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Navigating the process of sustainable business model innovation

A multiple case study of three large German firms

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Preface

This master thesis is one of a series of papers and reports published by the Centre for Sustainable Business (CSB) at NHH Norwegian School of Economics. The CSB does research, teaching, and outreach on the behaviors, business models, and technologies that promote sustainable business. Visit the center at http://csb.nhh.no.

Abstract

Purpose – The main purpose of this study is to increase the understanding of the sustainable business model innovation (SBMI) process in large firms by holistically examining the process from "idea to launch."

Design/methodology/approach – To provide an answer to how large firms navigate the process of SBMI, an initial conceptual process framework based on insights from innovation management literature and a synthesis of 16 process models from sustainable and conventional business model innovation (BMI) literature was abductively developed into a final process model that integrates the empirical findings of a multiple case study of SBMI processes in three large German firms. Both in-case analysis and cross-case analysis were applied.

Findings – This study proposes a process model for SBMI in large corporations. It comprises four process phases (diagnosis, discovery, design, and delivery) and provides insights into the process activities performed and actors involved in the aforesaid four phases as well as the overarching characteristics of the SBMI process as a whole. The study identifies ten process activities. The results indicate that both analytical and experimental activities are present in the SBMI process and while they show resemblance to conventional BMI, sustainability is strongly embedded in most process activities. In terms of process actors, the findings indicate that the process of SBMI is initiated either by the CEO or a small group of employees within a department that request cross-functional support inside the organization and integrate external stakeholders to a varying extent, depending on the process phase they are in. However, a uniform organizational anchoring of SBMI responsibilities tends to be missing. In terms of process characteristics, the findings suggest that the way that process actors navigate the process of SBMI can be guided by systematic schemes, yet its nature is characterized by non-linear iterations, in particular between the delivery and design phase as well as the discovery and diagnosis phase. Finally, the findings reveal the relevance of timing and intention in the process of SBMI, which emerged as additional patterns from the data.

Research implications – The study addresses the dearth of knowledge on the process of SBMI and paucity of empirical research in the specific context of large firms. The study contributes to the relatively nascent state of the process-oriented, holistic stream of SBMI literature.

Practical implications – The practical utility of the process model proposed lies in the provision of guidance to managers and cross-functional teams that wish to navigate the process of SBMI in the attempt to create a novel SBM or revise their current BM towards sustainability. As such, it gives practitioners a clearer understanding of how to approach the processual black box of SBMI, which constitutes a highly challenging and uncertain endeavor.

Keywords – Business model, sustainable business model, business model innovation, sustainable business model innovation, process model, multiple case study, large firms.

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Lastly, I would like to extend my gratitude to family and friends for their understanding and continuous moral support in these particularly uncertain and difficult times of COVID-19.

Kristina Rebeuf

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List of Abbreviations

BES	Business Experimentation for Sustainability
BM	Business Model
BMI	Business Model Innovation
B2C	Business to Consumer
CE	Circular Economy
CEO	Chief Executive Officer
CSR	Corporate Social Responsibility
GRI	Global Reporting Initiative
HVAC	Heating, Ventilation, and Air-Conditioning
INCIs	International Nomenclature of Cosmetic Ingredients
KPI	Key Performance Indicator
R&D	Research and Development
SBM	Sustainable Business Model
SBMI	Sustainable Business Model Innovation
SDGs	Sustainable Development Goals
VP	Vice President

1 INTRODUCTION

"Adapt or perish, now as ever, is the nature's inexorable imperative." – Wells (1945, p. 19)

The introductory chapter begins with explaining the background of this thesis. It is followed by a presentation of the problem statement and empirical context as well as the research purpose, questions, and approach before finishing with an outline of the thesis structure.

1.1 Background

The alarming severity and pervasiveness of today's grand sustainability challenges have prompted scientists to propose the advent of a new geological era, the Anthropocene, in which human impact becomes so profound that it threatens the natural equilibria and resilience of earth systems (Bocken, Ritala, Albareda, & Verburg, 2019; George, Howard-Grenville, Joshi, & Tihanyi, 2016; Steffen, Broadgate, Deutsch, Gaffney, & Ludwig, 2015; Steffen et al., 2011). Confronted with a progressively finite earth characterized by planetary boundaries, a limited carrying capacity, and anticipated limitations to growth, there is a genuine risk for humanity to "overshoot," i.e., exploit resources faster than they can be regenerated while accelerating climate change and reinforcing social and economic crises (Arrow et al., 1995; Bonvoisin, Stark, & Seliger, 2017; Khmara & Kronenberg, 2018; Meadows, Meadows, Randers, & Behrens III, 1972; Rockström et al., 2009).

To counteract this evolution, the work of Brundtland, chairman of the United Nations World Commission on Environment and Development, coined the nowadays widespread notion of sustainable development in the landmark report "Our Common Future," encouraging a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland et al., 1987, p. 41). In 2015, the United Nations summarized major sustainability challenges in 17 sustainable development goals (SDGs) related, inter alia, to the reduction of environmental degradation, social inequality, and overconsumption and overproduction (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016; Bocken, Ritala, et al., 2019).

