects a pluralist epistemology where differing interpretations are valued and encouraged (Söderbaum, 2009). For example, the CBM term was something developed during the ongoing interaction between various actors, and not something predefined by academics in the SISVI project. In other words, TD projects aim to give conceptual leeway based on the actor interaction in a particular context.

Acknowledging a pluralist epistemology, we can argue that in a TD approach to CS the predefined concepts of social and environmental concerns may be a source of tension themselves. Given the importance of joint problem framing, every involved actor should be able to negotiate the terms used. However, does this imply a relativistic approach where “anything goes?” Remig (2016) warns against such a position and emphasizes the need for a proper theoretical and methodological foundation. Indeed, remembering the ‘non-negotiable’ planetary boundaries (Sjåfjell, 2018), it seems paramount to secure an ontological core that adheres to the principles of SD.

The essential point is that science-based knowledge on how to understand the SD concept (e.g., Griggs et al., 2013) should be communicated during the TD process, and not be treated as an exogenous factor. That is to say, that it is the role of the involved TD scholar to argue this viewpoint and thereby engage in the co-creation of knowledge, i.e., Phase B of Figure 1. Most likely, actors from sectors other than academia will challenge abstract concepts by placing them in a specific context, which creates a dynamic situation of interpretation and knowledge integration.

To conclude, the TD methodology enables a powerful link between scientific and societal practice. This rests on the willingness of different actors to engage in interaction, and especially the ability of the researcher to communicate abstract concepts that reflect social and environmental concerns. Importantly, related conceptualizations must be adapted to the practical context at hand, while at the same time adhering to principles of SD. Thus, the potential for CS change does not lie in the academic attention to conceptual development, but in the interactive collaboration with societal actors.

5.4. Epistemological reflections

Tensions between different interpretations mean that clarification is necessary, which may open the door for new thinking (Söderbaum, 2009, p.80).

The quote points to the contested nature of CS since stakeholders interpret the meaning of social and environmental concerns in the context of business operations differently. Epistemologically speaking, knowledge about social issues at the individual level will always involve inter-subjective negotiation about the nature of the phenomenon, i.e., the social construction of reality (Berger and Luckmann, 1991). However, how about systemic issues such as planetary boundaries (Steffen et al., 2015)? Are such environmental concerns “negotiable” as well?

According to Sjøfjell (2018), the environmental dimension represents non-negotiable ecological limits given its vital importance for social and economic activity. If one agrees with this premise from an ontological (and normative) standpoint, the epistemological problem becomes how to understand business operations and related stakeholder dynamics in the context of the objectified reality found in the environmental dimension. In other words, how can we avoid the ‘fractured epistemology’ (Gladwin et al., 1995) of mainstream management theory that conceptually separates business organizations from the natural world?

Along these lines of reasoning, Whiteman et al. (2013) assert the need to integrate management discourses with the natural sciences in general, and the planetary boundaries in particular. They assert the need to view business operations as the systemic interaction with planetary processes, e.g., the global nitrogen cycle and biodiversity loss, effectively broadening the scope beyond the level of individual firms. The same logic is reflected in Griggs et al.'s (2013) definition of SD by treating the Earth's life-support system as the ontological core of knowledge development. Thus, a systemic perspective that targets interaction between different levels of analysis would advance theory on change for CS.

The CE concept exemplifies a systemic perspective to business operations. The contemporary debate draws heavily on objectified results based on scientific methods, e.g., analysis of material and energy flows, with the goal of minimizing resource input and waste, emission, and energy leakage of the economic system (Stahel, 2016, Geissdoerfer et al., 2017). Ideally, CE aims to accomplish SD through business models based on the natural limitations of the Earth's life support systems (Kirchherr et al., 2017, Prieto-Sandoval et al., 2018). However, some underlying epistemological dilemmas occur.

Referring to Figure 7, we can conclude that the CE concept targets the environmental and economic dimensions at the systemic level. As argued by Murray et al. (2017), this is problematic since the social dimension is at the heart of SD through the principles of inter- and intra-generational equity. That being said, there seems to be an underlying potential for social advantages inherent in the concept, primarily through job creation potential in a changed economic system (Stahel, 2016). Furthermore, the CE debate has proved to be valuable in attracting the business community to the issue of SD (Korhonen et al., 2018). Additionally, Bocken et al. (2018) suggest that experimentation in practice tends to draw on both the SD and CE concepts without clearly defined boundaries.

The CE example illustrates a theoretical problem of combining levels of analysis along with three change dimensions. As reflected upon by Whiteman et al. (2013), integrating knowledge from the environmental, social and economic domains requires scholars to join forces and communicate despite fundamentally different epistemological assumptions. Such a multi-disciplinary approach requires a pluralist epistemology where a variety of explanatory models and theoretical perspectives are valued (Söderbaum, 2015). The quote from the beginning of this section highlights the creative potential that stems from the inherent conceptual tensions of such an epistemological position.

To summarize, Chapter 5 illustrates the theoretical complexity surrounding the concept of CS. Moreover, the CE example illustrates the dilemmas that occur when specialized concepts become popular among societal actors, which can lead to unintended consequences. Such a blurred landscape also challenges the classical notion of the researcher's role, which implies collaboration between academics and practitioners through a TD methodology.

6. Conclusive remarks

The thesis contributes to field of CS through the four peer-reviewed publications on which it is based. With this final chapter, I aim to summarize the conclusions of the research questions that have guided the scientific work, see Table 7 for an overview.

Following the inductive logic of the TD methodology, I begin with the research question that specifically addresses the case study. The proceeding questions increase the level of abstraction and thereby theoretical relevance.

Table 7 Research questions and contributions

Research questions (RQs)	Contributions to the scientific discourse ⁸
1. How has Plasto integrated the selected SDGs in its business operations?	Paper 2
2. How can we conceptualize the role of interaction for CS?	Paper 3
3. How can the epistemology of CS be analyzed?	Paper 4

6.1. CS in practice

Paper 2 explores how the perceived conflicting requirement between product quality and recycling of materials, i.e., the case study's unit of analysis, was affected by application of the SDGs. The main finding is that Plasto's ongoing business operations regarding how to create value from plastic waste are seen in relation to SDGs number 9, 12, 14, and 17 (see Figure 6).

Plasto's representative was invited to interact with external stakeholders through a workshop series, "SDGs learning by doing." This led to the management group's decision to select four of the 17 goals, which resulted through a process of organizational learning. The company reported that the experience had facilitated internal collaboration between organizational units and helped to position business activities in a larger context.

The case study findings indicate that application of the SDGs provides a reframing of technical problems, which can change the perception of conflicting requirements, and even provide solutions. One may discover paradoxical patterns, however, as tensions may shift to other domains, for example moving from a technical issue to a strategic dilemma.

⁸ The role of Paper 1 is to summarize the empirical findings of the case study and it is therefore not guided by a research question.

6.2. The role of interaction for CS

Paper 3 proposes a framework that asserts the need to go beyond the perspective of the focal firm when analyzing CS phenomena. Changed behavior and routines are results of a process where actors from different organizations interact through social bonds, resources ties and activity links. This contrasts the stakeholder perspective found in strategic management literature, where one tends to analyze interaction through the role of the focal firm's formal managers.

Most stakeholders in a business context do not become actors that affect a company's objectives and related achievement. However, if, for example, a NGO aims to influence a business organization to address social and environmental concerns, the essential element is to make bonds with principal actors and engage in joint problem framing, which enables a process of mutual learning and change. Such dynamics highlight the importance of day-to-day interaction through practical activities and give less attention to practices such as CS reporting.

The TD methodology acknowledges the need for interaction between scientific and societal practice to enable change for CS. This perspective on knowledge demands specific skills from the researcher to balance critical reflection and active contribution to the process. When the goal is knowledge, the researcher's reflexive attention should be on the process of communicating abstract concepts, while at the same time being open to context-dependent interpretations from practitioners.

6.3. Clarifying the epistemology of CS

Starting from an ontological point view, Paper 4 argues the systemic nature of the environmental dimension of CS, thereby implying non-negotiable planetary boundaries. Similarly, the reality of the social dimension is based on the values and norms of individuals and thereby enables for inter-subjective debate of generic realities.

The ontological domain is not always accessible through actor-specific means. For example, the measurement of chemical emissions demands specialized tools that are closer to the scientific domain than societal practice. This creates an epistemological tension when discussing the change dimension of CS. Scientists may have access to systemic and generic realities, but individual actors can develop contradictory understandings based on contingent ontologies.

The thesis suggests that a pluralist epistemology can clarify the analytical starting point of CS change processes. This means that, by nature, knowledge is context-dependent, and actors from both academia and practice can provide valid input to research projects. However, trained researchers have a responsibility to communicate the abstract nature of systemic relations in the societal discourse.

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**Lessons learned from practice when developing a circular business
model**

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Lessons Learned from Practice when Developing a Circular Business Model

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Abstract

A circular business model (CBM) does not emerge in a vacuum. The company Plasto started its CBM journey in May 2014 and has encountered some key challenges, the most important being quality standards of products made from recycled materials. Ensuring quality is crucial to establish trust in the market, and this entails technical testing and competence development among employees. Plasto has realized that working with circular material streams must be seen in a larger context, and it has chosen the United Nations’ Sustainable Development Goals as a facilitating framework. By June 2017, the company is committed at the top-management level, and has started a strategy process based on the needs of a Circular Economy and sustainable development. The case of Plasto shows that developing a CBM occurs in close interaction with external actors, and, essentially is created through a process of learning and experimentation.

Introduction

The Circular Economy (CE) is emerging as a solution to some of the core challenges our society is facing, and both business practitioners and academic scholars are embracing the concept (Kirchherr & Hekkert, 2017). This is creating a demand for new business models.

The company Plasto produces plastic components in the business-to-business (B2B) market, and decided in 2014 to investigate the strategic advantages of what the company calls ‘circular material streams’. As of June 2017, it established the long-term goal of using 50 percent recycled materials in one of their product groups.

The case focuses on recycled plastic materials and implications for Plasto’s supply chain. This reflects a circular business model (CBM) development process that aims to create value from waste by means of recycling. The remainder of this chapter describes the drivers and barriers to Plasto’s CBM process and the lessons learned to overcome key challenges.

The case of Plasto

Plasto is a small family-owned company that supplies plastic products to a variety of industries. It was founded in 1955 and is based in the city of Åndalsnes in the west part of Norway. It is a company with around 40 employees. Most of the customers are based in Norway with several in the local area of Åndalsnes. However, through their customers’ products, their high-end components are spread internationally.

Up until the early 2000’s, Plasto was dependent on the automotive industry as a low-margin supplier to a car manufacturer. Financial difficulties resulted in a changed business model, going from standard components at low margins, to innovative and customised products at

higher prices. Today, Plasto’s strategy is centered on research-based innovation with a special emphasis on networks and external collaboration. The company is renowned for its open attitude and willingness to commit resources to research and development (R&D) projects in collaboration with universities and research institutions.

Plasto’s core business is to produce and deliver plastic components; the main product/market areas are aquaculture, maritime, oil and gas, furniture and automotive. Products are offered through advanced technology for injection moulding of thermoplastic polymers. See details in Box 29.1 on Plasto’s core competence.

Core competence of Plasto:

- 1) Knowing how to design the product so that it fulfils the customer’s demands.
- 2) Knowing how to design the mould so that the final product acquires the required qualities, for example strength of the different parts of the product
- 3) Knowing how to adjust the injection process of the production equipment so that these qualities are realised.

Box 29.1 *Plasto’s core competence*

In 2016, approximately 50 percent of its market was in the aquaculture industry through the customer AKVA Group, which supplies equipment to fish farming operators. Figure 29.1 shows an example of brackets that hold cage pipes together, along with walkways on the top of the fish farm, which are Plasto’s main products supplied to AKVA Group. The products are manufactured from high-density polyethylene (HDPE), which is a commonly recycled material.

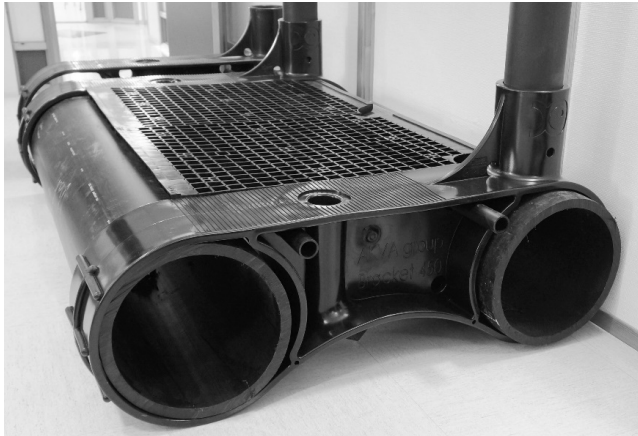


FIGURE 29.1 *Brackets and walkways supplied to AKVA Group*

The collaboration between Plasto and AKVA Group was established in 2008, and is described by both parties as a trust-based and long-term relationship. Representatives from both organizations work together to design moulds, the product and the production process, as these activities are dependent on each other to produce the desired output – e.g. a bracket with specific qualities and features. As of June 2017, AKVA Group has committed to contribute to Plasto’s ongoing efforts of evaluating risks and opportunities of recycled materials, and how to develop a CBM in the longer run.

About the Process

The role of external stakeholders and collaboration is well established in the academic literature on CE business models (N. M. Bocken, de Pauw, Bakker, & van der Grinten, 2016). However, implementing this takes time and reflects trial-and-error learning (Sosna, Trevinyo-Rodríguez, & Velamuri, 2010). The case of Plasto indicates generic features of such a process, and especially the role of external networks in achieving internal commitment among managers and employees.

The development of Plasto’s CBM has taken place in the context of the R&D project ‘Sustainable Innovation and Shared Value Creation in Norwegian Industry’ - SISVIⁱ. The CBM process started as a conceptual idea of the CEO at a kick-off meeting in May 2014, when he was challenged by university researchers on how to change the company’s business model in a way that could reduce the environmental impacts of its operations. As a follow up activity, a dedicated project manager became responsible for overseeing the CBM process in collaboration with the researchers. The project manager’s main responsibility was to link R&D activities with marketing efforts and customer needs, and he is still Plasto’s main contact point in the SISVI project as of June 2017.

- May 2014: Plasto’s CEO presents the CBM idea to partners in the SISVI project.
- September 2014: A dedicated project manager begins to follow the CBM process.
- September 2015: Plasto hosts a two-day research seminar.
- September 2016: The project manager gets access to valuable networks.
 - The company Nofir provides valuable contacts and insights.
 - The company Containerservice becomes a potential supply chain partner.
 - The Polytechnic Society provides an arena for learning.
- March 2017: The project manager receives input from Interface and Ocean Cleanup.
- June 2017: The management group participates in a workshop on business model development.

Box 29.2 HERE *Main developments in the CBM process*

Box 29.2 describes the main developments from May 2014 to June 2017. The first phase is represented by the two-year period from September 2014 – September 2016. SISVI researchers, along with master students, conducted several interviews with Plasto representatives to understand its context, challenges and strategic goals. In September 2015, the company hosted a two-day seminar with researchers, students and industry actors from the local community (SISVI, 2015). Moreover, a sub-project was initiated to conduct a Life Cycle

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Analysis (LCA) of Plasto’s products delivered to AKVA Group (brackets and walkways), with the purpose of calculating the environmental impact of using recycled materials. In general, activities in the first phase were aimed at understanding the industrial context, and especially at identifying the challenges of developing a CBM.

September 2016 was the starting point for the second phase of the project, when external actors became involved in the process. At a CE conference, Plasto got to know two experienced companies in the industry: Nofir and Containerservice. Nofir specializes in recycling discarded fish farming equipment; and Containerservice has unique technical capabilities related to the handling and cleaning of collected materials. In the same period, the Plasto project manager committed to an initiative regarding the application of the United Nations’ Sustainable Development Goals (SDGs) to the companies’ strategies and operations (UN, 2016). This was organised by the Polytechnic Society Norway, a non-profit organization that facilitates multi-disciplinary and cross-sectoral activities for societal purposes. The project manager attended three interactive workshops between September 2016 - June 2017.

In March 2017, an academia-industry workshop was organized by the SISVI project in Utrecht, Netherlands (SISVI, 2017). Plasto, Interface, and Ocean Cleanup were present as industry organizations. Interface is the world-leading producer of modular carpets and is well known for its corporate sustainability leadership (N. M. Bocken et al., 2016). Ocean Cleanup is a non-profit foundation developing advanced technology to clean the oceans of plastic waste. Follow-up activities were conducted with representatives from both organizations by the author to collect viewpoints on Plasto’s CBM process.

The final activity to facilitate the CBM process, was a one-day workshop in June 2017 with Plasto’s management group facilitated by the aforementioned project manager along with the author. The ‘Value mapping tool’ produced by N. Bocken, Short, Rana, and Evans (2013) was applied explicitly in order to understand how environmental and social values are created or destroyed by the company’s existing business model. Importantly, representatives from two external organizations, iKuben and ProtoMore, were given the task at the workshop of arguing environmental and social standpoints. These were actors from the local community that knew the company well and had good knowledge of CBMs and the SDGs.

To summarise, between the period of May 2014 to June 2017, Plasto became increasingly committed to a process of developing a CBM. More specifically, the company went from an internal focus on opportunity mapping to actively sharing experiences in external networks. Moreover, the company’s management invested a considerable amount of time on the process from September 2016 and now have started to see the strategic relevance of a changed business model.

Drivers and Barriers

An underlying driver and a motivation for Plasto’s development of a CBM is the supply chain configuration. At present, Plasto relies on one single supplier to produce brackets and walkways to AKVA Group. Having the ability to use recycled materials means increased flexibility in supply due to access to multiple sources of raw materials. In addition, an estimation of the costs of recycled materials produced by Cotainerservice show that Plasto will reduce their costs compared to procuring virgin materials.

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Another driver is increasing expectations from external stakeholders in terms of sustainability and environmental responsibility. This is particularly the case when it comes to plastic waste in the oceans with the issue of micro plastics becoming more of a media issue (theGuardian, 2017). In April 2017, Plasto’s CEO stated in the Norwegian Financial Times:

“We have identified new possibilities with a proactive approach. Sustainable utilisation of plastic materials is a prerequisite for further development within several industries. Micro plastic waste in the ocean is not a problem caused by our deliveries, but like any other company, we have a responsibility to utilise the raw material in a sustainable manner.”

(Finansavisen, 2017)

Responding to CBM drivers has led Plasto to encounter some barriers. First, the secondary materials need to be collected from coastal locations. For example, fish farming cages containing HDPE components must be collected, dismantled and then transported to production facilities. Second, the materials must be cleaned through a melt filter. Currently, this process needs an additional actor such as Containerservice because Plasto does not possess the technology needed,. A longer-term option is for Plasto to integrate a melt filter in its injection moulding machine, which enables the company to handle secondary materials directly. Third, and most important, the quality of the products must be assured in accordance with technical standards and customers’ needs. These challenges require testing and experimentation with related competence development for the R&D engineers. Quality considerations are discussed in more detail below.

Typical quality features of plastic products are strength and stretching behaviour. According to Plasto’s project manager, the quality of a product is inherently linked to the variation in raw

material properties. As an example, the walkways depicted in Figure 29.1 demand less rigorous quality standards than the brackets holding the pipes together. The brackets ensure the stability of the fish farm and must endure the impact of heavy seas, which means that the plastic material must be reliable in rough conditions. Consequently, AKVA Group’s main concern is that the brackets meet high quality standards and its technical staff have shown skepticism towards changing the raw materials used in established production processes. As a result, Plasto decided that the natural starting point for production of a product from recycled plastics is the walkways, rather than the brackets that must comply with stricter industry standards.

Working with recycled material also demands new competence among internal staff. Product engineers are used to working with virgin material that has well-known properties, leading to predictable behaviour during the production process. Recycled material, on the other hand, requires experimentation to understand the strength and stretching behaviour of the final product. This gives rise to psychological barriers since the engineers must think differently and change their routines and practices. However, according to the project manager, this can be reframed as something positive as the engineers will need to develop unique skills to tackle the more challenging material properties.

The Importance of Networks to Overcome Barriers

The specialised knowledge and technical capabilities needed to develop a CBM do not emerge in a vacuum. One of the key learning points for Plasto is the importance of engaging external actors in the development process.

“Getting to know Nofir and Containerservice was a milestone. We had realised that setting up a supply chain would be the most complex element of the whole project, but as a first step

we can use their existing chains, we can learn from them, and in the long run this can enable us to establish our own chain.” (Plasto project manager, April 2017)

This statement points to an essential aspect, namely that CBMs demand new types of collaborative relationships and a willingness to interact and learn from external actors.

A similar experience happened when Plasto presented its CBM process at the workshop in Utrecht, Netherlands where Interface and Ocean Cleanup were represented. The other participants contributed with comments and suggestions for further work. Norbert Fraunholz, the lead engineer for recycling at Ocean Cleanup and Jon Khoo, an innovation partner at Interface also provided written feedback on Plastos CBM process at a later stage.

“A next step would be in my opinion to be able to make a statement that the parts made from recycled HDPE are just as good as those from virgin plastic, so for the customer there would be no difference in use.” (Norbert Fraunholz, March 2017)

Norbert Fraunholz from Ocean Cleanup stressed that achieving quality standards is crucial to establish confidence in the market. Moreover, he recommended that Plasto should dig deeper into the possible differences in technical properties of recycled and virgin materials and this should relate to a specific application e.g. the production of the walkways. In this way, Plasto could show the customer that the final product meets the quality standards.

Jon Khoo from Interface, emphasised different challenges Plasto was likely to encounter. This was based on his experience with NetWorks a successful CBM development focused on the recycling of discarded fishing nets into carpet tiles (Luqmani, Leach, & Jesson, 2017). He

argued that Plasto must overcome a conservative market that is used to virgin materials and is not motivated by environmental concerns. Moreover, the company must secure the right partners and make sure to have a 'plan B' if the situation changes. Lastly, there must be a business case that makes sense to the board of directors and benefits that customers understand. Plasto's project manager expressed that the workshop was both inspirational and practical. Interface experience of working with CE at an operational level was particularly useful and provided practical insight that was transferable to Plasto.

Another input from external actors was through the Polytechnic Society Norway where Plasto indicated how the CBM process fits in the broader context of the SDGs framework. Plasto presented its experiences on two occasions within workshops where other company representatives were present.

The project manager highlighted that two working sessions in the Plasto management group had been assigned to the SDG framework and that they decided to prioritise four of the SDGs, while recognising that Plasto's operations were linked to all the goals. For example, goal number 14 is of specific strategic importance since it deals with the oceans and marine resources, and is therefore closely linked to Plasto's position in the aquaculture industry. Establishing a goal of 50 percent recycled materials within 2020 was a significant output of the process and the project manager has indicated that the SDG framework has in general facilitated internal communication over the CBM process.

Conclusions

Developing a CBM is a process of trial and error, which implies that companies will benefit from an incremental approach to minimise risks. The Plasto case illustrates how external activities and interaction with stakeholders speeds up the process.

The challenges of Plasto’s CBM relates to product quality. The substitution of recycled from virgin materials increases the production complexity and creates potential skepticism among customers and internal stakeholders such as engineers. The case also shows the importance of technical testing in trust-based collaboration with the customer. This process also allows the company to invest in and to develop internal competencies based on solid experience.

Below are some lessons learned when developing a CBM based on the Plasto experience:

- The challenges of the CE represent opportunities for innovation and business development.
- Company management must commit to a process of learning and allow for technical testing and experimentation.
- Collaboration between industry actors and academia helps to develop internal competencies along with external networks.
- Sharing of early results and experiences to external actors has a motivating and accelerating effect on the development process.
- The commitment of top management is essential coupled with a willingness to allocate financial resources to R&D.
- The development process must be designed to include inspirational events with external stakeholders so that management is kept motivated and interested.

- The case study illustrates how R&D projects can play a facilitating role in promoting CBMs. Moreover, governmental agencies can help to move CE projects amongst small and medium sized enterprises (SMEs) by providing financial support that facilitates industry-academia collaboration.

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¹ The research findings presented are based on a four-year project called ‘Sustainable Innovation and Shared Value Creation in Norwegian Industry’ (SISVI), operating from May 2014 to May 2018, see <https://www.sisvi.no/>. Plasto is one of the core industrial partners in SISVI, which is owned and managed by the NTNU, the largest university in Norway.

**Corporate sustainability in practice: An exploratory study of the
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Corporate sustainability in practice: An exploratory study of the sustainable development goals (SDGs)

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Abstract

Companies applying the sustainable development goals (SDGs) are likely to face a tension between business strategy and societal development. I develop this claim through inductive reasoning, drawing on an exploratory, and longitudinal case study of the company Plasto. The findings indicate that the SDGs framework is a well-suited platform for debating social and environmental concerns with societal stakeholders. In addition, the framework facilitates organizational learning and internal collaboration. However, actors such as customers may see the generic nature of the SDGs as irrelevant when it comes to specific business operations. Following the inductive logic, I position the findings within ongoing debates in the field of corporate sustainability. Further research should acknowledge contradictory requirements from stakeholders as a theoretical starting point. This implies that the emerging management literature on paradox theory fits well to advance insights on SDG application in a business context.

KEYWORDS

case study, corporate sustainability, exploratory research, inductive reasoning, management tensions, paradox theory, SDGs

1 | INTRODUCTION

A workshop series, "SDGs—Learning by doing," was run in the period of September 2016 to May 2017 and involved actors from private companies and governmental and nongovernmental organizations. This paper presents exploratory findings of how the company Plasto made use of this workshop series and of how related insights have influenced its business operations.

The analytical starting point for the case study research is the initial decision by Plasto's management to engage with the sustainable development goals (SDGs). More specifically, the company's management group decided to prioritize four of the 17 SDGs as the starting point for integration in already existing activities and as a platform for further development. The reasoning behind the selection was that goals numbers 9, 12, and 17 are closely related to the company's core activities and that goal number 14 concerns the market of Plasto's most important customer, AKVA group. Figure 1 highlights Plasto's selected SDGs.

As a response to the call for empirical insights on the practical use and business integration of the SDGs (Fleming, Wise, Hansen, & Sams, 2017; Howard-Grenville et al., 2017), the following question guides the study.

How has Plasto integrated the selected SDGs in its business operations?

The following chapter provides details on the exploratory approach and related research methods of the case study, which enables the reader to evaluate its scientific quality. Next, I present the paper's argument through *inductive reasoning*, that is, where specific insights form the basis for a discussion of general claims (Jupp, 2006). Accordingly, the structure follows a logic where empirical findings precede theoretical positioning. Finally, I offer concluding reflections and develop avenues for further research.

2 | ABOUT THE CASE STUDY

Research on the SDGs in a business context benefits from an exploratory research design because the existing knowledge base is poor (Howard-Grenville et al., 2017), and there is a lack of literature to provide conceptual frameworks or hypotheses (Yin, 2014, p. 39). Further, the case study approach is suitable for exploratory research, and Yin (2014) recommends a single case study when the researcher


















 <p>1. End poverty in all its forms everywhere.</p>	 <p>7. Ensure access to affordable, reliable, sustainable and modern energy for all.</p>	 <p>13. Take urgent action to combat climate change and its impacts.</p>
 <p>2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.</p>	 <p>8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.</p>	 <p>14. Conserve and sustainable use of the oceans, seas and marine resources for sustainable development.</p>
 <p>3. Ensure healthy lives and promote well-being for all at all ages.</p>	 <p>9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.</p>	 <p>15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and biodiversity loss.</p>
 <p>4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.</p>	 <p>10. Reduce inequality within and among countries.</p>	 <p>16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.</p>
 <p>5. Achieve gender equality and empower all women and girls.</p>	 <p>11. Make cities and human settlements inclusive, safe, resilient and sustainable.</p>	 <p>17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.</p>
 <p>6. Ensure availability and sustainable management of water and sanitation for all.</p>	 <p>12. Ensure sustainable consumption and production patterns.</p>	

FIGURE 1 The 17 sustainable development goals and the four goals selected by Plasto. The original figure stems from Fleming et al. (2017, p. 95)

“has an opportunity to observe and analyze a phenomenon previously inaccessible to social science inquiry” (pp. 52–53) and especially when it is possible to follow a process over time. Thus, given the current of state of related research and my access to Plasto and its network, I designed an exploratory single case study for this research.

At a fundamental level, the methodological approach resonates with the pluralist epistemology asserted by Vildåsen, Keitsch, and Fet (2017). A pluralistic setting implies that actors other than trained scholars can provide valid contribution to a knowledge debate, because real-world complexities of social and environmental concerns require collaboration between different actors, for example, academics and practitioners, to jointly define relevant problems (Schaltegger, Beckmann, & Hansen, 2013) and cocreate solutions (Arnold, 2017). In such a *transdisciplinary methodology*, “field validity” is key (Witjes, 2017); meaning that researchers’ need to generalize results must be balanced by practitioners’ need for salience. I applied this principle

by introducing the general topic of SDG application to Plasto’s salient problem of wanting to develop a circular business model (CBM).

The recurring unit of analysis is Plasto’s ongoing business operations as represented by its CBM project. This follows the fact that Plasto’s initial motivation to engage with the SDGs came from ongoing CBM activities. The following section describes main features of the case company and its process of developing a CBM, which began before the data collection period of this study. In the last section, I present details on the methods used while collecting data in the period from September 2016 to April 2018.

2.1 | The case company and its project to develop a CBM

Plasto is a small producer of plastic components in the business-to-business market. It had about 30 employees at the end of 2017. Plasto

grounds its business idea in research and development (R&D), which the board of directors has established in the company's strategy documents.

In the period from 2014 to 2017, the company experienced high fluctuations in market demand. This led to cost reductions and a lower capacity in production. However, Plasto was able to continue its investments in R&D through its large project portfolio. The strategic plan for 2017–2018 still maintains this focus and states that R&D collaboration with external actors is the company's most important promotion channel.

Plasto is a core partner in the project "Sustainable Innovation and Shared Value Creation in Norwegian Industry" (SISVI), which is an academia–industry research project that started in May 2014 (see www.sisvi.no). Plasto's focus has been to investigate what we refer to in the project as a CBM. More specifically, the idea is to explore how the company can use recycled plastic materials in its production of components for their most important customer, AKVA group.

AKVA group is a supplier to the aquaculture industry that offers "complete technical solutions and service" (AKVAgrou, 2018). Its main product is the fish farming cage, and Plasto supplies the brackets used to hold plastic pipes together, along with walkways. The plastic material used in this production can be recycled, and Plasto has investigated such possibility since May 2014. The core challenge of the CBM is product quality. Indeed, there is an inherent uncertainty whether Plasto can fulfill the technical requirements set by AKVA group when recycled plastics are used as raw materials in its production process. Actors in AKVA group have expressed this concern to Plasto's representatives on several occasions.

The quality issue has led Plasto to focus its R&D efforts on the technical testing of material properties. This began in June 2017, and as of April 2018, the results are satisfactory. In fact, AKVA group has agreed to use recycled plastics in the production of walkways as long as Plasto guarantees quality within the specified range. Plasto plans to start this production in the early fall of 2018 (Otterlei, 2018). In general, the feedback from AKVA group has changed over time, and especially after new actors, those who see the strategic relevance of Plasto's CBM project, have become involved in the process.

Plasto has at least three strategic motivations in aiming for a CBM. First, successful implementation provides the company a new source of raw materials. Currently, it is dependent on one supplier, the large company Borealis, for the production of components to AKVA group. This limits its flexibility. Second, Plasto's calculations show that the material cost per kilogram of plastic can be reduced by at least 30%, leading to significant savings.

Finally, the CBM project signals to external stakeholders that the company takes its responsibility seriously and aims to undertake voluntary measures independent of regulatory pressures. This should be seen in relation to the emerging attention on plastic pollution, especially when it comes to waste in the oceans. Indeed, there is a pressure from research communities (Li, Tse, & Fok, 2016) and governments (EU, 2017) for industry to take responsibility for the end of life of products through recycling and upgrading programs.

In September 2016, I encouraged the project manager of the CBM activity to see how the SDGs could relate to and strengthen ongoing efforts. My initiative was linked to the planned "SDGs–

Learning by doing" workshop series. This process was the basis for the primary data collection presented in this paper.

2.2 | Case study process and methodology

In June 2016, the Polytechnic Society, a nonprofit organization working to establish arenas for debating societal challenges, established a subgroup called Polytechnic Sustainability (PS). PS decided to organize the "SDGs–learning by doing" workshop series with the goal of exploring how Norwegian companies could transform the SDGs for practical use in their operations.

At the time, I had an active role organizing events together with seven other people in PS (PolytechnicSustainability, 2018). PS is led by the CEO of a small consultancy working with the SDGs in a business context. The other members represent three NGOs, one governmental actor, and two private companies. On August 31, 2016, I sent a formal invitation to the workshop series to Plasto's project manager on behalf of PS, and we had an informal dialogue about the initiative at a circular economy conference on September 2. I then re-sent the invitation on September 5 and included Plasto's CEO and another board member of PS who had also approached the company.

On September 12, the project manager responded that the company would like to take part in the process with the following email:

[The CEO] hopes our participation will make us better prepared for our sustainability ambitions within the aquaculture industry. We accept the invitation, and are looking to forward to getting to know the network. Because of the current market situation, we need to be careful with regards to resources spent on the process, but we will be sufficiently involved and contribute so that both we and you receive output from our participation. (Plasto's project manager, September 2016).

On September 23, Plasto's project manager attended his first workshop in PS (SISVI, 2016). He committed to present the SDGs to key actors in the company in order to identify the framework's relevance from Plasto's perspective. The organizers of the process emphasized that the company should structure ideas and reflections based on current company activities relevant for the SDGs on the one hand, and with future risks and innovation opportunities stemming from the SDGs on the other hand.

I explored the process following the first workshop in September 2016 by conducting a case study guided by the research question of this paper. Table 1 shows details of the data collection, which took place from September 2016 to April 2018 and specifically concerns Plasto's application of the SDGs. In addition, I utilized secondary data about the CBM process composed of 25 interviews, 14 observations, and two documents that took place in the SISVI project. These data are presented in detail in the appendix of this paper.

I collected the primary data, and the secondary data gathering also involved other SISVI project researchers and Master's students. The main source of qualitative data has been interviews. However, as recommended by Yin (2014), I actively sought to triangulate the findings

TABLE 1 Details on primary data

Date collected	Data type	Relevance for the case study
September 23, 2016	Active observation	The project manager presented the CBM case at a PS workshop and received feedback from other participants.
December 16, 2016	Active observation	The project manager reported on progress concerning application of the SDGs at a PS workshop and received feedback from other participants.
May 23, 2017	Passive observation	The project manager reported on progress concerning application of the SDGs at a PS workshop and reflected on lessons learned during the process.
October 3, 2017	Document	An application for funding was sent to the agency, Innovation Norway for a project that applies the SDGs in the context of the CBM process.
November 23/24, 2017	Semistructured interview	Plasto's project manager reflected on the CBM case and the SDGs process.
November 23, 2017	Semistructured interview	Plasto's CEO and CTO (the owners) reflected on the CBM case and the SDGs process in separate interviews.
January 19, 2018	Open ended interview	AKVA group's representative gave reflections on relevance and usage of the SDGs in the context of a workshop on January 11. ^a
January 22, 2018	Open ended interview	Plasto's CEO reflected on the output from the workshop on January 11.
April 19 2018	Semistructured	Plasto's project manager reflected on the CBM case and the SDGs process.