Their recognized urgency und wicked nature resulted in a call for action on individual, societal, and organizational level to rethink the status quo (George et al., 2016; Long, Looijen, & Blok, 2018; Rauter, Jonker, & Baumgartner, 2017). As powerful economic actors, businesses moved into the center of the sustainability discourse, being heralded as obstacles but also as potential catalysts capable of devising necessary solutions for change (Adams et al., 2016; Jørgensen & Pedersen, 2018; Rauter et al., 2017). Either way, the formalization of these sustainability challenges encouraged firms to find novel ways to contribute to sustainable development and led progressively to the realization that these challenges might also represent major business opportunities (Adams et al., 2016; Bocken, Ritala, et al., 2019; Porter & Kramer, 2011; Yang, Vladimirova, & Evans, 2017).

Nonetheless, progress towards sustainable development is slow, raising concerns regarding the present profit-maximizing modus operandi of businesses (Baumgartner & Rauter, 2017; Schaltegger, Hansen, & Lüdeke-Freund, 2016). In this regard, extant approaches to sustainability through corporate social responsibility (CSR) and philanthropy as mere "add-ons" to the main business and innovation in the form of new products, processes, and technologies alone are considered to be not far-reaching enough to foster genuine sustainable change (Abdelkafi & Täuscher, 2016; Markevich, 2009; Morioka, Bolis, Evans, & Carvalho, 2017; Olofsson, Hoveskog, & Halila, 2018; Schaltegger, Hansen, et al., 2016; Stubbs, 2017). Following this understanding, scholars have turned to the business model (BM) concept that encapsulates the underlying value-creating, value-delivering, and value-capturing logic of doing business (Magretta, 2002; Rauter et al., 2017; Teece, 2010; Zott & Amit, 2010; Zott, Amit, & Massa, 2011).

Acknowledging the limitations of conventional BMs, such as short-termism, a one-dimensional economic value logic or exclusive customer and shareholder-centricity, the concept of sustainable business models (SBMs) has emerged (Jonker & Faber, 2019; Lüdeke-Freund & Dembek, 2017; Schaltegger, Lüdeke-Freund, & Hansen, 2016). Today, the SBM concept is increasingly understood as a promising pathway to secure competitive advantage and contribute to sustainable development by permanently embedding sustainability at the very core of business practices under the consideration of multifaceted stakeholder needs and both positive and negative externalities (Bocken, Short, Rana, & Evans, 2014; Boons & Lüdeke-Freund, 2013; Evans et al., 2017; Jørgensen & Pedersen, 2015, 2017; Schaltegger, Lüdeke-Freund, et al., 2016). Or in other words, it is a means for companies to become sustainable *and* profitable (Jørgensen & Pedersen, 2015, 2018).

1.2 Problematization

Despite the aforementioned benefits of adopting SBMs, their diffusion remains limited (Laukkanen & Patala, 2014; Small-Warner, Abuzeinab, & Taki, 2018). Geissdörfer, Vladimirova, and Evans (2018) attribute this development to a design-implementation gap, which is echoed by a number of scholars signaling an absence of knowledge on *how* firms transition towards more sustainable BMs (Bocken et al., 2014; Rauter et al., 2017; Stubbs, 2017; Yang, Evans, Vladimirova, & Rana, 2017; Zollo, Cennamo, & Neumann, 2013). To address this knowledge gap, research on sustainable business model innovation (SBMI) attempts to conceptualize the acquisition and formation of novel SBMs as well as the modification of existing (often unsustainable) BMs (Geissdörfer, Vladimirova, & Evans, 2018; Long et al., 2018).

While examining the outcomes of SBMI realized through componential changes from integrating sustainable strategies and patterns has gained prominence (Bocken et al., 2014; Brehmer, Podoynitsyna, & Langerak, 2018; Lüdeke-Freund, Carroux, Joyce, Massa, & Breuer, 2018; Olofsson et al., 2018), little is known about the underlying *process* through which firms navigate to ultimately arrive at more sustainable BMs (Aagaard & Lodsgård, 2019; Brehmer et al., 2018; Geissdörfer, Vladimirova, & Evans, 2018; Pieroni, McAloone, & Pigosso, 2019a; Rauter et al., 2017; Zollo et al., 2013).

Within the limited process-oriented body of SBMI literature, some scholars have begun to explore necessary business experimentation capabilities and methods to address the inherent uncertainty and iterativity in the SBMI process (Baldassarre, Calabretta, Bocken, & Jaskiewicz, 2017; Bocken, Boons, & Baldassarre, 2019; Weissbrod & Bocken, 2017), while others have focused on particular stages of the SBMI process (Geissdörfer, Bocken, & Hultink, 2016; Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a). However, only few scholarly publications holistically examine the SBMI process in its entirety, which represents a relatively novel and under-researched phenomenon (Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a). Contrary to an abundance of holistic process models developed in conventional BMI literature, their use in the field of SBMI is still sparse with the exception of relevant work from Geissdörfer, Savaget, and Evans (2017) and Roome and Louche (2016). Accordingly, a more intimate and coherent understanding of the characteristics of the overall SBMI process and, more specifically, the activities and actors involved in the different process phases has yet to be produced.