^aThe workshop was initiated by Polytechnic Sustainability and addressed SDGs numbers 9, 14, and 17. The context was environmental challenges of the aquaculture industry. I did not take part because of practical concerns.

by including observations of the CBM project manager along with document analysis.

My active role in introducing the SDGs to the company is a topic for methodological reflection. It is evident that I have influenced organizational actors because they did not know the framework before. However, given the nature of an exploratory case study, the goal is not to verify theoretical hypotheses in the role of passive observer but to develop new and hopefully more interesting research questions based on the learning outcomes of the study (Yin, 2014). Moreover, following a pluralist epistemology and a transdisciplinary methodology, my role as researcher has been to engage with practitioners to test and experiment with new ideas and approaches. Thus, the next chapter reports on the experiences of Plasto's SDG application in the context of its CBM project, based on the interactive process of academia–industry collaboration.

3 | HOW HAS PLASTO INTEGRATED THE SELECTED SDGS IN ITS BUSINESS OPERATIONS?

The following subsections serve different purposes. First, I describe how Plasto applied the SDGs in context of its business operations. Then I present further details on the activity links between the CBM project and the SDGs process. Together, these empirical descriptions will ground the discussion of theoretical positioning in Section 4, adhering to the inductive logic of this paper.

3.1 | Application of the SDGs framework

After the first workshop in PS in September 2016, the project manager committed to work with the SDGs internally at Plasto and to report on the experiences at a meeting later that year. The "homework" was structured so the company could identify current activities contributing to the SDGs, along with future risks and innovation opportunities. At meeting in December, the project manager

presented the result, as shown in Figure 2. Plasto's management group had discussed the homework questions (shown in the figure) in a workshop where all company functions were represented.

In the workshop invitation sent to the management group, the project manager writes,

The goal with our participation [in PS] is to gain insights into the SDGs and how our operations affect and are affected by these goals. The Norwegian Research Council has signaled that future project applications can be evaluated on the basis of whether they contribute towards the SDGs. These insights can therefore be valuable with regards to securing our success rate for project applications also in the future. (Plasto's project manager, November 2016)

The selection of the four goals follows strategic considerations. Goals 9 ("Industry, Innovation and Infrastructure") and 17 ("Partnerships for the Goals") reflect the company's current strategy of investment in R&D based on collaborative processes with its customers and research institutions. Goal 14 ("Life Below Water") is applicable to the aquaculture industry, and Plasto sees it especially relevant for its relationship with AKVA group. Additionally, the company has stated its ambition to use 50% recycled materials within 2020 as contribution to goal 12 ("Responsible Consumption and Production").

When asked about the company's decision to select four of the 17 goals, the project manager argued that the company, in principle, affects, and is affected, by all the goals. However, this makes it difficult to focus and operationalize the goals. After presenting lessons learnt at the third workshop in May 2017, his view was that they were able to place the company's activities in a larger context through an efficient organizational process. Moreover, the framework had helped them communicate between organizational units, especially between those responsible for day-to-day operations and those responsible for R&D.

Plasto's owners, that is, the CEO and the CTO, relate the SDG framework to new market opportunities. The CEO reflected upon

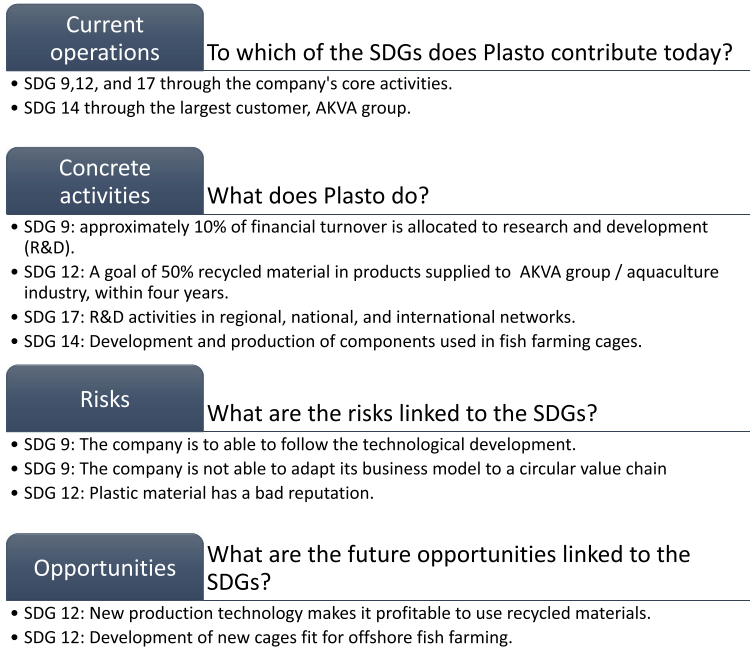


FIGURE 2 The management group's prioritization of the sustainable development goals (SDGs)

the trend of politicians and interest organizations increasingly using the SDGs. This increases the SDG relevance for Plasto, so they may stay prepared for future regulations and governmental requirements. Moreover, the owners see that the SDGs can be used to frame offerings to public sectors, such as in infrastructure projects where the company has relevant competence.

The CTO also reflected upon whether Plasto should actively promote some of the goals, for example, numbers 9 and 12, while ignoring others. This could make them vulnerable to "attacks" from external stakeholders about other goals to which the plastics industry negatively contributes. In other words, "the CTO perceives a tension between strategically prioritizing a few goals, and holistically considering all goals."

3.2 | Linking the SDGs with the CBM project

After the third workshop of PS in May 2017, the project manager signaled that the process had been fruitful. One of the concrete outputs was the management group's decision to establish a goal of 50% recycled plastics in the aquaculture business area within the year 2020. Thus, the project manager decided to continue the SDGs process as a way of creating momentum in the CBM project. The case study reveals three activity links following the workshop in May 2017.

The first activity link was an application for funding to support their CBM project that was developed during the fall of 2017. This was sent to Innovation Norway, a governmental agency that provides financial support for different kinds of business development with the overall aim of increased competitiveness. Additionally, the agency is a strong advocate of the SDGs (IN, 2017). In the application document, Plasto explicitly referred to the SDGs, that is, goals 9, 12, 14, and 17,

and evaluated potential innovation opportunities and risks based on the material presented in the PS workshop series.

The second activity link relates to the R&D project, MegaMould, which began in November 2016. This project deals with technical issues of the CBM project to provide quality assurance, and AKVA group is a partner in this project. The linkage to SDGs was done by Further, the MegaMould project manager who chose to include the SDGs in the project communication to societal stakeholders. The project webpage reads,

"MegaMould has identified the SDGs that the project affects, and these goals will be used to describe project results in relation to sustainability." (MegaMould, 2017)

This statement was a direct result of the management group's prioritization (Figure 2), as MegaMould's original project description did not include a reference to the SDGs.

The final activity links reflect the process of actively involving AKVA group in the SDG process. In January 2018, PS organized a workshop that specifically targeted the aquaculture industry. The topic for discussion was how the industry, as a whole, could contribute to the SDGs. Three actors from the aquaculture value chain were represented, including Plasto and AKVA group. SDGs 9, 14, and 17 framed the discussion, and the challenge of plastics in the oceans framed the scope.

AKVA group's representative reflected on the workshop in a follow-up interview. Positively, she commended Plasto for taking part in such initiative and especially for the concrete results that were emerging from the CBM project. She also, however, signaled some skepticism towards the SDGs, making the argument that the SDGs represent a trend to which several actors are attracted, many by means of self-promotion and positioning.

Her perspective was that SDG engagement could result in superficial discussions on the level of strategy and communication. However, when tackling problems in a specific industry, actors must respect the contingent factors and the unique insights that already exist, for example, with regard to the issue of plastic pollution. In other words, "the AKVA group representative perceives a tension between the generic nature of the SDGs and the specific problems in an industrial context."

4 | THEORETICAL POSITIONING OF THE FINDINGS

The exploratory findings presented in this paper provide some "abductive hunches" (Howard-Grenville et al., 2017) that could motivate a more theory-oriented debate. However, to have a meaningful conversation about possible generalization following the inductive structure of this paper, we need to establish a conceptual bridge between the empirical and theoretical worlds.

The concept of corporate sustainability (CS) serves this purpose, and I select the established definition given by Van Marrewijk (2003, p. 102) for this paper, "Company activities—voluntary by definition—demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders."

In the following, I use this definition to position my findings in a wider scientific debate. The phenomenon at hand is how the company includes new *company activities*, that is, the SDG process, in already existing *business operations*, that is, the CBM project.

4.1 | The theoretical link between CS and the SDGs

Contemporary debates in the field of CS consist of several theoretical positions (Bansal & Song, 2017; Hahn, Figge, Aragón-Correa, & Sharma, 2017). A fundamental difference exists between those who adapt a management-oriented perspective (e.g., Baumgartner & Rauter, 2017; Hahn, Preuss, Pinkse, & Figge, 2014) and those who use a society-oriented perspective (e.g., Upward & Jones, 2016; Whiteman, Walker, & Perego, 2013). Interestingly, empirical phenomena related to SDG application in a business context can be illuminated by both perspectives, and thus, we find interesting avenues for theory development.

The SDG framework is, by nature, a society-level phenomenon (Pradhan, Costa, Rybski, Lucht, & Kropp, 2017) and the result of political ambition to tackle the social and environmental challenges of our world by 2030. The private sector plays an important role (Scheyvens, Banks, & Hughes, 2016), and many top-executives recognize the SDGs as a framework for innovation and opportunity spotting (Accenture, 2016). However, a puzzle emerges when thinking about the linkages between the SDGs and CS activities in more detail.

For example, how do firms interpret the general terms used by the SDGs? In general, what happens when we shift the analytical perspective from high-level societal challenges to the local context of a specific firm? This is a fundamental problem about the systemic context of business operations and is the heart of the debate among CS scholars (Bansal & Song, 2017; Vermeulen & Witjes, 2016;

Williams, Kennedy, Philipp, & Whiteman, 2017). Thus, it should be possible to use the field of CS as a theoretical home for our exploration of the SDGs.

Indeed, the contribution by Sullivan, Thomas, and Rosano (2018) suggests that CS scholars should utilize strategic management theory to analyze and discuss business contributions to the SDGs. Their text analysis of the 17 goals and the associated 169 target descriptions shows that topics such as "innovation," "partnerships," and "strategic positioning" act as a conceptual bridge to the CS literature. The following section explores this idea and uses insights from the case study to enrich the theoretical discussion.

4.2 | From strategic management to paradox management

Taking a strategic management perspective on SDG application, a basic question deals with how a firm can the framework to develop a strategy based on unique resources and capabilities that competitors are not able to imitate and copy (Hart, 1995; Russo & Fouts, 1997). However, according to Neugebauer, Figge, and Hahn (2015), CS strategies are difficult to plan and tend to "emerge" over time.

The difficulty of strategic planning is especially the case for situations based on complexity, societal impacts, and long-term considerations (Neugebauer et al., 2015). Arguably, this resonates well with the SDGs. The framework has a 15-year horizon, it is based on societal challenges, and its complexity is illustrated by the discussion of interrelations between goals, including possible trade-offs (Nilsson, Griggs, & Visbeck, 2016; Spangenberg, 2017). We can therefore assume that integration of the SDGs in strategic decision making likely contains strong features of an emergent process.

Viewing SDG application as an emergent process "(...) implies learning what works—taking one action at a time in search for that viable pattern or consistency" (Mintzberg & Waters, 1985, p. 271). Moreover, the role of learning in for organizational development is generally highlighted by CS scholars (Lozano, 2014; Siebenhüner & Arnold, 2007). Interestingly, in the Plasto case, we recognize a pattern in the way SDGs serve as the platform for learning in interaction with both external stakeholders and internal actors at workshops. Integration in the MegaMould project and the application to Innovation Norway are examples of learning outcomes.

However, the case study reveals that the learning process involves conflicting requirements from actors. AKVA group's representative argues a tension between the generic nature of the SDGs and the specific problems of the aquaculture industry. The Plasto CTO asserts the risk of actively promoting a few SDGs because external stakeholders may question why the company leaves out the other goals. As argued by the project manager, Plasto affects and is affected by all the goals in principle, but in practical decision making, the involved actors feel the need to prioritize. In general, the findings indicate an underlying tension between business strategy and societal development.

Recognizing the tension involved with SDG application, our discussion benefits from the emerging paradox perspective on CS (Hahn, Figge, Pinkse, & Preuss, 2018; Van Der Byl & Slawinski, 2015). This perspective posits that any company that engages with the framework

will encounter tensions between, for example, societal and organizational levels of analysis (Hahn, Pinkse, Preuss, & Figge, 2015). The underlying position draws on a “theory of paradox” (Smith & Lewis, 2011), which asks the question, “How can organizations and their managers effectively engage A and B simultaneously?” (p. 395). For our purpose, this translates to the objective of understanding how business actors can simultaneously meet the requirements of specific industry problems and the societal requirements reflected by all SDGs.

Proposing the paradox perspective as a theoretical position concludes the inductive argument presented in this chapter. In the final chapter of this paper, I draw some concluding remarks that provide a starting point for further debate.

5 | CONCLUDING REMARKS AND FURTHER RESEARCH

A long-standing dilemma in the field of CS surrounds the divide between the interests of business actors and the requirements of the larger social and environmental systems of which they are part. Interestingly, the SDGs have emerged as a possible link to narrow the gap between microlevel actors and macrolevel systemic concerns.

The role of the SDGs in a business context has spurred a conceptual debate (Scheyvens et al., 2016; Sullivan et al., 2018), but practical insights are needed to empirically ground the discussion. Indeed, Howard-Grenville et al. (2017, p. 108) assert the state of the debate as “(...) exploratory pre-theory stage of empirical description, diagnoses of important phenomena, and abductive hunches of phenomena, rather than more traditional theory development or testing.” In other words, we are stepping into an uncharted knowledge territory.

Following the suggestion by Sullivan et al. (2018), the knowledge debate should draw on strategic management theory to illuminate empirical phenomena. However, there is reason to argue that the strategic management perspective fails to capture the complexities and dynamics involved. In fact, the review by Hart and Dowell (2011) shows a lack of empirical research on the broader strategy of “sustainable development.” This points to the idea that business strategy in a CS context is a dynamic process of learning (Neugebauer et al., 2015) and actor interaction (Vildåsen & Havensvid, 2018), as opposed to a planned approach by management actors.

Assuming that CS phenomena, in general, and SDG application, in particular, are dynamic processes of learning, paradox theory provides interesting avenues for further research. The core question is then to understand how organizations and their managers can address contradicting requirements through acceptance and resolution strategies (Smith & Lewis, 2011). Following the principle that an exploratory study should end in theory-oriented questions (Yin, 2014), I suggest the guidance for further research:

- Is it a trend that firms select and prioritize some SDGs as opposed to a holistic consideration of all the goals? If so, why?
- How do firms' prioritizations of the SDGs change over time based on learning outcomes and feedback from stakeholders?
- How do firms resolve contradicting requirements of stakeholders in the context of the SDGs?

The SDGs appear to be a valuable framework for attracting attention to social and environmental concerns in a business context. This paper hopes to inspire further inquiries and knowledge debates, and actual change in business operations.

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APPENDIX A

TABLE A1 Details on secondary interviews.

Date	Type	Interviewees	Comment
December 10, 2014	Open ended	Project manager and Engineer	Two separate interviews with Plasto representatives
February 8, 2015	Open ended	Purchasing manager	Plasto representative
April 16, 2015	Open ended	n, Project manager, R&D manager, and Engineer	Four separate interviews with Plasto representatives
October 27, 2015	Open ended	Purchasing manager and R&D Manager	Two separate interviews with AKVA group representatives
February 19, 2016	Open ended	Project manager	Plasto representative
March 7, 2016	Open ended	Technical sales manager	Representative of AKVA group subsidiary
June 10, 2016	Open ended	Project manager	Plasto representative
March 9, 2016	Open ended	R&D manager	Representative of AKVA group subsidiary
September 19, 2016	Open ended	CEO, Project manager, Engineer and CFO	Four separate interviews with Plasto representatives
October 27, 2016	Semistructured	Project manager	Plasto representative; transcriptions available
November 8, 2016	Semistructured	CEO	Containerservice representative; transcriptions available
November 10, 2016	Semistructured	Business developer	AKVA group representative; transcriptions available
November 22, 2016	Semistructured	Project manager	Plasto representative; transcriptions available
April 5, 2017	Semistructured	Project manager	Plasto representative
June 6, 2017	Semistructured	CEO and Project manager	Plasto representatives
April 19, 2018	Open ended	Quality manager	Containerservice representative; informal setting

TABLE A2 Details on secondary observations of Plasto

Date	Role of the researcher(s)	Company actors at Plasto	Comment
May 28, 2014	Passive participant	CEO	First formal meeting in the project; written minutes available
November 28, 2014	Passive participant	CEO Project manager	First research seminar in the project; written summary and company slides available
March 19, 2015	Passive participant	R&D manager	Company presentation in research seminar; slides available
May 21, 2015	Passive participant	Project manager	Discussions at research seminar; written summary available
September 28, 2015	Passive participant	Project manager COO	Research seminar at Plasto's facilities; written summary and company slides available
February 22, 2016	Passive participant	R&D manager Engineer	Interactive workshop; written summary and company slides available
March 8, 2016	Passive participant	CEO	Company presentation at research seminar
May 18, 2016	Passive participant	Project manager	Discussions at research seminar; written summary available
September 2, 2016	Active participant	Project manager	Company presentation at circular economy conference; company slides available
March 24, 2017	Active participant	Project manager	Interactive workshop; written summary and company slides available
June 2, 2017	Active participant	Management group	Interactive workshop; written summary available
June 8, 2017	Passive participant	Project manager	Presentation and group discussions at an industrial networking event
September 28, 2017	Passive participant	Project manager	Discussions at research seminar; written summary and company slides available
April 18, 2018	Passive participant	Project manager	Company presentations at circular economy conference; written summary and company slides available

TABLE A3 Details on secondary documents

Type	Date retrieved	Relevance for the CBM case
Strategy document	November 7, 2017	Shows Plasto's strategic priorities for 2017 and 2018
Plan for research project	April 7, 2017	The R&D project MegaMould deals with core activities of the CBM project.