Besides the limited holistic process orientation, a paucity of empirical research on SBMI in large firms exists as extant studies have often been contextualized in the setting of emerging, small firms.

1.3 Empirical context

This thesis focuses on investigating SBMI processes in the empirical context of large firms. Building on the enterprise classification proposed in § 267 of the German Commercial Code and the Statistical Office of the European Union (2016), the author of this thesis delineates large firms as firms that are established in the market, have more than 250 employees, and an annual turnover of more than 40 million euro and/or a balance sheet total exceeding 20 million euro.

This study's decision to examine the process of SBMI in large firms is motivated by the extant dearth of studies in this context but also the distinctive nature of large firms that makes scholarly insights from SBMI in smaller firms or new ventures possibly less applicable. In this regard, a superiority in resource availability for innovation endeavors exists in large firms (Rothwell & Dodgson, 1994). Yet, they are often slow in recognizing the need for transformation and allocate these resources to innovating BMs towards sustainability, gravitating traditionally towards a lower commitment to sustainable development (Ritala, Huotari, Bocken, Albareda, & Puumalainen, 2018; Schaltegger, Lüdeke-Freund, et al., 2016). A predominant characteristic that contributes to this issue is the inherent organizational complexity in large firms. It may manifest itself in, inter alia, rigid organizational structures, leadership challenges, and slow decision-making and communication (Bocken, Miller, Weissbrod, Holgado, & Evans, 2017; Chesbrough, 2010; Rothwell & Dodgson, 1994). The consequential prevalence of path dependencies, a dominant logic, and inertia tend to hinder large firms from developing novel SBMs that diverge from the established, oftentimes profitable, yet unsustainable BM (Bohnsack, Pinkse, & Kolk, 2014; Ciulli & Kolk, 2019; Geissdörfer, Vladimirova, & Evans, 2018; Prahalad & Bettis, 1986). Recent findings from conventional BMI literature indicate, however, that applying a systematic, process-focused approach can increase the chances of successfully developing novel BMs in large and diversified firms (Winterhalter, Weiblen, Wecht, & Gassmann, 2017), which makes the holistic process perspective also worth exploring in the realm of SBMI in large corporations.

1.4 Research purpose, questions, and approach

Based on the problematization and empirical emphasis presented, the primary purpose of this thesis is to advance the understanding of the process of SBMI in large corporations.

The rationale for adopting a holistic process lens in this thesis stems from the wish to shift the predominant focus from the static outcomes of SBMI to understanding the dynamic business modeling process and strengthening its application in the particular empirical context of large firms.

Building on that, the following principal research question has emerged:

HOW DO LARGE FIRMS NAVIGATE THE PROCESS OF SBMI?

To provide an answer to this question, the author has divided the overarching research question into three sub-questions:

a. What are the main activities in the different process phases of SBMI?
b. Who are the main actors involved in the process phases of SBMI?
c. How is the overall process of SBMI characterized?

To holistically examine the process of SBMI from "idea to launch," an initial conceptual process framework was constructed based on the review of 16 process models from BMI and SBMI literature and insights from general innovation management literature. The holistic "idea-to-launch" perspective is delineated through four theoretically derived phases (diagnosis, discovery, design, and delivery). The initial diagnosis phase is concerned with comprehending the status quo inside and outside the firm and diagnosing the requisite for change to allow for an effective initiation of the SBMI process. Moving from comprehending to rethinking the current business situation, the discovery phase encourages the discovery of ideas for potential new SBMs. The design phase attempts to design elaborated SBM concepts through a gradual, experimental refinement of ideas. In the final delivery phase, the realization of the newly developed SBM concept and its management across the firm and in the market becomes of prime importance.

The initial four-phase conceptual process framework was subsequently applied to guide the empirical investigation of SBMI process trajectories in the context of three large German corporations from different industries. The resulting empirical findings of the multiple case study were integrated into a final process model that enriched the initial conceptual process framework. The final process model developed provides a deeper insight into the SBMI process of large corporations by delineating the main activities performed and actors involved in the four different process phases and illustrating the characteristics of the overarching SBMI process related to its nature as well as the intention and timing of embarking on the process of SBMI.

1.5 Research outline

In the following section, the structure of the remainder of this thesis is described.

Theoretical Background: The second chapter introduces the reader to the concepts of conventional and sustainable BMs and BMI. Subsequently, process-oriented literature is reviewed, discussing the conceptual roots of process models in innovation management literature and 16 process models from BMI and SBMI literature. Finally, an initial conceptual process framework, guiding the empirical part of this thesis, is developed to analyze and answer the research question.

Methodology: In the third chapter, methodological choices, including research design, data collection, and analysis as well as research quality and ethics, are critically discussed.

Empirical Findings and Analysis: In the fourth chapter, the empirical findings of this study are presented and analyzed based on the conceptual process framework proposed. An in-case analysis, detailing the SBMI processes of three large German corporations, is followed by a cross-case analysis, which consolidates the findings from the multiple cases studied.

Discussion: The fifth chapter discusses this study's findings in relation to scholarly publications to identify how they contribute to, extend, or contradict extant literature.

Conclusion: In the final chapter, a concise answer to the research question is presented. This is further complemented with implications for theory and practice as well as limitations and propositions for future research avenues.

2 THEORETICAL BACKGROUND

"We see the world in terms of our theories." – Kuhn (1962)

This chapter encompasses a review of relevant academic literature. First, the broad concepts of conventional and sustainable BMs and BMI are introduced to the reader. Second, a narrow process perspective is adopted in relation to the research subject, discussing the conceptual roots of process models in innovation management literature before proceeding with an in-depth review of 16 process models identified in BMI and SBMI literature. Building on that, the author finally constructs a conceptual process framework intended to guide the subsequent empirical part of this thesis.

2.1 Understanding the concept of BM and BMI

2.1.1 What is a business model?

2.1.1.1 Origins and purpose of the BM concept

Confronted with the emergence of new businesses, such as virtual organizations or e-commerce, as a result of advancements in information and communication technologies, the BM concept has gained prominence and proliferated significantly since the mid-1990s (Foss & Saebi, 2017; Schaltegger, Hansen, et al., 2016; Wirtz, Pistoia, Ullrich, & Göttel, 2016; Zott et al., 2011).

Today, it constitutes a dynamic interdisciplinary field of research with numerous contributions from technology, innovation management, entrepreneurship, and strategy scholars (DaSilva & Trkman, 2014; Schneider & Spieth, 2013; Zott et al., 2011). Outside the scholarly community, BMs equally attract the interest of practitioners that are increasingly exposed to strongly competitive and volatile business environments (Lüdeke-Freund & Dembek, 2017; Wirtz, Göttel, & Daiser, 2016). The BM concept's principal purpose is to classify firms, understand heterogeneity in firm performance, and explain its relevance as "a vehicle and source of innovation" (Foss & Saebi, 2015, p. 5).

2.1.1.2 Conceptualization of the BM concept

Despite existing disparities and conceptual ambiguity in the literature related to the BM definition, a reasonable agreement between scholars exists in terms of its role as a *novel unit of analysis* (Demil & Lecocq, 2010; Foss & Saebi, 2018; Zott et al., 2011), holistically describing the core logic of how "firms do business" (Zott et al., 2011, p. 1019). This relates to how value is created, delivered, and captured from the provision of product and/or service offerings to customers (Magretta, 2002; Rauter et al., 2017; Spieth, Schneckenberg, & Ricart, 2014; Teece, 2010; Zott & Amit, 2010).

While on a higher level of abstraction a BM may be regarded as a structural template (Amit & Zott, 2001), frame of reference (Afuah & Tucci, 2003), cognitive instrument (Baden-Fuller & Mangematin, 2013), or a firm's architecture (Teece, 2010; Timmers, 1998; Wirtz, Pistoia, et al., 2016), it has also been specified in a series of *interrelated components* or *building blocks* (Osterwalder & Pigneur, 2010; Osterwalder, Pigneur, & Tucci, 2005). As indicated in Figure 1, these components can further be condensed into three principal categories, namely *value creation, delivery, and capture* (Jørgensen & Pedersen, 2015; Teece, 2010).

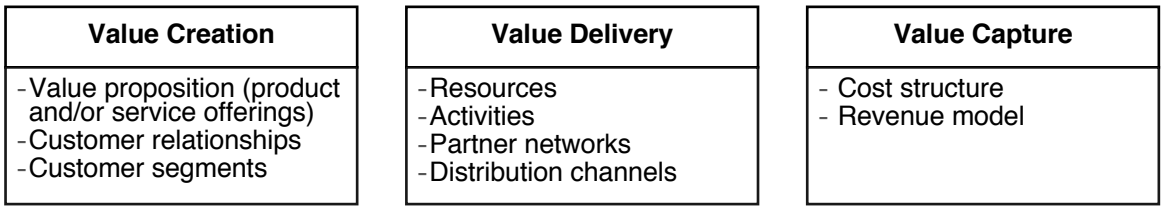

Figure 1. Overview of BM components.
Adapted from Jørgensen and Pedersen (2015), Osterwalder and Pigneur (2010), Osterwalder et al. (2005), and Teece (2010).

Extending this component-based understanding of the BM construct, Amit and Zott (2001) further emphasize its boundary-spanning ability and view it as an *activity system* that entails not only firm-centric activities but also interactions with external actors in the value network wherein it is embedded.

Another way of conceptualizing the BM concept has emerged from the increasing attempts of strategic management scholars to *differentiate BMs from strategy* (Wirtz, Pistoia, et al., 2016). While in the early stage of research BMs were considered to be identical with the concept of strategy (Porter, 2001), a predominant body of literature meanwhile understands BMs and strategy as complementary concepts (e.g., Magretta, 2002; Mitchell & Coles, 2003; Teece, 2010; Zott & Amit, 2008).

Following this complementary understanding, strategy typically places a stronger outward-looking focus on the firm's environment, particularly its positioning towards competitors, whereas BMs are generally more inward-oriented, related to the firm's core value-generating logic (Seddon, Lewis, Freeman, & Shanks, 2004; Wirtz, Pistoia, et al., 2016). In this regard, Teece (2010) argues that the two concepts complement each other in that strategy analysis informs a competitively sustainable BM.