The role of interaction for corporate sustainability

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Paper 3

The role of interaction for corporate sustainability

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Abstract

Purpose – Most scholars acknowledge the role of firm-stakeholder relationship for enabling corporate sustainability (CS), but existing literature tends to apply a superficial understanding of interaction. Thus, the purpose of this paper is to advance knowledge by challenging classical stakeholder theory with fundamental insights from the IMP perspective, which in turn leads to a deeper conceptualization of interactive CS.

Design/methodology/approach – A typology framework is developed through an abductive research design grounded in the concepts of actors, resources, and activities. The authors illustrate the potential of the framework through a longitudinal case study. The empirical case revolves around an initiative for recycling of plastic material in a partly beforehand established supply chain, and the study reveals three main findings.

Findings – First, recycling solutions can result in major technological challenges. For example, using recycled material can jeopardize industrial quality standards. Second, third-party stakeholders represent critical knowledge and competence that can remedy technological challenges. Finally, R&D projects are important means for developing firm-stakeholder relationships.

Research limitations/implications – The paper introduces IMP concepts to the CS debate, which can illuminate the emerging literature on tensions and paradoxes related to CS phenomena. Further research is needed on the role of non-business actors as capacity generators for social and environmental change in traditional business networks.

Practical implications – The proposed framework can be used to analyze why some stakeholders (individuals and groups) turn into contributing actors in inter-organizational relationships, while others remain latent.

Originality/value – This paper illustrates the usefulness of actor bonds, resource ties and activity links as explanatory concepts. Moreover, developed relationships in terms of collaboration and networks represent a capacity to change, which is overlooked in current CS debates.

Keywords Case study, Corporate sustainability, Interaction, Tensions, ARA, Stakeholder relationships

Paper type Research paper

1. Introduction

The last three decades have shown an accelerating awareness and interest in dealing with the social and environmental consequences of business activities. Here referred to as “corporate sustainability” (CS), taking such consideration means engaging in “company activities – voluntary by definition – demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders” (Van Marrewijk, 2003, p. 102). This popular definition emphasizes the stakeholder concept (Freeman, 2010), which is typically used to map requirements of individuals and groups that affect or are affected by a focal firm’s activities.

While the literature on CS consists of several streams and conceptualizations (Hahn, Figge, Aragón-Correa and Sharma, 2017; Baumgartner, 2014), stakeholder theory tends to dominate scientific discourse (Johnsen *et al.*, 2017). Some scholars enter the debate by normatively assuming that “ideal” CS activities should meet requirements of multiple stakeholders, such as shareholders, employees, clients, pressure groups and communities

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(Lozano *et al.*, 2015; Stubbs and Cocklin, 2008; Dyllick and Hockerts, 2002). A different entry point is to acknowledge that the realization of multiple actors' requirements creates tensions and paradoxes for firms and their managers (Van Der Byl and Slawinski, 2015; Smith and Lewis, 2011; Margolis and Walsh, 2003). However, most scholars in the area of CS agree that, given limited time and resources, every firm needs to prioritize social and environmental concerns that are most material to their business operations (Eccles and Krzus, 2015; Porter and Kramer, 2011). Turning to stakeholder theory (Mitchell *et al.*, 1997), it follows that CS activities in practice will reflect the stakeholders upon which the focal firm is dependent.

However, the weakness of classical stakeholder theory is that the focal firm, represented by its managers, is seen as the central actor of its surrounding network, while other stakeholders are seen as static entities (Johnsen *et al.*, 2017). Thus, by emphasizing the focal firm as the central actor and separate from other actors, classical stakeholder theory tends to underestimate the dynamics of inter-organizational relationships. As such, little systematic knowledge exists on the strategies chosen by actors when making challenging prioritizations on how to include social and environmental concerns in business operations. Recalling that the phenomena at hand are interactive by definition (Van Marrewijk, 2003), we regard this theoretical weakness as a limiting factor in ongoing CS debates.

Moreover, a substantial number of empirical studies in supply chain management (SCM) strongly suggest interactive learning as a key enabler for CS (e.g. Mollenkopf *et al.*, 2010; Seuring and Müller, 2008; Vermeulen and Ras, 2006). This typically concerns systems for information sharing (Van Bommel, 2011) and collaborative efforts for knowledge development (e.g. Young and Kielkiewicz-Young, 2001; Lamming and Hampson, 1996). However, few studies go in-depth into how such learning processes unfold, and rarely consider the role of the network context (Miemczyk *et al.*, 2012; Hojmosse and Adrien-Kirby, 2012; Carter and Liane Easton, 2011; Walker *et al.*, 2008). Thus, while learning and knowledge development are considered key aspects of integrating social and environmental concerns in business operations, few investigations analyze the content of relationships in such efforts.

By using the IMP perspective, we find it intriguing to theorize CS from the standpoint that interaction indeed is a central business activity for firms, rather than a supplementary one. In this view, interaction enables adaptation and collective learning among the involved actors because of both confrontational and compromising processes. This makes the content, or substance (Håkansson and Waluszewski, 2002), of specific business relationships a key aspect of how CS initiatives can become an integrated part of existing or new business operations. Furthermore, interactive activities are key to understand the development of new relationships resulting from social and environmental concerns. With the ambition of gaining a deeper understanding of the role of interaction in such efforts, we ask the following research question:

RQ. How can we conceptualize the role of interaction for CS?

As part of introducing such a conceptualization, we also present a case study of an initiative for recycling plastic material in the Norwegian aquaculture industry. The case is used to both illustrate the relevance and potential of the proposed conceptualization, as well as to discuss the managerial challenges of business interaction being a central part of dealing with CS.

The remainder of the paper is organized as follows. Section 2 clarifies important conceptual boundaries and theoretical assumptions related to CS. Section 3 presents the IMP perspective and its implications for dealing with CS. We end this section by presenting a new typology for business interaction and the potential of coping with CS based on the actors, resources and activities (ARA) model. In Section 4, we give an account of the data collection and the case study approach connected to the case for plastic waste recycling.

Next, in Section 5, we present the empirical findings and discuss them by applying the typology for interaction. Finally, Section 6 returns to the research question by pinpointing some theoretical as well as managerial dilemmas encountered through the case study, and how the conceptualization can be developed further.

2. Clarifying conceptual boundaries and knowledge gaps

Before we can conceptualize the role of interaction for CS, we need to clarify theoretical boundary conditions. Thus, this section discusses fundamental aspects of CS as a construct, challenges the theoretical underpinnings of current debates and identifies related knowledge gaps.

2.1 Positioning in a blurred conceptual landscape

Before we explore how CS can be applied for the purpose of this paper, it is necessary to touch upon the related concept of “corporate social responsibility” (CSR). CSR has been discussed actively by scholars since the 1950s (Carroll, 1999), and emphasis has been put on the activities companies undertake in the social and environmental domains, going beyond legal requirements. Dahlsrud (2008) analyzes 37 definitions of CSR and finds that the concept mainly deals with the dimensions of stakeholder, social, economic and voluntariness, while the environmental dimension is less prominent in explicit definitions.

In recent debates, there are those who use CSR and CS as interchangeable umbrella concepts (e.g. Kudlak and Low, 2015; Strand *et al.*, 2015), and those who emphasize fundamental differences between the concepts (e.g. Hahn, Figge, Aragón-Correa and Sharma, 2017; Bansal and Song, 2017). As recommended by Montiel (2008), a certain level of pragmatism and flexibility is necessary when pursuing a common goal, that is advancing social, environmental and economic values in a holistic manner. This is in line with the approach of Strand *et al.* (2015, p. 2), who argue that CSR and CS are umbrella constructs that contain expressions such as “corporate citizenship” (Matten and Crane, 2005), “business ethics” (Bowie, 1999), “stakeholder engagement” (Freeman, 2010), “stewardship” (Davis *et al.*, 1997), “triple bottom line” (Elkington, 1997) and “creating shared value” (Porter and Kramer, 2011). However, in this paper we focus on CS as the fundamental concept for two main reasons.

First, and most importantly, the concept of CS contains an inherent ontological difference compared to, for example, CSR. This paper’s position is that the physical reality, i.e. material and energy flows, must be included as boundary conditions in scientific analysis of business operations. This adheres to the CS concept because while CSR can be understood as a social construct based on inter-subjective negotiations in a certain context (Dahlsrud, 2008), CS is influenced by a realist tradition where environmental and physical limitations of the planet are seen as fundamental for knowledge debates and scientific analysis (Bansal and Song, 2017; Whiteman *et al.*, 2013). Second, the CS concept resonates well with the emerging research agenda concerning the sustainable development goals adopted by the United Nations (UN, 2016). We believe these 17 goals will act as frame conditions for researching relationships between business and society in the years come. Mainstream management journals have already included the framework in recent calls for empirical research (Howard-Grenville *et al.*, 2017).

In essence, our contribution adheres to principles of “sustainable development” (SD) stemming from the publication, “Our Common Future” (WCED, 1987). Recent contributions in CS research (Williams *et al.*, 2017; Whiteman *et al.*, 2013) have emphasized the systemic nature by pointing to the ecological context of inter-organizational networks and business operations in general. This aligns with the seminal contribution of “planetary boundaries” (Rockström *et al.*, 2009), which Griggs *et al.* (2013) used to refine the definition of SD: “development that meets the needs of the present while safeguarding Earth’s life-support

system, on which the welfare of current and future generations depends” (p. 306). This definition establishes an ontological core of how the concept of CS should be interpreted, by putting environmental concerns at its center.

2.2 Going beyond classical stakeholder theory

Applying the macro-oriented definition by Griggs *et al.* (2013) in an (inter-) organizational context implies a paradoxical setting (Hahn, Figge, Pinkse and Preuss, 2017). One core puzzle lies in the treatment of environmental concerns, such as ecosystem services (Costanza *et al.*, 1997), in micro-level analysis of firms and their networks. Another issue lies in understanding the tension between efficiency of individual organizations and the ability of socio-economic systems to absorb shocks (Hahn *et al.*, 2015). In other words, the leap from macro to micro creates a theoretical dilemma that must be resolved.

A common methodological and analytical simplification to address the micro-macro issue is to apply the concept of stakeholder by assuming that there are some groups or individuals that can legitimately serve interests of the planet and society at large (Vildåsen *et al.*, 2017; Mitchell *et al.*, 2016). Stakeholder is defined by Freeman (2010, p. 46) as: “any group or individual who can affect or is affected by the achievement of the organizations’ objectives.” For example, by following this theoretical view one can assume that non-profit organizations will represent social and environmental concerns in industrial networks when interacting with traditional companies.

The stakeholder perspective provides us with a conceptual tool that links firm level activities with their wider societal context. Indeed, as seen by Van Marrewijk’s (2003) definition of CS, a central theoretical premise concerns interactive activities between a company and its stakeholders. This suggests that the IMP approach would be popular in existing CS literature. However, the review by Johnsen *et al.* (2017) shows the contrary, indicating a great potential for inter-disciplinary debates and future research projects. There seem to be two main reasons for the lacking conceptual depth related to interaction and network approaches in CS literature.

First, stakeholder theory tends to treat relationships from the perspective of the focal firm. This is linked to the managerial scope, i.e. how to prescribe decisions and actions related to social and environmental concerns that enhance organizational performance (Orlitzky *et al.*, 2003; Clarkson, 1995), meaning that stakeholders other than the managers are viewed as something to be “managed.” Conceptually, this leads to a focus on direct relationships, as opposed to the IMP approach where the focal firm is not assumed to be at the center of the network (Johnsen *et al.*, 2017; Håkansson and Snehota, 1995).

The second reason for limited focus on networks and interactions in CS is that stakeholder theory has developed in the context of strategic management since Freeman’s (1984) influential book *Strategic Management: A stakeholder Approach*. Its reissue shows its great popularity among management scholars (Freeman, 2010). Interestingly, “interacting with stakeholders” is discussed and Freeman argues, “The bottom line for stakeholder management has to be the set of transactions that managers in organizations have with stakeholders” (p. 69). A transactional view indicates yet another theoretical limitation as seen from the IMP perspective. This view is based on firms primarily acting opportunistically with their own self-interests in mind. Relationships, therefore, need to be managed mainly through formal contracts. In addition, focus is placed on single transactions rather than on the potential long-term benefits of relationships.

2.3 The need for an interactive approach

The definition by Van Marrewijk (2003) uses the phrase “demonstrating the inclusion of social and environmental concerns in business operations and in interactions with stakeholders,”

as a qualitative criteria for company activities that are within the CS scope. This opens up the debate regarding ambition levels and which stakeholders are taken into account.

Indeed, navigating between multiple values and stakeholder concerns is seen as a fundamental problem in the emerging literature streams on “tensions” (Van Der Byl and Slawinski, 2015) and “paradoxes” (Hahn, Figge, Pinkse and Preuss, 2017) in CS research. Similar debates can be found in classical literature on stakeholder theory (e.g. Mitchell *et al.*, 1997), where it is argued that social and environmental concerns tend to become “salient” if they are represented by stakeholders with certain features, such as power. This means the content and dynamics of specific firm-stakeholder relationships play a decisive role.

Early CS studies conceptualized firm-stakeholder relationships as an intangible resource that a focal firm possesses. Hart (1995, p. 992) established the construct of “stakeholder integration,” which was later refined through empirical research as the ability “[...] to establish trust-based collaborative relationships with a wide variety of stakeholders, especially those with noneconomic goals” (Sharma and Vredenburg, 1998, p. 735). The notion of collaborative relationships has received increasing attention recently through terms such as “creating shared value” (Porter and Kramer, 2011), and “cooperative advantage” (Strand and Freeman, 2015). Interestingly, this reframes the debate away from the classical perspective of competitive advantage and optimization of financial performance.

Relevant examples can also be found in SCM literature. A variety of studies focus on how to achieve more socially and environmentally responsible supply chains. Several studies state that it requires both “closer” (i.e. more intense collaboration) and “wider” relationships (i.e. collaboration regarding new processes), as well as information sharing further upstream and downstream (Mollenkopf *et al.*, 2010; Seuring and Müller, 2008; Vermeulen and Ras, 2006).

Tensions linked to CS, especially concerning what it means to implement it across a number of interrelated organizations, increase the need for knowledge sharing. As the required knowledge is mainly related to problem solving, this in turn creates a need for coordinating efforts among actors. Furthermore, as identified in several literature reviews, such collaborative activities should be informal rather than formal, and deep rather than superficial or at arm’s length (Rizzi *et al.*, 2013; Hoejmose and Adrien-Kirby, 2012; Solér *et al.*, 2010; Kumar and Malegeant, 2006). Lamming and Hampson (1996) argue that the goal is to achieve mutually favorable learning and teaching conditions, as well as developing new knowledge and ways of working based on collaboration.

The general state of the current literature is that few studies go into depth of how such collaborations unfold, and more precisely, that they do not analyze the specific interaction patterns they entail among firms and other types of organizations. As stated by Johnsen *et al.* (2017, p. 11), the dominant stakeholder theories have largely disregarded “[...] the mechanisms of interaction among actors [...]” and “[...] in reality have little to say about relationship management [...]” Thus, while existing literature on CS, both conceptual and empirical, calls for a more collaboration and network oriented view (e.g. Vermeulen and Witjes, 2016), the theoretical underpinnings of this literature are not well equipped to perform analysis on interactive phenomena in the context of CS.

3. Toward an IMP-grounded conceptualization

This section presents the first step toward a conceptualization of “interactive CS,” substantiating the definition given by Van Marrewijk (2003). The goal is to clarify the role of interactive relationships as part of dealing with social and environmental concerns.

3.1 *Placing an IMP lens on CS*

While not a central theme in IMP (see Johnsen *et al.*, 2017), there are several examples of studies investigating CS as part of coping with change in industrial networks (e.g. Crespín-Mazet and Dontenwill, 2012; Baraldi *et al.*, 2011; Andersson and Sweet, 2002).

From the perspective that firms are interdependent, these studies investigate what it means to implement change toward increased CS in terms of developing new and existing business relationships.

The assumption that important business relationships contain a number of interconnected resources and activities that have been shaped in relation to each other over time has particular implications for implementing CS. As with other types of changes, it means that several parties need to adapt to each other and combine their knowledge and technologies across firm boundaries (e.g. Håkansson and Waluszewski, 2002). It also reflects that not all parties might be willing to do so because of the “heaviness” of earlier investments. Furthermore, the connectedness of business relationships indicates a specific type of complexity when managing change; any changes that are made in one business relationship will affect other relationships directly as well as indirectly (Håkansson and Johanson, 1992). In general, previous studies tend to show that established business networks that initiate change toward increased CS will often appear quite different after such change is implemented.