In another perspective, the two concepts share a nested relationship of either superordination or subordination (Stieglitz & Foss, 2015). Casadesus-Masanell and Ricart (2010) and Shafer, Smith, and Linder (2005) see the BM as a reflection of strategic considerations characterized by an ex-post specification of the BM based on the realized strategy. As such, strategy includes "designing business models (and redesigning them as contingencies occur) to allow the organization to reach its goals" (Casadesus-Masanell & Ricart, 2010, p. 204). Chesbrough and Rosenbloom (2002) postulate a reverse relationship in which competitive strategy is a constituent of a higher-level BM. Extending this understanding, Tikkanen, Lamberg, Parvinen, and Kallunki (2005) further elaborate that strategy as a single BM component can nonetheless affect the configuration of all other BM components.

Lastly, the BM construct can also be viewed as an intermediary layer positioned between business strategy and operational processes (Al-Debei & Avison, 2010; Bask, Tinnilä, & Rajahonka, 2010; Cavalcante, Kesting, & Ulhøi, 2011; Veit et al., 2014). Figure 2 summarizes the different relationships discussed in the literature.

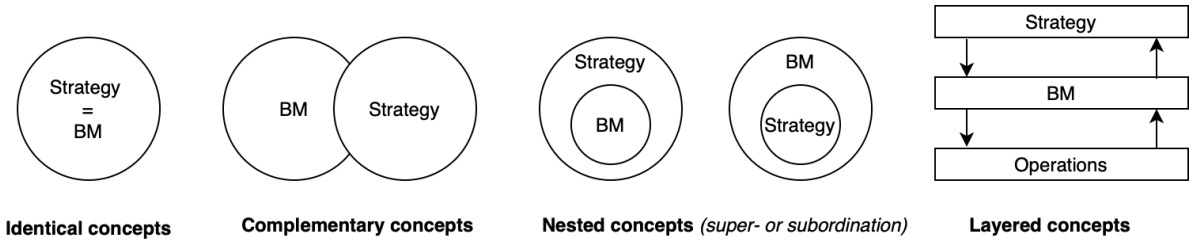

Figure 2. Relationship between BM and strategy.
Adapted from Al-Debei and Avison (2010), Seddon et al. (2004), and Veit et al. (2014).

Despite the divergent portrayal of the relationship between strategy and BMs, the different perspectives illustrate that, with the exception of the early-stage understanding as identical concepts, BMs and strategy are increasingly understood as closely intertwined yet different concepts that co-exist and ideally need to be aligned.

2.1.2 What is business model innovation?

2.1.2.1 Conceptualization of the BMI concept

Parallel to the BM concept, a uniform conceptualization of business model innovation (BMI) is missing in the literature (Björkdahl & Holmén, 2013; Laudien & Daxböck, 2017; Mitchell & Bruckner Coles, 2004a; Spieth et al., 2014).

Albeit extant differences regarding scope and novelty (Foss & Saebi, 2017), the terms BM change (e.g., Saebi, 2015; Sosna, Trevinyo-Rodríguez, & Velamuri, 2010), reconfiguration (e.g., Massa & Tucci, 2014), evolution (e.g., Demil & Lecocq, 2010), renewal (e.g., Doz & Kosonen, 2010), or innovation (e.g., Frankenberger, Weiblen, Csik, & Gassmann, 2013; Markides, 2006) are utilized by scholars to largely describe a similar phenomenon. Hence, Casadesus-Masanell and Zhu (2013, p. 480) conclude that BMI is "a slippery construct to study."

In essence, BMI as an umbrella term for all the aforementioned notions relates to changes of either existing BMs or the development of new BMs directed towards the search for innovative value-creation, delivery, and capture mechanisms capable of satisfying unmet customer needs and yielding positive returns (Amit & Zott, 2012; Casadesus-Masanell & Zhu, 2013; Markides, 2006; Massa & Tucci, 2014).

BMI has been conceptualized as both an *outcome* and *process* (Foss & Saebi, 2017; Laudien & Daxböck, 2017). A predominant stream of research adopts a component-driven, static perspective on BMs and examines changes in components and related interlinkages, focusing on the outcome achieved through BMI at a given time (i.e., ex-post examination of the new BM). However, an alternative stream perceives BMI as an inherently dynamic process, postulating a continuous fluidity in BM activities and the need to revisit them over time (Bucherer, Eisert, & Gassmann, 2012; Demil & Lecocq, 2010; Saebi, 2015; Saebi, Lien, & Foss, 2017; Wirtz, Pistoia, et al., 2016).

2.1.2.2 Link between BMI and other types of innovation

While a BM can represent a vehicle for innovation, allowing firms to commercialize new technologies in a market, the BM itself can constitute an independent source of innovation (Amit & Zott, 2012; Björkdahl & Holmén, 2013; Chesbrough, 2007, 2010; Chesbrough & Rosenbloom, 2002; Foss & Saebi, 2015; Massa & Tucci, 2014; Schneider & Spieth, 2013).