Baraldi *et al.* (2011, p. 840) suggest that particular actors can be direct driving forces for others to work in more CS-oriented ways: “[...] the initiative of certain actors is important to induce other actors to combine their resources in new ways to devise new technical solutions, as well as to identify replicable and economically feasible ones.” Crespín-Mazet and Döntenwill (2012) inform us that CS practices require the individual firm to involve other types of actors than classical business organizations, for example non-governmental organizations (NGOs). They go on to state that collaboration with non-business actors is “a key success factor to develop the firm’s resources and legitimacy in sustainable development” (Crespín-Mazet and Döntenwill, 2012, p. 208). Another example is a case study by Andersson and Sweet (2002), who analyze a food supply network with both loose and tight couplings in which the initiating firm needs to manage these existing couplings (relationships) in different ways. They state that “[...] in order to change, i.e. implement a sustainable system for recycling, firms will need to build on, and adapt to, already existing patterns of bonds and relationships. It can also mean that new actor bonds and relationships will be established in the change process.” (p. 467). In essence, Andersson and Sweet (2002) contribute with a conceptual foundation for approaching the issue of introducing CS in an existing business network.

The conceptual foundation is based on stability and change being simultaneous states in the network during such initiatives, which in turn creates tensions that the involved firms need to handle. By focusing on the changing roles and positions that the involved actors adopted during the different phases of the recycling initiative, the authors conclude that any approach considering management of CS initiatives needs to pay attention to three main issues. These are: the tensions, conflicts and contradictions of requirements that any initiating firm needs to handle; that firms (to be able to alter their position in the network) are dependent on and must relate to both loose and tight couplings in the network, as well as direct and indirect relationships in order to identify new and beneficial connections within the network; and as relationships and relationship configurations change over time, the approach toward separate relationships in terms of exercise of power and conflict handling must also change.

From an IMP view, any initiative or change toward increased CS will be greatly affected by existing business relationships and the earlier adaptations made in these relationships over time. However, such initiatives also tend to create changes to these business relationships as well as require new ones established. In this paper, we strive for a better understanding of these dynamics by attempting to conceptualize the relation between the way interaction takes place in business relationships and achieving increased CS. Next, we will outline the underpinnings of the ARA model and present a typology of interaction that we use as a way to relate types of interaction to the potential of coping with changes toward increased CS.

3.2 *The first step: a typology framework for interactive CS*

The ARA model captures both the content and interrelatedness of business relationships through and among three dimensions – Actors, Resources and Activities (Håkansson *et al.*, 2009). Business relationships are conceptualized as having three layers in which interdependencies are formed over time through mutual adaptations. Resource ties represent both material and immaterial resource combinations. This can for instance relate to features in products and production processes being co-developed or particular knowledge combinations being made between parties. Activity links represent efforts by firms to create more efficient inter-firm operations. For instance, mutual advantages can be achieved by linking the transportation services of one firm to the production processes of another. Relationships also have a social dimension in that they, over time, create actor bonds between counterparts regarding the attitudes and behaviors toward each other (e.g. Håkansson and Snehota, 1995; Håkansson and Johanson; 1992; Håkansson, 1987).

It should be noted that what constitutes an actor is related to how it affects any particular relationship or network, which can represent either business or non-business objectives and incentives (Crespin-Mazet and Dontenwill, 2012). Thus, in relation to our research objective, the framework does not only represent business actors, but also acknowledges the influence of non-business actors (i.e. various forms of stakeholders that can have a direct or indirect impact). In addition, the interrelatedness of business relationships suggests that changes to the ties, links or bonds of one relationship will have direct and indirect effects on other business relationships (including relationships to non-business actors) of the involved parties.

In analyzing the specific content of interaction, Håkansson and Prenkert (2004) and Cantillon (2010) develop typologies based on different levels of interaction in terms of changes that are made on each side of one or several relationships over time. The analytic assumption is that adaptation and learning among counterparts depends on the level of interaction between the actors involved. The interaction needs to have specific content or features to result in any substantial learning or change. These features are reflected in the changes that have been made to the ties, links and bonds of the specific relationships and which have brought specific knowledge to the involved parties. For the purpose of this paper, we single out three such interaction categories also used by Håkansson and Ingemansson (2011) listed below.

While the original typology developed by Håkansson and Prenkert (2004) contains more categories, we find that the following three are adequate to depict the relation between type of interaction and implementation of change toward CS. As our basis for relating interaction to CS presupposes that some form of substantial interaction has taken place, we only use the categories that presuppose an inter-organizational relationship containing adaptations. Therefore, developing the typology from how it is used by Håkansson and Ingemansson (2011), we have removed the first two categories – pure exchange and minor social exchange. In addition, while the original typology focused on the resource dimension we use all three layers of the ARA model to outline which type of change has taken place: in actor bonds, resource ties and activity links.

Technical exchange relates to a situation where adaptation takes place as an effect of how the exchanged object, such as a product, is to be related to the buying or selling party. There may be some adaptation needed in terms of how it fits into the existing operations of either party, and some minor changes can take place in related resources and activities. However, this occurs as part of internal changes in either party, and not necessarily through interactive learning situations due to joint changes. Therefore, it can only entail limited changes in either bonds, ties or links as an effect of one party implementing change.

Cooperation, on the other hand, entails joint projects and mutual adaptations in the sense that both parties will need to learn and adapt specific resources and activities in relation to each other to solve a problem. This type of exchange is based on openness to knowledge exchange and adaptation. As a result, both parties can engage in problem solving through

such interaction that would not be possible by working separately. In this category, changes are likely made in all three relationship dimensions: bonds, ties and links.

Networking contains the same interaction features as those of “Cooperation,” but also requires the involvement of (at least) one third party. Here, several parties have interests in solving the same issue and engage in mutual learning and adaptation processes. This causes the combination and confrontation of several actor-, resource- and activity interfaces, which in turn increases the level of complexity in the interaction and, thus, in the learning and adaptation processes.

We use these interaction categories to develop a typology for the interactive dimension of CS (see Table I). Higher levels of adaptation and learning between a firm and its stakeholders imply higher potential for coping with changes toward increased CS. By only involving limited elements of interaction, technical exchange results in limited capacity to enforce changes toward increased CS within a broader network. Cooperation denotes a more encompassing type of interaction as it involves adaptation and learning in relation to several layers. As such, it increases the commitment between parties and incentives to adapt to new

	Actor bonds	Resources ties	Activity links
Interaction elements: Technical exchange	Know how to work together in relation to a specific resource or activity	Minor changes in facilities and business units concerning specific resource. Often one-sided	Minor changes in related activities, often one-sided
Limited CS	The firm-stakeholder relationship is based on short-term needs, and flexibility is maintained. Third-party organizations can be relevant in the adaptation processes, but only indirectly		
Interaction elements: Cooperation	Know how to adapt to each other in relation to different types of resources and activities	Mutual changes in several types of resources	Mutual changes in joint and related activities
Potential CS	The firm-stakeholder relationship goes beyond short-term needs of individual actors. Both parties make a clear commitment to contribute towards mutual and long-term objectives. Third-party organizations can be relevant in the adaptation processes, but only indirectly		
Interaction elements: Networking	Know how to systematically relate to several parties in co-managing resources and activities	Mutual changes in relation to several parties in several types of resources	Mutual changes in relation to several parties in joint and related activities
Substantial CS	Third-parties are an integrated part of the firm-stakeholder relationship and decision-making processes are based on contributions from coalitions of actors. Employees from more than two organizations work together in cross-functional groups		

Table I.
A typology
framework for
interactive CS

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situations and requirements. However, it still only involves mainly two parties. Networking, on the other hand, involves (at least) three parties that learn collectively from making changes. This denotes a greater capacity to enforce changes within a broader network collectively.

However, the single firm will be part of a variation of these interaction categories. As also noted by Andersson and Sweet (2002), to be able to change its position within the broader network as well as to influence the position of others, the firm will need to make use of these variations in terms of tight and loose couplings as well as direct and indirect relationships. In addition, the dynamic nature of business relationships implies that relationships can develop from a “lower” category to a “higher” interaction category over time.

Limited CS denotes a situation where a firm acknowledges a specific stakeholder. The organizations interact in relation to a specific resource or activity, for example the equipment needed in a production process. Small investments in terms of resources can be made, but flexibility is maintained. Short-term orientation limits the creation of actor bonds, resource ties and activity links. Third-party organizations are considered only indirectly, for example when a customer refers to environmental standards or a governmental agency’s regulations.

Potential CS is founded on an established relationship between a firm and a specific stakeholder. Both organizations adapt to each other’s needs, and there is mutual understanding of long-term development of resource ties and activity links. Several actors from different functions of the two organizations interact on a regular basis. This increases the likelihood that third-party organizations are considered, for example, representatives from sales and marketing bring the viewpoints of NGOs into decision-making processes.

Substantial CS reflects a situation of decision-making processes that are based on “coalitions” of actors representing different perspectives. This process happens over time, and more than two formal organizations work together in cross-functional groups. The incentives for passive stakeholders to become contributing actors in the network change over time based on adapted activity links and resource ties. For instance, willingness to invest in environmentally-friendly technology can change based on improved or new business relationships.

We propose that with this typology, it is possible to analyze the interactive processes of CS as specific relationships in the context of industrial networks. How this can be achieved is further elaborated in the data collection section, as well as practiced through the analysis of the case study in the Norwegian aquaculture industry.

4. Methodological considerations

The conceptualization presented in this paper draws on a case study of a developing supply network in the Norwegian aquaculture sector, and particularly in the salmon farming industry. The main actor in this case is a plastic components producer, *Plasto*, which aims to realize the potential of recycled material in its production. Such strategy represents an extended producer responsibility, which implies interaction and collaboration with several actors in relevant business networks. The case is structured as an analysis of three main actors (see Table II): *AKVA group* is a producer of fish farming equipment, *Plasto* is AKVA group’s main supplier of plastic components, and *Containerservice* supplies recycled plastic materials to *Plasto*.

The context of the research is a four-year academia-industry collaboration project concerning shared value creation and sustainable innovation in Norwegian industry,

Table II.
Main actors in
the case study

Actor	Main role in the case study	Phase I/II of the case study
Plasto	Produces plastic components	Phases I and II
AKVA group	Produces equipment for the fish farming industry	Phases I and II
Containerservice	Collects and recycles plastic materials	Phase II

financed 80 percent by the Norwegian Research Council. Plasto is a core partner and provides approximately 5 percent of the funding. As part of the project, the CEO of Plasto presented the idea of using recycled material at the kick-off meeting in May 2014. This is an idea that over more than three years (until today's date October 2017) have meant an interesting development for the firm and its existing and new partners about the formation of a "closed loop" for producing plastic components. It is this development, in terms of the interactions between the involved firms, which forms the basis for our case study.

Our data gathering started in May 2014 and continued until October 2017. It is based on 22 interviews with key managers and staff connected to the main events of the case, follow-up e-mail correspondence and 16 of the most significant observations made during company visits, project meetings and industry seminars/conferences, see details in the appendix. Moreover, secondary material, such as formal project documentation, was used for triangulation purposes. The data were collected by the authors of the paper, as well as two master students with a related project. The case study developed across two phases, as an additional actor, the firm Containerservice, became involved in September 2016 (see Table II).

The first phase of the case study consisted of semi-structured interviews and observations of Plasto and AKVA group. The purpose was to understand the relationship between the two organizations and how their collaboration had developed in the past, and continued to develop during the study as an effect of the initiative for extended producer responsibility. This involved mapping the initiation and development of bonds, ties and links in production and product development efforts both before and during the initiative for extended producer responsibility. There were also informal discussions between the authors and company representatives regarding the strategy of recycling and the opportunities and challenges involved.

The second phase was initiated as Containerservice, an additional firm, became involved in the initiative. This process started in September 2016 when Plasto got to know the activities of Containerservice through networking at a circular economy conference. It was then decided to allocate master students to the research process, supervised by the authors of this paper. The second phase of the research process was dedicated to continuing the investigation of the relationship between Plasto and AKVA group, as well as the additional relationship with Containerservice and the contribution of this actor to the ongoing development of a "closed loop" supply chain.

The authors of this paper have been discussion partners during the investigation of the ongoing process where Plasto is engaging in a new business strategy in collaboration with two other actors, which means that (inter)-subjective values and interpretations are an inherent part of the knowledge generation. This resonates with the qualitative and exploratory research design chosen (Alvesson and Sköldbberg, 2009), along with a transdisciplinary and collaborative approach that has become common in recent debates on CS (e.g. Vermeulen and Witjes, 2016; Schaltegger *et al.*, 2013).

The study adheres to a methodological approach referred to as systematic combining (Dubois and Gadde, 2002). This implies an abductive logic in which the theoretical constructs and the interpretation of empirical findings co-develop. In this case, the typology framework was developed as data collection was still carried out, and, as such, the two processes supported each other. In turn, the conceptual framework in this paper enables external validity (Yin, 2013) as it links the specific findings of the case study to general theory. In the next section, the case findings are laid out.

5. Empirical findings and analysis

During the last few years, the aquaculture industry has experienced increased governmental pressure on producer responsibility for take-back solutions of fish farming equipment. In early 2014, Plasto, a small producer of plastic components, presented the idea of "closing the loop" to their research partners. As of October 2017, the idea has developed

into formal project initiatives with their most important customer, AKVA group, along with a supplier of recycled plastic materials, Containerservice. Moreover, Plasto's management group has established the goal to use 50 percent recycled materials by the end of 2020 for the products supplied to the aquaculture industry.

With the ambition of creating a "closed loop" for product components in collaboration with two other firms, Plasto is a pioneer in trying to strengthen environmental awareness in the aquaculture industry. If successful, it has the potential to re-shape the supply chain for production and use of fish farming equipment in Norway as well as in other countries. The following sections detail how the business relationship between Plasto and AKVA group has developed through interactive processes over several years, as well as how a third-party organization eventually became involved in the recycling initiative.

5.1 The initiation and development of an important customer relationship

The relationship between Plasto and AKVA group was initiated in 2008 when representatives from the two firms met at an aquaculture convention in Norway. The two Norwegian-owned firms found common ground in that AKVA group, a world-leading supplier of fish farming equipment, needed a supplier of high-end product components, and that Plasto was searching for new customers in the aquaculture sector. In 2009, they initiated a relationship based on the development and production of camera casings that were to hold camera equipment on the sea-based fish farming cages produced by AKVA group. This made Plasto a supplier of product components for the fish farming equipment produced by AKVA group, in turn sold to the global fish farming industry.

Before 2009, AKVA group had outsourced their plastic component production to China. Their relationships with the Chinese suppliers were functioning quite poorly, however, and there were trust-issues related to the suppliers having the ability to deliver the products in compliance with agreed terms. The advantages of using Plasto as a supplier appeared to be many. Being a small firm with a core competence in combining sophisticated production technology in injection molding with basic and easy accessed raw materials, AKVA group saw the potential in using the production capabilities of Plasto to increase the quality of their final products – the sea-based fish farming cages.

Besides their own production capabilities, Plasto was also part of an extensive R&D network involving several other firms, governmental actors and research institutions. Within which, Plasto was collaborating through several different R&D projects and product development efforts. This was an important resource for AKVA group, and when the development of the camera casings turned out to save substantial costs, Plasto was appointed main supplier of plastic components for the fish farming cages including several key components. For instance, the essential brackets that hold the cylinder-shaped cages together (with a maximum girth of 200 m), and walkways used by the fish farmers operating the cages out at rough seas.

The relationship between AKVA group and Plasto is described by both parties as a close partnership based on trust and transparency. With the decision to engage in collaboration with Plasto over several components of the cages, came an eight-year production contract. This was the longest-term contract that AKVA group had ever signed with a supplier. Among several formalities, the contract also specified that the two parties should engage in open dialogue and work in collaboration as partners. Between 2009 and 2016, this resulted in the development of several new models of the brackets, key components not only for holding the cage construction together, but also designed to anchor the cages at sea.

Based on the increasingly sophisticated requests of AKVA group's customers, and governmental regulations regarding quality, the requirements for the cages and these components became higher. While fish farming customers during this time requested increasingly larger cages, and, consequently, larger brackets to hold them together, governmental regulations also required that cages should last for at least 20 years and provide a safe work

environment for the fish farming operators. These regulations required necessary quality certificates for AKVA group as an equipment supplier to the global fish farming market.

The new bracket models, weighing up to 100 kg, and thus representing the biggest products ever molded by Plasto, were developed through close cooperation between Plasto and AKVA group. This required extensive development of the production equipment at Plasto's facilities, joint purchasing trips by Plasto and AKVA group to Plasto's sub-suppliers of molds in China, and a close dialogue between the R&D department at AKVA group and the engineers at Plasto.

5.2 *Recycled material as a CS approach*

Due to the political pressure placed on the aquaculture industry to take increased environmental responsibility, both AKVA group and Plasto recognized the likelihood of future regulations in terms of recycling requirements. Moreover, the possibility of alternative sourcing possibilities represented an important incentive. The idea to use recycled material for product components was therefore communicated by Plasto, on several occasions, at research conferences and seminars involving academics and industry participants.

Through networking at a conference in September 2016, Plasto was introduced to the company Containerservice, which specializes in collecting plastics from fish farming cages. Their ambition is to become a central actor in recycling as well. This demands competence in cleaning technology, for example filtering of melted plastic components. One of Containerservice's latest investments is a production line enabling them to recycle in-house. Their previous technology was based on the grinding of plastic material only, with the further handling completed by other firms. With their new solution based on filter technology, they expand their product scope to reach new markets. Containerservice has stated that their main priorities are access to plastic material and to satisfy what they perceive as an increasing market demand. Moreover, they are looking for long-term customers to secure stable quantities of orders.