The latter has further been discussed in relation to more established innovation types, such as product, service, or technological innovations. To facilitate an easier distinction, some scholars prescribe a "minimum-number" requirement of BM elements that need to be altered to qualify as BMI. However, a scientific consensus about the specific number is missing (Foss & Saebi, 2017).[1] Compared to other innovation types, BMI encompasses a higher degree of complexity and comprehensiveness. At the same time, if implemented successfully, it can lead to superior benefits for the firm (Winterhalter et al., 2017).

2.1.2.3 Drivers and challenges of BMI

The need to innovate BMs can be driven by various external and internal triggers (Andreini & Bettinelli, 2017; Demil & Lecocq, 2010; Foss & Saebi, 2017; Teece, 2010).

External triggers are located outside the firm and are often summarized under changes in the business ecosystem. More specifically, changes in the competitive or regulatory landscape, market and stakeholder needs, technological advances, rising cost, and innovation pressures have been identified as critical drivers for BMI in the literature (Bucherer et al., 2012; De Reuver, Bouwman, & MacInnes, 2009).

Internal triggers stem from inside the firm and include conscious corporate decisions to adapt BM components and/or their interlinkages or technologies developed from own research and development (R&D) efforts (Cortimiglia, Ghezzi, & Frank, 2016; Demil & Lecocq, 2010). As such, BMI is often regarded as a source of competitive advantage, corporate renewal, and improved financial profitability (Amit & Zott, 2012; Aspara, Hietanen, & Tikkanen, 2010; Chesbrough, 2007; Chesbrough & Rosenbloom, 2002; McGrath, 2010; Mitchell & Coles, 2003; Sosna et al., 2010).

However, despite the relevance and associated benefits with BMI, the development and realization of novel BMs is highly challenging and, in many instances, prone to failure (Chesbrough, 2010; Laudien & Daxböck, 2017; Mezger, 2014; Winterhalter et al., 2017). As a result, businesses are often confronted with a number of difficulties because

[1] To qualify as BMI, a change in one component, two or more components, at least four components, or even all components has been demanded in the literature (Foss & Saebi, 2017).

i. *resources* (e.g., financial funds, human capital, knowledge) may not be sufficiently allocated to BMI (Cavalcante et al., 2011; Chesbrough & Rosenbloom, 2002; Laudien & Daxböck, 2017; Sosna et al., 2010),
ii. *path dependencies and a dominant logic* may cause incumbent firms, in particular, to get cognitively "locked into" an established (often already profitable) BM, preventing the development of novel BMs that substantially deviate from it (Cavalcante et al., 2011; Chesbrough, 2010; Prahalad & Bettis, 1986),
iii. *missing leadership and inertia* may result in ill-defined responsibilities for BMI and resistance to necessary change (Cavalcante et al., 2011; Chesbrough, 2010; Doz & Kosonen, 2010), and
iv. *a high level of complexity and uncertainty* can impede BMI, particularly if it is driven by external (unforeseen) stimuli, configurational dynamics between different components, or the need to manage multiple BMs at the same time (Baden-Fuller & Mangematin, 2013; Berends, Smits, Reymen, & Podoynitsyna, 2016; Laudien & Daxböck, 2017; Mezger, 2014).

2.1.3 Why the conventional BM/BMI concept is not enough for sustainability

Beyond the widely acknowledged scholarly criticism of conceptual inconsistencies, a missing theoretical anchoring in economics or business studies, and the adoption of a predominantly static outcome perspective related to the BM and BMI concept (Arend, 2013; Laudien & Daxböck, 2017; Mason & Spring, 2011; Massa, Tucci, & Afuah, 2017; Spieth et al., 2014; Teece, 2010; Zott et al., 2011), this section aims to critically evaluate these concepts in light of the increasing sustainability pressures explained in Section 1.1.

From the conceptualization of conventional BMs and BMI presented, it becomes evident that economic value plays a pivotal role in these concepts. However, when applied to the sustainability realm, this mainly profit-driven value logic poses difficulties since it neglects the additional consideration of social and environmental factors. As such, it thrives on the premise that such factors constitute externalities that can be discarded, if needed, and are considered to be immaterial to the primary business (Coase, 1960; Eells & Walton, 1961; Gulbrandsen, Jørgensen, Kaarbøe, & Pedersen, 2015; Jonker & Faber, 2019).

Consequently, this logic inherently fails to embed sustainability into the business modeling process and the resulting novel BMs (Boons & Lüdeke-Freund, 2013; Upward & Jones, 2016), although such externalities "are tied to the specific resource usages and activity configurations of companies and their operations" (Jørgensen & Pedersen, 2017, p. 146).

At the same time, this also implies a short-term thinking that fails to go beyond the satisfaction of shareholders' expectations and paying clients (Laasch, 2018). Despite the extant conceptualization of the conventional BM as an activity system (Amit & Zott, 2001), interactions typically remain limited to a small number of the aforementioned stakeholders (Jonker & Faber, 2019; Laasch, 2018; Stubbs & Cocklin, 2008). Building on that, a short planning horizon and missing system scope emerge as critical issues in the conventional BM and BMI concept (França, Broman, Robèrt, Basile, & Trygg, 2017).

To conclude, this critical evaluation points to the insufficiency of the conventional BM and BMI concept to contribute to sustainable development. It further fuels the need to assess and reconsider the value logic that underpins the conventional construct. The concepts of SBM and SBMI address some of the shortcomings discussed. They are delineated in greater depth in the following section.

2.2 Understanding the concept of SBM and SBMI

2.2.1 What is a sustainable business model?

2.2.1.1 Origins and purpose of the SBM concept

In light of increasing economic, ecological, and societal ills and concerns about the insufficiency of common approaches to sustainability through voluntary CSR and philanthropy as "add-ons" to the primary business, the BM concept has increasingly been explored in relation to sustainability in recent years (Bolton & Hannon, 2016; Schaltegger, Hansen, et al., 2016; Stubbs, 2017; Stubbs & Cocklin, 2008). The main purpose of the SBM concept is to incorporate sustainability into the business while serving as a driver for corporate innovation (Bocken et al., 2014; Stubbs, 2017).

SBM scholarship is a relatively young field of research in comparison to the conventional BM concept, which has been studied intensely since the mid-1990s (Lüdeke-Freund et al., 2018). Despite that, a rich body of literature on SBMs, including several special issues in academic journals (e.g., Arevalo et al., 2011; Boons, Montalvo, Quist, & Wagner, 2013; Dentchev et al., 2018; Schaltegger, Hansen, et al., 2016; Svensson & Wagner, 2011), has formed.

It has been discussed as a sub-field within established research fields, such as the conventional BM field presented in Section 2.1, or as an independent stand-alone field that distinctly differs from existing fields (Lüdeke-Freund et al., 2018; Lüdeke-Freund & Dembek, 2017). Today, the research on SBMs displays more and more peculiarities of an *emergent integrative research field*. As such, it depends and is rooted in established scholarly fields yet also has the capability of surpassing them (Dentchev et al., 2018; Lüdeke-Freund et al., 2018; Lüdeke-Freund & Dembek, 2017).

2.2.1.2 Conceptualization of the SBM concept

In a recent literature review, Geissdörfer, Vladimirova, and Evans (2018) delineate that extant conceptualizations of SBMs represent alternations of conventional BMs that include further qualities and requirements. As such, the SBM concept integrates certain sustainability-focused principles into organizational activities, structures, and processes or incorporates them into value-creation, delivery, and capture components (Geissdörfer, Vladimirova, & Evans, 2018; Laasch, 2018). This becomes evident in early-stage research on SBMs, postulating the need to include the social, environmental, and economic aspects of sustainability into the decision-making processes, purpose, and performance measurement of a business (Stubbs & Cocklin, 2008). Boons and Lüdeke-Freund (2013) propose normative requirements to incorporate sustainability into BM components, which are specified as sustainable value proposition, supply chain, customer interface, and the financial model.

Thenceforth, a number of SBM definitions have been developed in the literature. Since the body of literature on SBMs has proliferated along diverse and sometimes diverging trajectories, it is not surprising that a convergence to a universal definition of the SBM construct is to date still missing in the literature (Dentchev et al., 2018; Lüdeke-Freund et al., 2018; Schaltegger, Hansen, et al., 2016). Table 1 provides an overview of selected SBM definitions.

Table 1

Overview of selected SBM definitions.

Author	Definition
Stubbs and Cocklin (2008, p. 103)	"A model where **sustainability concepts shape the driving force of the firm and its decision making** [so that] the dominant neoclassical model of the firm is transformed, rather than supplemented, by social and environmental priorities."
Bocken et al. (2014, p. 44)	"A sustainable business model aligns interests of all stakeholder groups, and explicitly considers the **environment and society as key stakeholders.**"
Jørgensen and Pedersen (2015, p. 119)	"Sustainable business models are organizational designs for value creation, value delivery, and value capture, where the company's reduction of **negative externalities** or promotion of the company's **positive externalities**, or both, are an **integrated part of how value is created, delivered, and captured**."
Schaltegger, Hansen, et al. (2016, p. 6)	"A business model for sustainability helps describing, analyzing, managing, and communicating (i) a company's sustainable value proposition to its customers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating **natural, social, and economic capital beyond its organizational boundaries**."
Morioka et al. (2017, p. 724)	"SBM is a representation of business elements, their interrelations and the systemic context that enable **sustainable value exchange with stakeholders** towards corporate sustainability performance, translating and providing feedback between corporate strategy and operations."

In the attempt to unify the abundance of extant definitions, primary attributes have been proposed by a number of SBM scholars (e.g., Breuer, Fichter, Lüdeke-Freund, & Tiemann, 2018; Evans et al., 2017; Lüdeke-Freund & Dembek, 2017). These attributes present core beliefs, underpinning the SBM concept, which are well reflected in the definitions presented. As characterizing the concept of SBM is logically built on the conventional BM concept presented in Section 2.1.1, these common attributes can be regarded as *conceptual extensions* that differentiate SBMs from conventional BMs through a shift from (Breuer et al., 2018; Schaltegger, Hansen, et al., 2016):

i. A monetary to an extended, multifaceted value notion that integrates social, ecological, and economic value forms,
ii. a customer and shareholder-centricity to considering the needs of all stakeholders, including the society and environment,
iii. a firm-centered to a wider embedded systems perspective, and
iv. an outsourcing of externalities to internalizing them by taking into account the value uncaptured.