The relationship between Plasto and Containerservice reflects an initiation stage. An informal Skype meeting, facilitated by a close partner of AKVA group that was present at the conference, was the first step. A concrete activity was planned to test the quality of Containerservice's products. This was conducted in June 2017 with satisfactory results, the envisioned cost savings for Plasto are calculated to be as much as 30 percent. Moreover, they have collaborated on a funding application that was submitted in September 2017. This was sent to Innovation Norway, a governmental agency that supports different kinds of business development with the overall aim of increased competitiveness. The agency emphasizes the principles of SD, and promotes "interaction between enterprises, knowledge communities, and R&D institutions" (IN, 2017). If the project is funded, Containerservice can scale-up their recent technology, while Plasto can experiment with recycling solutions that fit their existing machinery and production process.

The role of AKVA group in this recycling initiative has, so far, only been indirect. They are, however, engaged in a new research project managed and owned by Plasto and financed by the Norwegian research council, a governmental actor like Innovation Norway. This is a four-year project that had its kick-off meeting in November 2016. The goal is to develop production technology that can produce larger plastic brackets, which in turn will enable larger fish farming cages. This R&D activity is based on the close cooperation between the R&D facilities at a subsidiary of AKVA group and the engineers at Plasto. One of the project work packages will focus on the economic and environmental potential of recycled plastics.

5.3 *The opportunities and challenges of "closing the loop"*

Plasto's project initiatives toward both AKVA group and Containerservice are based on the idea of a closed loop, which enables the possibility of using plastic material from existing products as a resource in the production of new products. Figure 1 illustrates the logic of

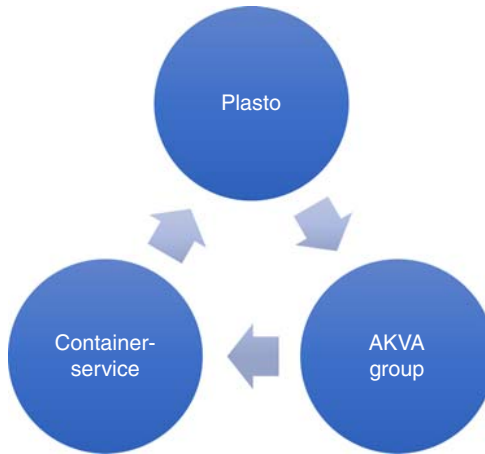


Figure 1.
A “closed loop”
business model of
plastic components

introducing Containerservice in the supply chain as a way of handling discarded plastic products from fish farming cages produced by AKVA group. The key element is to develop the production technology so that Plasto can use the recycled material in the production of new equipment.

The aim is to be able to collect the cages and reuse the material to produce new ones using so called secondary material. This in turn would require new production technology. A first step could be to develop this idea for components that are not as strictly regulated as the brackets, such as the walkways. Then, on a long-term basis, the production method could be developed further for the components with stricter regulation. Using secondary material, i.e. plastics that come from discarded fish farming equipment, would not only decrease the environmental effect, but also lower the material costs for both Plasto and AKVA group.

Using secondary material raises several challenges and implicates different requirements of the actors involved. To AKVA group, dependable material properties as well as cost benefits are key needs to be fulfilled. For the brackets to satisfy safety requirements and the regulated demands of durability (20 years), only dependable raw material can be used. Secondary material that is ground down can still contain remnants of sand, seashells and small rocks, and the properties of the material are compromised: strength and durability become more unpredictable. Also, if there are no substantial cost benefits, AKVA group is not prepared to make any investments in new material sources.

Plasto is mainly concerned with their production technology’s ability to handle the impurities of secondary material, which must be seen in relation to AKVA group’s quality requirements.

Moreover, Plasto’s ideal future scenario is to become a self-reliant supplier through the development of technology and competence that can handle secondary materials directly. In other words, they would be able to utilize the discarded components from fish farms produced by AKVA group without the involvement of Containerservice. Containerservice has stated that the market demand is large, meaning that they are not dependent on Plasto as a customer, but that they see future collaboration as fruitful. At the current stage, both Plasto and Containerservice acknowledge their mutual interests and possibilities for learning, but are open about needs for flexibility.

A central strategy for all the actors is to use governmental support as means for risk reduction in R&D projects. Both Innovation Norway and the Norwegian Research Council

have proven to be central stakeholders in this regard. Overall, it becomes clear that the CS idea of “closing the loop” requires collaboration through the combination of resources and adjustment of activities between several actors. The following section analyzes these processes by using the new typology.

5.4 *Applying the typology*

The case describes three actors involved in a CS initiative, each organization representing a business model with economic value creation as a core need. The analysis is centered on Plasto as the initiator of the CS initiative, and this firm’s relationships with its most important customer and a key supplier. The typology framework in Table I is applied to describe core features of the relationships, and to classify the potential to cope with change toward increased CS, i.e. the level of CS realization.

Table III summarizes the core actors’ requirements in the context of the CS initiative. First, Plasto has the largest stake in the project based on their role as an initiator and risk taker. Second, some core interests of Plasto and AKVA group are aligned through their established customer-supplier relationship. Finally, the relationship between Plasto and Containerservice is characterized by complementary needs in the short run, but possible tensions in the longer run.

The next step concerns the CS typology found in Table I. To classify the realized CS in this context, we must analyze the bonds, ties and links that characterize the relationships. The logical starting point in this case is activity links, because they represent the foundation from which resource ties and actor bonds have developed.

The relationship between Plasto and Containerservice is grounded in their shared interest in the recycling of plastic material. As described earlier, they have recently adapted their production processes by quality testing. This implies that Plasto adjust their technology to test the products from Containerservice, i.e. some degree of developing resource ties. An important development is the recent application for funding to Innovation Norway, which can be seen as a driver for increased collaboration. However, the history of their relationship is short, social arenas are lacking, and only some social sentiments have developed so far between the organizations. Containerservice has also signaled limited dependency on Plasto’s resources, which indicates short-term orientation and flexibility. In general, limited learning has taken place and the relationship is characterized by technical exchange.

Although the relationship between Plasto and Containerservice is characterized by aligned CS objectives, the limited degree of adaptations that have taken place as of yet implies that this relationship is characterized by “Limited CS” according to the typology

Actors	Requirements in the context of the CS initiative
Plasto	Preparing for future regulations New sourcing alternatives Product quality
AKVA group	Dependable material properties Customer satisfaction Cost benefits
Containerservice	Access to plastics that fit their technology Meeting increasing market demand Long-term partners

Table III.
The actors
and their interests

IMP
12,1

framework (see Table IV). However, as we move on to discuss the relationship between Plasto and AKVA group, it will become clear that analyzing relationships without considering their network context provides limited insights into their CS potential. Rather, each relationship and its potential to contribute to increased CS must be viewed in the context of other relevant relationships.

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Analyzing the relationship between Plasto and AKVA group reveals that they have developed bonds, ties and links through an almost decade-old relationship. More specifically, they have linked their respective R&D activities and departments through concrete joint projects. This, in turn, has resulted in resource ties between several products and specific production technology. Overall, their relationship is characterized by long-term mutual adjustments. They have started to actively include the needs of third-parties, for instance in their recent R&D project, but cross-functional groups with more than two organizations are not fully established.

However, the relationship is mainly characterized by “traditional” business goals in terms of developing new technology and activities for the sake of satisfying customer demands and producing a wider variety of products. As such, the relationship is not based on or driven by CS objectives. Rather, when one party in the relationship (Plasto) introduces such goals, tensions arise as AKVA group is not driven by the same ambition. Nevertheless, both parties are involved in mutual project initiatives for taking greater environmental concern. In addition, it is because of this relationship that Plasto takes the CS initiative in the first place. Without the increasing demand from the customers of AKVA group for larger products (brackets), the long withstanding R&D cooperation and the production adjustments, the initiative in its present form would not have been possible.

Thus, in the context of the relationship between Plasto and Containerservice, and what this might bring in terms of a closed loop supply chain with AKVA group as a key customer and partner, the cooperative relationship between Plasto and AKVA group is denoted as “Potential CS” in the typology framework (see Table V).

Analysis indicates that the highest level of realized CS does not exist in any one single relationship. It is the existence and dependence of the two relationships that creates the potential of forming a “Substantial CS” initiative with several contributing parties. Interestingly enough, the relationships play different roles in supporting each other. The relationship between AKVA group and Plasto does not contain mutually expressed CS goals, but years of mutual adaptations form the foundation for achieving trust and

Table IV.
The technical exchange between Plasto and Containerservice classified as “Limited CS”

Limited CS	Actor bonds	Resources ties	Activity links
Plasto ↔ Containerservice	Actors in each organization have agreed to work together	Some adjustment in Plasto's production process	Quality testing of products. R&D initiatives have been made

Table V.
The cooperation between Plasto and AKVA group classified as “Potential CS”

Potential CS	Actor bonds	Resources ties	Activity links
Plasto ↔ AKVA group	Individuals from different functions work together on a regular basis Trust has developed between leading individuals	Resources are adapted based on the needs of both parties and technological opportunities R&D resources are shared with financial implications	Plasto's production processes are aligned with the product needs of AKVA group A joint R&D project is established

commitment, technology development and adapted activities between a supplier and one of its key customers. The relationship between Plasto and Containerservice, on the other hand, is based on aligned CS objectives but shows little adaptation yet.

Thus, while one relationship is driven by mutual CS objectives, the other is required to eventually realize them in terms of production technology and a “receiving end” of a customer and end-users. Due to its character, the latter relationship (between Plasto and AKVA group) also has the potential to develop into “Substantial CS” by inviting third-parties into their ongoing activities and resource development. For example, if Containerservice were to be invited into the recent R&D project, this would be the first step toward an active network where different actors would contribute to achieve common objectives.

Thus, our case indicates that for CS to become a realized activity, at least one substantial and long-term business relationship is needed for a network of relationships to develop. This relationship may, however, not be the one that drives the CS objectives as such. In a sense, the long-term relationship between Plasto and AKVA group, involving several resource ties between central R&D, product and production resources, as well as joint activities, here forms the basis for a potentially realized CS initiative. However, it is also clear that this cannot be achieved in isolation but requires the existence of other relationships, such as the one with Containerservice, which can provide a necessary service in the proposed closed loop and is part of formulating mutual CS goals.

As the case shows, non-business actors can also play a central role in “activating” or supporting CS initiatives in existing inter-firm relationships and initiate or legitimate new ones. This is illustrated by Innovation Norway, the governmental agency providing funding for specific CS initiatives and thus playing a pivotal role in providing an arena for both business and technology development, which Plasto uses to move forward with their emerging CS strategy.

Developing a network is challenging. It demands negotiation between the needs and expectations of the actors involved, especially in terms of risks and financial contributions. The case illustrates that these dynamics can be facilitated, and potentially overcome, if there are stable relationships in the network that continue to build on earlier investments in resource combinations and ongoing activities. At the same time, however, such relationships can also act as hindrances. This is demonstrated in the case where the relationship with AKVA group acts both as a prerequisite for the CS initiative to take place, as well as added skepticism to several of the elements of the initiative, which might not provide economic return instantly.

6. Discussion and conclusions

The role of interaction for CS is explicitly acknowledged in the popular definition of Van Marrewijk (2003), and this paper seeks to substantiate understanding of related phenomena. Fundamentally, we initiate a multi-disciplinary process by establishing a conceptual platform between two established research traditions. Such a debate takes place in a blurred landscape, since theoretical and epistemological dilemmas can be found in both IMP (De Boer and Andersen, 2016) and CS (Vildåsen *et al.*, 2017) literature. Thus, we hope to engage scholars in future research projects that will improve and refine our work.

In general, previous CS literature addresses firm-stakeholder relationships. However, there is a tendency to treat these as exogenous and static elements. As argued by Vermeulen and Witjes (2016), the “embedded nature” of CS is overlooked. Empirical phenomena are analyzed through the focal firm’s perspective – a weakness of classical stakeholder theory on which most CS literature is based – resulting in a static perception of other actors.

By taking the basic assumptions of the IMP perspective and building on the earlier work of Andersson and Sweet (2002), this paper contributes to the CS literature with a typology

framework that specifically addresses the content of firm-stakeholder relationships with regards to activity links, resource ties and actor bonds and its implications for coping with change toward CS. The typology suggests that based on existing links, ties and bonds, specific firms and relationships will have different capacities to induce change within a broader network. It also implies that as a basis for collective learning, adaptations taking place in several relationship dimensions and between more than two actors are a necessary condition for implementing substantial CS across supply networks. In relation to the research question, we pinpoint two theoretical implications.

First, while the stakeholder concept covers any individual or group affected by the actions of the firm (Freeman, 2010), from an IMP perspective an actor is an individual or organization that actively contributes in a relationship. This means that not all stakeholders are actors. For example, even though NGOs are arguably stakeholders in the recycling initiative of Plasto, no individuals or groups from such organizations are actors in the interactive activities. Thus, while much CS literature claims that non-business actors need to be part of CS initiatives and even often drive them, the typology helps reveal the ways different actors indeed are central to network changes. While a wide range of stakeholders might play a facilitating role in terms of providing funding, legitimacy or other types of resources, those actors that are part of the network through their adaptation of resources and activities in relation to each other over time represent a stronger capacity with which changes can be made.

Second, the role of the framework is to assess the potential and capacity to transition toward increased CS. Relationships based on substantial interaction have a higher potential for social and environmental improvements, compared to a setting based on technical exchange. However, the framework is not normative in the sense of indicating which activities are better than others in the context of CS. Rather it can be used to assess the basis on which change toward increased CS is taken, and the potential in specific and in sets of several relationships to implement such change within a broader network. Moreover, the typology can be used to pinpoint gaps between active actors and legitimate stakeholders such as NGOs, and thereby give important insights on the interactive challenges that emerge when firms implement CS strategies and approaches.

The delineation between actors and stakeholders, along with the notion of potential change, gives CS researchers several interesting avenues for further investigation. We believe this can be related to the emerging perspective in the field of CS that addresses fundamental tensions (Hahn, Figge, Pinkse and Preuss, 2017; Van Der Byl and Slawinski, 2015). This is based on the “theory of paradox” (Smith and Lewis, 2011), and posits CS as “[...] interrelated yet conflicting economic, environmental, and social concerns with the objective of achieving superior business contributions to sustainable development.” (Hahn, Figge, Pinkse and Preuss, 2017, p. 3). In our opinion, this perspective opens a debate on the tensions involved when passive stakeholders become actors, and which also represents a potential for change in terms of economic, environmental and social concerns.

The contribution of this paper to the ongoing CS debate is to provide a framework for understanding how tensions can be balanced and resolved by linking IMP concepts, i.e. ARA, to the emerging themes of collaboration (Strand and Freeman, 2015) and shared value (Porter and Kramer, 2011). As shown in the case, as part of making technical and organizational adaptations across firm boundaries, Plasto, AKVA group and Containerservice are learning about their different requirements and technologies. Not only are they learning about existing activities and resources, but also how they need to potentially be adapted in relation to each other. As such, over time they learn which changes are feasible and which are not.

Moreover, we identify that actors can make use of earlier investments in both technical and organizational adaptations. While the framework suggests that a higher level of interaction in terms of earlier adaptations and learning is positive for inducing change, it

also creates “heaviness” and inertia. Thus, firms need to find ways of making either minor improvements to existing resource and activity structures, or find new ways of combining resources and activities. The latter can be done either through forming new relationships or changing existing ones. This is shown in the case by the relationship between Plasto and Containerservice, which developed based on mutual interests in a supply chain structure. The initiation happened because existing supply relationships did not provide solutions that aligned with the requirements of a recycling initiative.

There is still more to learn about how interactive relationships between a firm and its stakeholders imply adaptation over time, and how this influences realized CS in terms of concrete resource and activity structures. For CS researchers addressing tensions and paradoxes, and in the context of the framework developed in this paper, the dynamic process of developing a relationship from “cooperation” to “networking” emerges as a relevant topic for further research. It is especially interesting with longitudinal case studies that explore the role of third-parties in established relationships, and especially how non-profit organizations influence classical processes of industrial networks. The interactive nature of CS is in literary infancy, and we hope our contribution engages scholars in upcoming debates.

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Appendix. Details on data collection

The data gathering was conducted from May 2014 to October 2017, and is based on interviews, e-mail correspondence and observations. Secondary sources such as formal project descriptions have also been analyzed.

The context of the research presented in this paper is the project called "Sustainable Innovation and Shared Value Creation in Norwegian Industry", see <https://sisvi.no/>. Plasto is an industry partner in this project, which means that there have been ongoing research activities throughout the period.

Tables AI and AII presents details on 22 interviews and the 16 most significant observations, respectively.

Date	Type	Interviewees	Comment
December 10, 2014	Open ended	Project manager and engineer	Two separate interviews with Plasto representatives
February 8, 2015	Open ended	Purchasing manager	Plasto representative
April 16, 2015	Open ended	CEO, Project manager, R&D manager, and Engineer	Four separate interviews with Plasto representatives
October 27, 2015	Open ended	Purchasing manager and R&D Manager	Two separate interviews with AKVA group representatives
February 19, 2016	Open ended	Project manager	Plasto representative
March 7, 2016	Open ended	Technical sales manager	Representative of AKVA group subsidiary
June 10, 2016	Open ended	Project manager	Plasto representative
March 9, 2016	Open ended	R&D manager	Representative of AKVA group subsidiary
September 19, 2016	Open ended	CEO, Project manager, Engineer and CFO	Four separate interviews with Plasto representatives
October 27, 2016	Semi-structured	Project manager	Plasto representative; transcriptions available
November 8, 2016	Semi-structured	CEO	Containerservice representative; transcriptions available
November 10, 2016	Semi-structured	Business developer	AKVA group representative; transcriptions available
November 22, 2016	Semi-structured	Project manager	Plasto representative; transcriptions available
April 5, 2017	Semi-structured	Project manager	Plasto representative; written summary available

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Table AI.
Details on interviews

Table AII.
Details on
observations of Plasto

Date	Role of the researcher(s)	Company actors at Plasto	Comment
May 28, 2014	Passive participant	CEO	First formal meeting in the project; written minutes available
November 28, 2014	Passive participant	CEO Project manager	First research seminar in the project; written summary and company slides available
March 19, 2015	Passive participant	R&D manager	Company presentation in research seminar; slides available
May 21, 2015	Passive participant	Project manager	Discussions at research seminar; written summary available
September 28, 2015	Passive participant	Project manager COO	Research seminar at Plasto's facilities; written summary and company slides available
February 22, 2016	Passive participant	R&D manager engineer	Interactive workshop; written summary and company slides available
March 8, 2016	Passive participant	CEO	Company presentation at research seminar
May 18, 2016	Passive participant	Project manager	Discussions at research seminar; written summary available
September 2, 2016	Active participant	Project manager	Company presentations of Plasto and Nofir, networking was facilitated by researchers
September 23, 2016	Active participant	Project manager	Joint presentation and discussion at an industrial networking event
December 16, 2016	Active participant	Project manager	Presentation and group discussions at an industrial networking event
March 24, 2017	Active participant	Project manager	Interactive workshop; written summary and company slides available
May 23, 2017	Passive participant	Project manager	Presentation and discussions at an industrial networking event
June 2, 2017	Active participant	Management group	Interactive workshop; written summary available
June 8, 2017	Passive participant	Project manager	Presentation and group discussions at an industrial networking event
September 28, 2017	Passive participant	Project manager	Discussions at research seminar; written summary and company slides available

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Clarifying the epistemology of corporate sustainability

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Clarifying the Epistemology of Corporate Sustainability

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ABSTRACT

Business research is placing increasing focus on the relationship between the natural environment and the political concept of sustainable development. Within this nexus, one area, labelled 'Corporate Sustainability', emphasizes the interactions between economic, environmental and social values. The need to consider multiple values has contributed to a blur in the conceptual landscape. This is partly due to the fact that authors often address epistemological challenges on an implicit level. Moreover, hidden ideologies, e.g. the profit maximization paradigm, can explain the conceptual obscurity.

The contribution of this article is twofold. Firstly, a conceptual framework is developed based on the dichotomy of positivism and constructivism. A relation is established between these epistemological positions and the analytic treatment of environmental and social values. The framework can be applied to increase transparency on epistemological challenges and thereby strengthening construct validity in the field. Secondly, an analysis of the most influential literature from the last 50 years shows that there is a trend of clustering theoretical positions and value constructs without any critical awareness of their philosophical assumptions. The authors hope that acknowledgement of a multi-paradigmatic approach can help to clarify the epistemology of the research area by establishing pluralism as an explicit position.

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1. Introduction

An ongoing debate in business research challenges the traditional view of economics, based on a linear model of resource consumption, with the circular system thinking of ecology (Spangenberg, 2015). Furthermore, the political concept of sustainable development represents increasing societal expectations for business conduct (Baumgartner and Ebner, 2010), and the United Nation's new Sustainable Development Goals (SDGs) are planned to act as frame conditions for the global economy in the years to come (Griggs et al., 2013).

A specific stream of literature, called 'Corporate Sustainability' (CS), is especially interesting in the debate between traditional economics and a systemic ecological perspective since it deals directly with the role of business, i.e. economic value creation, when it comes to ecological and social concerns. This calls for a multi-paradigmatic perspective (Bansal and Hoffman, 2012, p. 19), which poses epistemological challenges related to how to address values and ideologies (Söderbaum, 1999). The seminal work by Gladwin et al. (1995) assert that traditional business research suffers from an 'epistemological crisis' because the natural world is excluded in the study of human organizations. When

investigating contemporary debates, several scholars point to similar fundamental dilemmas when it comes to the level of analysis (Hahn et al., 2015), along with the choice of value constructs (Van der Byl and Slawinski, 2015) in the area of CS.

On one hand, authors such as Whiteman et al. (2013) and Costanza et al. (1997) stress that the analytical premises of CS are given by environmental science, which assumes that reality is objective. On the other hand, researchers must consider inter-subjective processes such as human decision-making, and thus acknowledge factors related to values (Hemingway and Maclagan, 2004) and power (Mitchell et al., 1997) in the generation of knowledge. Because of this dilemma, and since values are often related to ideologies, this article seeks to investigate epistemological challenges in CS by applying the positions of *positivism*¹ and *constructivism* found in the philosophy of science (Robson, 2011).

This article engages in the ongoing debate in *Ecological Economics* regarding the epistemology of 'sustainability economics' (see Söderbaum, 2015; Remig, 2017). Emphasis is placed on CS and the role of social and

¹ It is symptomatic that business literature does not distinguish between the two positions 'positivism' and 'post-positivism'. We have chosen to use the term positivism in this article, since it is commonly reflected in the literature even if some articles comprise post-positivist aspects. However, we discuss differences between the positions in the philosophical analysis in Section 2.2.

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environmental value constructs. The chosen approach aligns with, for example, Dembek et al. (2015), who explains why research areas addressing business and its relationship to societal values need to clarify epistemological assumptions. The research topic is operationalized through two specific questions:

- 1) How can the epistemology of CS be analyzed?
- 2) What are the epistemological trends of the most influential literature in CS?

Question 1 is approached in this article through a conceptual analysis grounded in two distinct positions within epistemology, i.e. positivism and constructivism. A framework is developed by evaluating the relation between epistemological positions and the value constructs found in CS. Question 2 is answered through an analysis based on the framework. The main finding is that the most influential literature from the last 50 years contains implicit clustering in terms of theoretical value constructs. Finally, the article discusses resulting epistemological challenges. A remedy is proposed through a pluralistic epistemology, which asserts the role of value-based discourses in the field of economics (Söderbaum, 2015).

The following section introduces the concept of CS by explaining the historical background, along with recent trends in the literature. Moreover, the first research question is approached through a philosophical analysis. In Section 3, the second research question results in an analysis of top-cited literature in CS. Section 4 discusses epistemological challenges by synthesizing the contributions of the two previous sections. Finally, Section 5 presents concluding reflections along with future implications for researchers and practitioners in the field of CS.

2. Philosophical Anchoring of Corporate Sustainability

This section provides an overview of CS, along with a historical account of its central concepts. Such exercise elucidates why and how the research area has become anchored in fundamentally different values, i.e. environmental, social and economic concerns. Further, a philosophical analysis is conducted in order to demonstrate how underlying tensions in CS are connected to epistemological aspects. This results in a conceptual framework that can be used to analyze the epistemology of knowledge contributions in the area of CS.

2.1. Conceptual Background

Drawing on the historical account by Bansal and Hoffman (2012), it is clear that CS as a research area has evolved since the 1960s through a series of major changes in values, beliefs and norms. A relevant example is how ecological economics has emerged as an alternative position to neoclassical economics. CS can be seen as a new paradigm – the practice and motive that define a scientific discipline (Kuhn, 1970).

Historically, knowledge development has been linked to core theoretical concepts in business research – Regulatory Compliance, Strategic Environmentalism and (Corporate) Sustainability. In the 1960s and 1970s, emphasis was placed on regulation, and new governmental agencies were formed in response, forcing industry to focus on legal compliance and technical aspects. Most scholars acknowledge Rachel Carson's 1962 publication of *Silent Spring* as an important starting point for such regulatory focus. The book's main assertion is that chemicals adversely affect the environment and society (Carson, 2002). In the next phase of scientific development, during the 1980s and 1990s, environmental issues were elevated to a strategic concern for business through principles such as pollution prevention and product stewardship. Stuart L. Hart's 'Natural-resource-based view' (NRBV) was an important contribution to strategic management literature, and emphasizes how firms can enhance their competitive position while simultaneously securing ecological values (Hart, 1995). The contemporary debate is centered on the concept of sustainability, which,

in a business context, reflects upon how firms can contribute to development that recognizes the needs of future generations by ensuring social standards and safeguarding the natural environment. State-of-the-art literature conceptualizes this as 'corporate sustainability' (CS) (Baumgartner and Ebner, 2010; Lozano et al., 2014). It should be noted that the political underpinnings CS originate in the United Nations, and especially in the publication *Our Common Future* (Brundtland, 1987).

An important conceptual grounding for CS can be found in system theory, the interpretation of sustainability as the ability of the human system to adapt to the ecological system (Holling et al., 2002). The system perspective has received increasing attention in the sustainability debate because it addresses the complexity present when dealing with different underlying values and sub systems. Furthermore, several authors argue that the solution to sustainability is to adopt a holistic view, in order to analyze the qualities that emerge from the interactions within the whole, instead of breaking the system down into parts. Griggs et al. (2013) have received significant attention for this way of thinking, and suggest a new paradigm where Earth's life-support system is the basis for all human activity. This aligns with the logic of Holling et al. (2002), which emphasizes the embeddedness of human systems in the slower-changing ecological system. Such paradigm represents a fundamental understanding of the human and environmental systems at hand, providing a useful theoretical context.

The macro perspective of Griggs et al. (2013), however, is not directly applicable to change processes at the organizational level, which are the core focus of CS. The model provided by Hahn et al. (2015) is therefore appropriate because it simultaneously takes into account different levels of analysis, namely the individual, organizational and systemic (Fig. 1). The purpose of the model is to provide scholars and decision makers a theoretical lens to analyze the underlying tensions related to change for sustainability at the business level. The model illustrates a dynamic aspect by including the temporal dimension of the context in which change takes place. For example, the temporal dimension highlights how short-term financial concerns can be a barrier to the long-term orientation of social and environmental concerns because they are perceived as having more value. Another example can be conflict between the individual motivations of employees and the company's

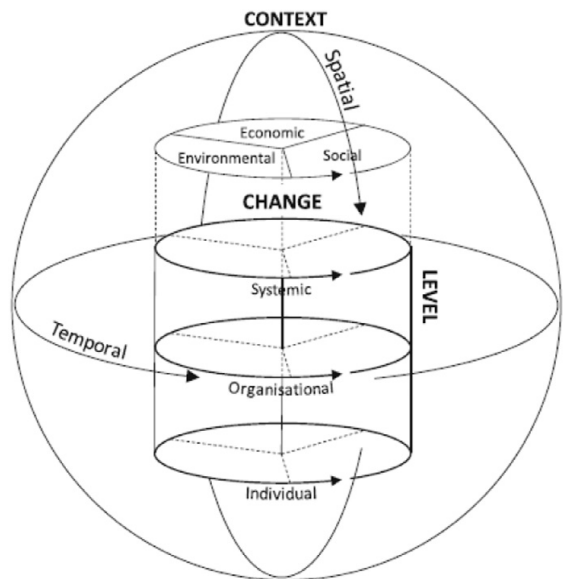


Fig. 1. The fundamentals of corporate sustainability (Hahn et al., 2015).

organizational goals, which illustrates the need for different levels of analysis (i.e. individual, organizational and systemic).

The model can be used to summarize the basic concepts in CS. First, the dimensions of change, i.e. economic, social and environmental values, are linked strongly to differing societal interests. Second, the level of change reflects the systemic nature of sustainability, and the intersection between the ecological, economic and social areas. Finally, the context has fundamental implications. One aspect reflects temporal aspects where short-term profit orientation is a barrier to long-term investment, in environmental technology for example. The second aspect reveals spatial elements such as how companies divide their activities between developed and under-developed regions in the world with different social standards and environmental technologies (Hahn et al., 2015). To summarize, CS is an area that deals with multiple perspectives and knowledge disciplines, something which generates latent tensions in change processes both at organizational and systemic levels.

The topic of tensions in CS, and particularly the inter-relations between social, environmental and economic values, can be seen in relation to two distinct positions in sustainability science. According to proponents of 'strong sustainability,' there are fundamental differences between the three constructs. This rests on the premise that natural capital represents a unique contribution to societal welfare, which cannot be substituted by human or financial capital (Ekins et al., 2003). Moreover, natural capital cannot be understood purely through quantitative techniques since there are qualitative differences between ecosystem services and their influence on social systems (p. 176). 'Weak sustainability,' on the other hand, treats the three forms interchangeably with the assumption that the aggregated amount of capital is to be allocated in an optimal manner. As an example, CO₂ emissions to the atmosphere are not a damage to human welfare as long as other forms of capital are created, e.g. machineries and roads (Pelenc et al., 2015). In other words, this position makes it possible to conduct trade-offs between social, environmental and social values.

On the whole, there are different philosophical issues to consider when analyzing the conceptual grounding in CS. Hahn et al. (2015) have made an important contribution here because their model indicates how CS draws on different disciplines and underlying value constructs. Overall, the model supports discourses aimed at fundamental epistemological challenges, which are illustrated in the following section.

2.2. Philosophical Analysis

A field's philosophical anchoring is typically determined by assumptions within ontology, the philosophic study of reality, and epistemology, the philosophic study of knowledge. The classic philosophic dichotomy between *positivism/post-positivism*² and *constructivism* (Robson, 2011; Cunliffe, 2010), is useful for our purpose. A premise for this usefulness is that theoretical concepts and empirical observations are central parts of the positivism/post-positivism vs constructivism scholarly debate.

Main features of positivism are that knowledge is based on experience, research means gathering evidence about reality and that any 'transcendent' knowledge claims are refuted ('Positivism', Encyclopaedia, 2016). Ontologically, positivism sees reality as an objective realm, independent from human mind, but accessible through, for example, research. Epistemologically, access to reality is achieved by observing and collecting data. Research reflects an objective nature with the goal to explain, predict and control phenomena under inquiry (Guba and Lincoln, 1994), and to verify theories. Critiques of positivism state, however, that there is no guarantee to get a true picture of an objective world since all collected data are necessarily incomplete (Popper, 2005). Post-positivist Popper thus introduced the 'falsification

principle' claiming among others that data that to refute a hypothesis is far more decisive than data that support it. Post-positivists (see also 'critical realism', Alvesson and Sköldböck, 2009) acknowledge reality is not understandable with absolute certainty, however, research and experiments make it possible to approach truth (Guba and Lincoln, 1994; Willis and Jost, 2007). An important difference for this article is also the post-positivist acknowledgement that collected data are not neutral (as positivists believe), but to some degree influenced by the researcher's decisions and values.

Positivism/Post-Positivism is linked to the elements in Fig. 1. On the *systemic level* and in the *environmental dimension*, knowledge is based on the assumption that a natural world exists, and that reasoning can be justified with the help of empirical observations and/or experimental testing. This is for example visible in methods such as 'Material Flow Analysis' (MFA), which assesses environmental impacts of materials in a system and predicts changes with help of algorithms - a combination of empirical data collection and mathematics. However, knowledge about factual circumstances/reality is here connected with researchers' decisions and values, and thus a post-positivist position seems appropriate for the systemic level/environmental dimension. In a MFA, this means that sources of material input in the system for example from production facilities are based on the researcher's selection. Missing knowledge, missing data or the ignorance of a source can result in a wrong prognosis, besides the fact that data collection can be challenging since actors may be reluctant to reveal correct figures. Also one has to consider that *temporal* and *spatial* aspects are not universal, new knowledge will result in revised prognosis and the results might be limited to a certain geographic area. According to Post-positivism these uncertainties can only be mitigated by constant testing and application of scientific methods and revision of hypotheses.

Focusing entirely on interpretations and values, constructivism claims that knowledge is always relative and context dependent. Moreover, the individual values of the researcher and participants become an integral part of knowledge development via hermeneutic interpretation (Høiseth et al., 2014). Consequently, constructivist-based reasoning relies on the interpretation of qualitative data in order to explore and explain how human actors attach meaning to phenomenon and objects. Constructivists perceive reality as mental constructions, socially and experientially based, local and specific in nature, although often shared among many individuals. 'Truth' can never be claimed and even if there be an external world, it is not possible to approach it. Ontologically, constructivism can be described as relativism, epistemologically as 'transactional and subjectivist', its methodologies being interpretivist and hermeneutical (Guba and Lincoln, 1994).

Related to Fig. 1 one can connect constructivism from an epistemological, as well as ontological, perspective with the *individual level* and the *social dimension*. Reality is socially constructed, based on (inter-)subjective values and norms, experienced subjectively and decisions are 'negotiated' through transactions. Intersubjective values are for example visible in principles of social sustainability such as to achieve well-being for those living and their descendants (Chiu, 2003). Rather than referring to an objective necessity, minding future generations' well-being is based on a (contemporary) value of care, which is individually experienced ('my children should have a good life as well') and up for intersubjective debate. In contrast to positivism and to a certain degree also to post-positivism, constructivism is not considering any objectivized notions of time and space. On the contrary, knowledge generation is per se contextual i.e. related to certain historical and cultural place-bound circumstances. *Temporal* and *spatial* dependencies are thus not seen as uncertainties, but as conditions for analysis.

Finally, the *organizational level* and in the *economic dimension* in Fig. 1 will most frequently have elements of both constructivism and positivism/post-positivism, which appear to be interdependent. For example, dealing with the allocation of natural resources in a decision-making context, or relating to a company's internal negotiations among individuals on how to prioritize time and resources, includes

² We have chosen to use the term 'positivism' in this article except in Section 2.2 where we also discuss 'post-positivism'.

Epistemology	Value constructs		
	Environmental	Economic	Social
Constructivist		X	X
Positivist	X	X	

Fig. 2. A framework for analyzing the epistemology of corporate sustainability.

positivist and constructionist elements. A positivist element relates here to information and data collection on infrastructure and technology, and to underlying *temporal* conditions, such as estimated production- and distribution time. *Spatial* aspects that vary in different countries would be local resource availability and access, and infrastructure conditions such as taxes and salaries. A constructivist element is reflected in companies', employees' and societal values, which are grounded on (inter-)subjective interpretations. This relates to issues such as when and where to work, mobility and productivity, and favorable local settings for production facilities.

The philosophical analysis has considered all the *dimensions* (economic, social and environmental), *levels* (individual, organizational and systemic) along with *contextual aspects* (spatial and temporal) of Fig. 1. Moreover, we have argued relations with epistemological positions found in constructivism and positivism. Fig. 2 shows how an analytical framework can be developed by applying this logic. The framework emphasizes the three underlying value constructs and how they are premised upon the set of philosophical assumptions explained previously. As a result, one can identify a fundamental epistemological difference between the environmental and social dimensions because the former assumes objectivity, while the latter implies a relative approach and context-dependency of knowledge.

Fig. 2 represents a framework for analyzing the epistemology of CS, i.e. the first research question of this article. An application is presented in the next section, and this process aims to answer the second research question along with facilitating critical discussion on the philosophic underpinnings of CS.

3. Analyzing the most Influential Literature in Corporate Sustainability

It is appropriate to adopt a broad scope when conducting analysis in the field of CS because the theoretical foundation draws on different perspectives and disciplines (as in e.g. Hahn et al., 2015). Consequently, this article analyzes the literature without further specifying thematic boundaries. Relevance, in terms of scholarly citations, was selected as the main criteria when sampling the literature.

An analysis of the most-influential literature in the field, based on the framework developed in the previous section, was selected as the main method. Hoffman (2011) conducts a review of most influential articles in CS, and is one of the main authors of the *Oxford Handbook of Business and the Natural Environment* (Bansal and Hoffman, 2012). His review is based on the 874 articles covered in the handbook. Hoffman's list ranks the articles based on normalized citations in Google Scholar, which take into account the fact that older articles will gather more citations than recent ones. The top 20 articles on Hoffman's list are analyzed in this article.

An important aspect is the criteria applied in the analysis. They were created through the application of Fig. 2, and the value constructs linked to the social, environmental and economic dimensions. The process of analysis was to investigate how these constructs were applied within the individual articles on the list. The logic of this approach is grounded in the concept of 'construct validity' as means of scientific quality. This criterion concerns "(...) how well information about the constructs in the theory being built are measured in the research" (Healy and Perry, 2000, p. 124). For example, when scholars in CS applies the construct of 'corporate social performance', construct validity implies that the

information at hand must represent something 'social'. The remaining part of this section presents the results of the analysis and provides examples of the classification process.

Table 1 presents the 20 article sample of the most-influential literature in the field of CS. The literature is classified based on the usage of underlying values (social, environmental and economic), which varies between single and multiple constructs. Examples are provided in the following paragraphs on the different combinations. Moreover, the analysis reveals a multitude of approaches when it comes to the explicit application of the three value constructs.

Articles are grouped into three main clusters. The one with the fewest articles concerns an explicit focus on the economic and environmental dimensions. Costanza et al. (1997) adopts a systems perspective on how natural ecosystem services can be valued in terms of monetary constructs, as shown by the following statement: "We have estimated the current economic value of 17 ecosystem services for 16 biomes, based on published studies and a few original calculations" (p. 253). Porter and Van der Linde (1995) use a qualitative approach and focus on the effect of environmental regulation on the competitiveness of business organizations. 'Social benefits' are mentioned as a topic (p. 98), but the social value construct is treated implicitly as an economic variable.

The second largest cluster of articles concerns the constructs of social and economic values. The general trend among the seven articles is that the environment is regarded as a social value. This is typical for quantitative-oriented articles that focus on the concept of 'performance' (e.g. Waddock and Graves, 1997; Wood, 1991), where relationships between social and economic performance are analyzed. An exemption is Mitchell et al. (1997), who deal with qualitative negotiation processes between social actors. The environmental dimension is indirectly regarded as a social stakeholder, as illustrated by the following statement: "Persons, groups, neighborhoods, organizations, institutions, societies, and even the natural environment are generally thought to qualify as actual or potential stakeholders." (p. 855). Moreover, the economic dimension in this cluster is qualitatively represented through emphasis on management strategies.

The largest article cluster addresses all three value constructs. The meta-analysis by Orlitzky et al. (2003) is a good example because it defines social, environmental and economic variables explicitly. Moreover, it clarifies the inter-relations between social and environmental variables in the chapter on methodology (p. 410). The overall construct includes both environmental and social values, and is called 'corporate social performance' (CSP). In the quantitative analysis, however, statistical results are calculated through a breakdown of social and environmental dimensions. This variable is discussed in relation to 'corporate financial performance' (CFP). It should be noted that several of the other articles (e.g. Margolis and Walsh, 2003; Matten and Moon, 2008) apply a qualitative approach within which they explicitly state that the social dimension is interpreted to include environmental values.

The analysis clarifies how inter-linkages between value constructs are treated in the literature. Some authors explicate, both quantitatively and qualitatively, the social, environmental and economic dimensions as distinct elements. Others make an implicit clustering, for example when the natural environment is regarded as a social stakeholder. In general, there is a tendency to use the constructs of social and environmental interchangeably, and especially to assume that the social dimension also includes environmental concerns. The next section aims to discuss the epistemological implications of these methodological trends.

4. Discussion

Transparency in terms of underlying philosophical assumptions is necessary to uncover hidden values and to secure scientific development in a field in general (Alvesson and Sköldberg, 2009). Banerjee

Table 1
Analysis the top 20 literature in the area of corporate sustainability.

Nr ^a	Title	Author and year	Journal	Explicit value constructs
1	The value of the world's ecosystem services and natural capital	Costanza et al. (1997)	Nature	Environmental economic
2	Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts	Mitchell et al. (1997)	Academy of management review	Social economic
3	A stakeholder framework for analyzing and evaluating corporate social performance	Clarkson (1995)	Academy of management review	Social economic
4	Corporate social and financial performance: A meta-analysis	Orlitzky et al. (2003)	Organization studies	Social environmental economic
5	Toward a new conception of the environment-competitiveness relationship	Porter and Van der Linde (1995)	The journal of economic perspectives	Environmental economic
6	Green and competitive – Ending the stalemate	Porter and Vanderlinde (1995)	Harvard Business Review	Environmental economic
7	Misery loves companies: Rethinking social initiatives by business	Margolis and Walsh (2003)	Administrative science quarterly	Social environmental economic
8	Corporate social responsibility: A theory of the firm perspective	McWilliams and Siegel (2001)	Academy of management review	Social economic
9	The social responsibility of business is to increase its profits	Friedman (1970/2007)	The New York Time Magazine	Social economic
10	The corporate social performance-financial performance link	Waddock and Graves (1997)	Strategic Management Journal	Social economic
11	Corporate social performance revisited	Wood (1991)	Academy of Management Review	Social economic
12	A resource-based perspective on corporate environmental performance and profitability	Russo and Fouts (1997)	Academy of Management Journal	Social environmental economic
13	A natural-resource-based view of the firm	Hart (1995)	Academy of Management Review	Social environmental economic
14	Environmental regulation and the competitiveness of US manufacturing	Jaffe et al. (1995)	Journal of Economic Literature	Social environmental economic
15	A General Framework for Analyzing Sustainability of Social-Ecological Systems	Ostrom (2009)	Science	Social environmental economic
16	The impact of supply chain structure on the use of supplier socially responsible practices.	Pieter van Donk et al. (2010)	International Journal of Operations & Production Management	Social environmental economic
17	"Implicit" and "explicit" CSR: a conceptual framework for a comparative understanding of corporate social responsibility	Matten and Moon (2008)	Academy of Management Review	Social environmental economic
18	A three dimensional model of corporate social performance	Carroll (1979)	Academy of Management Review	Social economic
19	Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations	Aguilera et al. (2007)	Academy of Management Review	Social environmental economic
20	Shareholder value, stakeholder management, and social issues: what's the bottom line?	Hillman and Keim (2001)	Strategic Management Journal	Social environmental economic

^a The numerical ordering reflects ranking in terms of normalized citations in Google Scholar.

(2012) argues, for example, that knowledge development in the area of CS lacks a critical reflection because the basic assumption of the profit maximization paradigm remains unchallenged. This is supported by Hahn and Figge (2011), who call for a redefinition of corporate profitability that takes into account social and environmental capital. In general, publications are not often explicitly aware of the origin of the epistemological approaches chosen, and units of analysis are tacitly presumed.

The main finding from the analysis of literature is that there seems to exist a clustering of value constructs, each representing fundamentally different epistemological assumptions. Indeed, there are several examples from the top-cited literature on how social and environmental dimensions are combined as a unit of analysis. Remembering the research questions of this article, it is important to discuss the epistemological implications of this observation. Moreover, the framework depicted in Fig. 2 can be applied in order to discuss the philosophical anchoring of CS. There are epistemological challenges involved when social and environmental values are combined in scientific analysis because they relate to the different paradigms of constructivism and positivism.

There is a general trend in the literature, namely that the construct based on the social dimension is typically defined, or interpreted, as including the environmental dimension. This implies two fundamental challenges. First, positivist-oriented articles typically treat social and environmental values as a joint construct called CSP. Referring to the logic in Fig. 2, there is an epistemological challenge when social values are treated as objects. For example, who defines social values? Strong arguments are made that social concerns must be understood through a context-dependent process of interpretation, along with negotiations between actors. Second, constructivist-oriented articles tend to interpret the environmental dimension as a social stakeholder, for example through governmental agencies. This is also problematic because the main-stream epistemology in natural science assumes objectivity, meaning that the social context should not influence scientific analysis

and understanding. This implies that ideologies and hidden values can influence how environmental concerns, for example CO₂ emissions, are treated in decision-making processes. On the whole, the combination of social and environmental values in a single construct implies a fundamental epistemological challenge.

An ongoing debate in Ecological Economics can be related to the insights of this article. Remig (2015) critically discusses the emerging contributions centered on the topic of 'sustainability economics.' The author argues the fuzziness and unnecessary complexity of the concept since there is a tendency to cluster theoretical concepts without specifying boundary conditions and analytical criteria. As a response, Söderbaum (2015) warns against the notion of "mainstreaming" economics, and refuses the classic idea that a scientific area must belong to one defined paradigm since values and ideologies are an inherent part of the scientific discourse. This creates complexity, which he argues must be met through epistemological pluralism and a multi-paradigmatic approach. It should be noted, that Remig (2017) supports the pluralist position, but argues: "Yet, pluralism must not be confused with anything goes." (p.2). His main argument concerns the need of a structured approach when dealing with multiple methodological approaches.

This article acknowledges a pluralist epistemology in sustainability science as advocated by both Remig and Söderbaum. Indeed, this position may remedy the fundamental challenge that exists in the area of CS. The classic dichotomy of positivism vs constructivism is useful to apply in order to explicate epistemological dilemmas, but this frame of reference seems unsuitable to advance the discussion. Resultantly, a structured approach toward pluralism that synthesizes insights from the classical paradigms may be a way further. This could increase construct validity when addressing social and environmental values in traditional business disciplines. One specific topic to investigate in this regard, is the role of social stakeholders when representing the value of ecosystem services. This creates a complex setting of negotiations, where both democratic principles and the inherent value of nature must be taken into account.

The ontological aspects of sustainability, the worldview behind the concept, are not the scope of this article. However, the analytical findings indicate that the most influential literature in CS resonates strongly with the position of weak sustainability. This means that the three forms of capital (human, natural and financial) are assumed to be substitutable. Such an inference is supported by the observation that social and environmental constructs are treated on a common scale, for example through CSP, as explained earlier. An ontological position of strong sustainability would, in contrast, have assumed that the inherent value of natural capital cannot be traded off with financial or human capital. On this note, it seems safe to conclude that the core literature of CS represents the mainstream ideology in economics, namely that financial value creation can be optimized on the basis of input factors such as natural resources and human capabilities.

5. Conclusion and Implications

The core elements of CS concern the social, economic and environmental dimensions (as seen in Fig. 1). The overall goal of this article is to increase the transparency of epistemological challenges that arise when research is conducted within the inter-relationships between these three distinct constructs. The means toward this goal has been to answer two distinct research questions that have resulted in the following contributions. Firstly, a conceptual framework has been developed in order to analyze the epistemological foundation of CS. Secondly, an application of the framework shows that the most influential literature from the last 50 years adopts mixed and contradictory positions in terms of epistemology. As a consequence, concepts and philosophical worldviews are clustered without critical awareness of their implications, resulting in what we name, 'implicit pluralism.'

To remedy the situation, we assert a pluralistic position that makes explicit statements about underlying value assumptions and their inter-relations, in order to facilitate critical reflection and scientific development in the field. Further research can apply the groundwork laid in this article for philosophical transparency related to epistemological and ontological aspects. More specifically, research can be placed within the context of Hahn et al. (2015), whose model represents the holistic understanding of the interactions between systemic mechanisms anchored in the concept of sustainable development, and organizational decision-making rooted in inter-subjective values. We have focused on the triple value construct that represents the conceptual core of CS, but there are several avenues for further knowledge development. The dynamic and temporal element is relevant, and especially in the context of micro-macro interactions between the systemic and the organizational level. The ongoing implementation of the UN SDGs, which will last until 2030, is an interesting process for scholars to investigate. A fundamental topic is the nature of systemic change prescribed by the goals, and the philosophical debate between organic and mechanistic worldviews (Ims et al., 2015). This touches upon the ontological dimension of philosophical analysis, which has not been scope of this article, but is indeed an area to explore further.

In addition to scholars, practitioners and decision makers can utilize the insights of this article in order to adopt the SDGs in their activities. Others have argued that the 17 SDGs are interrelated and rife with latent tensions (Nilsson et al., 2016), which makes it even more relevant to consider the framework's underlying assumptions in terms of social, economic and environmental values. In this respect, we strongly warn against superficial adoption of the goals, along with the 'cherry picking' of a few without systemic consideration of all 17. A business organization, for example, must make an explicit decision on how to deal with the different topics of the SDGs, and specifically take a principal stance to manage the tensions and conflict that will occur in practical implementation. This is a natural task for company boards and other high-level governing bodies in organizations, and we hope our suggestions can facilitate value-oriented discussions that challenge taken-for-granted assumptions such as the ideology of profit maximization.

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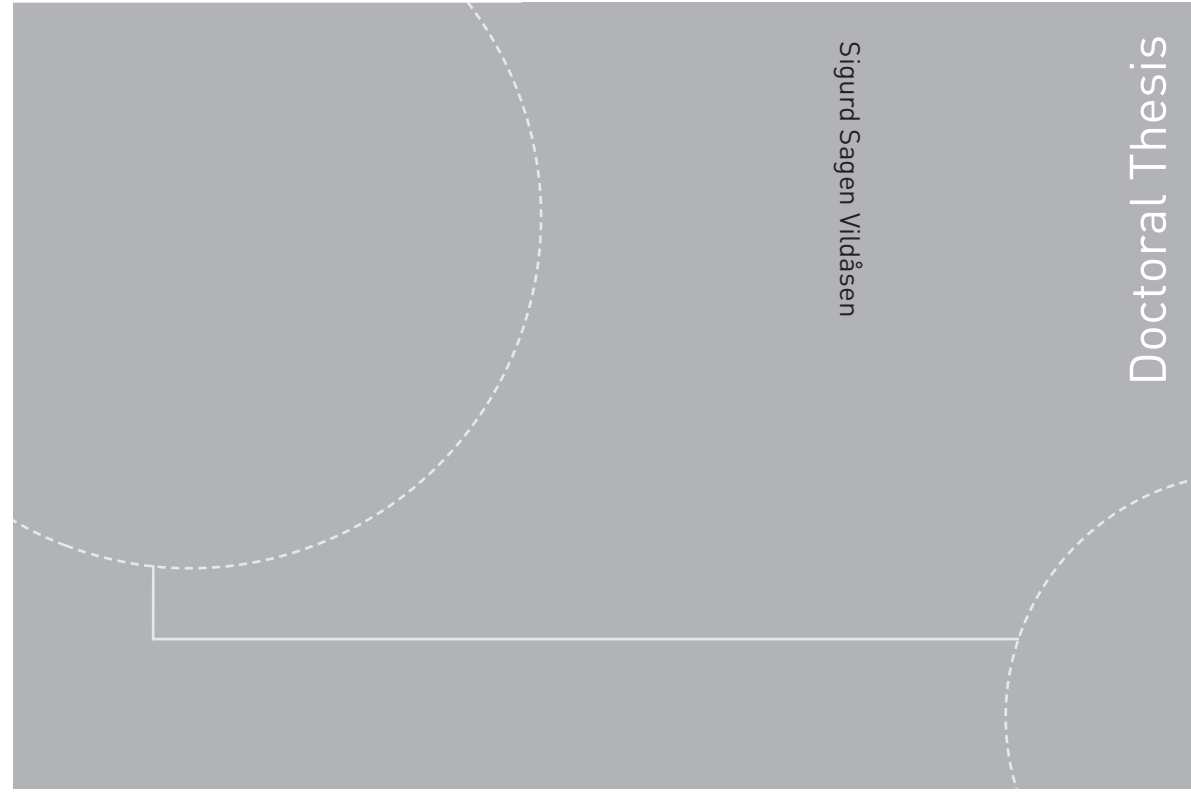
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Sigurd Sagen Vildåsen

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