The first attribute refers to the *integration of multiple value forms* in SBMs that collectively form a sustainable value (Breuer et al., 2018; Evans et al., 2017). While financial viability is acknowledged to be an essential prerequisite for pursuing SBMs (Bocken, Short, Rana, & Evans, 2013; Boons et al., 2013), economic value on its own is perceived to a lesser extent as the ultimate end goal of SBMs. Instead, it is predominantly regarded as a means to simultaneously generate long-term environmental and/or social value (Schaltegger, Hansen, et al., 2016; Stubbs, 2017; Stubbs & Cocklin, 2008). This extended, multifaceted notion of value entails questioning its conventionally monetary antecedent and definition of success, in particular the short-term horizon of expected financial earnings (Laasch, 2018; Lüdeke-Freund & Dembek, 2017).

The second attribute emphasizes the importance of *stakeholder integration* in SBMs (Breuer et al., 2018). It implies the necessity to shift from an exclusive prioritization of customers and shareholders to explicitly considering the needs of a greater variety or even all stakeholders (Dembek, York, & Singh, 2018; Lüdeke-Freund & Dembek, 2017; Stubbs & Cocklin, 2008). To exemplify this, Upward and Jones (2016) discuss co-creation with all stakeholders of an organization. More precisely, Stubbs and Cocklin (2008) mention the necessity to treat nature as a stakeholder, while Evans et al. (2017) and Bocken et al. (2014) extend this view, discussing the natural environment and society as principal stakeholders.

The third attribute refers to the need to adopt a *wider systems perspective* in SBMs. In analogy to the activity systems perspective proposed by Amit and Zott (2001) in conventional BM literature, SBMs are understood as boundary-spanning activity systems of interwoven synergetic activities (Breuer et al., 2018).

While acknowledging the relevance of internal capabilities within organizational boundaries, Stubbs and Cocklin (2008) encourage a systematic consideration of the surrounding wider system of the SBM that ultimately also needs to be sustainable. In this regard, the proactive engagement of firms in institutional work and collaborative partnerships between internal and external stakeholders are considered to be crucial factors (Morioka et al., 2017; Stubbs, 2017; Stubbs & Cocklin, 2008).

The fourth attribute relates to the *internalization of externalities* into SBMs (Gulbrandsen et al., 2015). Jørgensen and Pedersen (2015) differentiate between positive and negative externalities. Positive externalities, or put differently a firm's "sunny side," refer to novel profitable business opportunities that are realized by addressing environmental and/or social problems (Jørgensen & Pedersen, 2015, 2017). Negative externalities, on the other hand, can be described as a firm's "shadow side." They relate to the negative environmental and/or societal footprint caused by business practices or the mere existence of a firm, which in conventional BMs tends to be neglected (Jonker & Faber, 2019; Jørgensen & Pedersen, 2015, 2017). SBMs, however, need to internalize not only positive but also negative externalities (Gulbrandsen et al., 2015; Jørgensen & Pedersen, 2015). This typically implies the need to consider the value created but also build awareness around the value uncaptured (Dembek et al., 2018).[2]

Amalgamating the definitions and the main attributes presented, this thesis defines an SBM as

> *a BM that embeds sustainability at the heart of business practices to create environmental and/or social value jointly with economic value and internalize positive and negative externalities while considering the needs of a variety of stakeholders, including nature and society, in a long-term perspective.*

[2] The value uncaptured may manifest itself in the form of the value destroyed (e.g., depletion of non-renewable resources, pollution, health, and safety hazards for employees), value surplus (e.g., overproduction or waste of resources), value missed (e.g., underutilization of by-products and disorganized use of human capital), or value absence (e.g., lack of expertise or labor) (Bocken et al., 2013; Yang, Evans, et al., 2017; Yang, Vladimirova, et al., 2017).

2.2.2 What is sustainable business model innovation?

2.2.2.1 Conceptualization of the SBMI concept

Research on the concept of SBMI, a subfield of SBM, is in a relatively nascent state (Aagaard, 2019; Geissdörfer, Vladimirova, & Evans, 2018). A number of scholars postulate that sufficient knowledge on how organizations develop and realize BMs, which are directed towards sustainability, has yet to be produced (Bocken et al., 2014; Pieroni et al., 2019a; Rauter et al., 2017; Stubbs, 2017). In response to that, some researchers have attempted to define the concept of SBMI. This has led to a fragmented understanding of SBMI in the absence of an unequivocal definition (Geissdörfer, Vladimirova, & Evans, 2018). Table 2 presents an overview of selected SBMI definitions.

Table 2

Overview of selected SBMI definitions.

Author	Definition
Zollo et al. (2013, p. 242)	"**Processes** through which firms actually navigate the multiple change requirements, **to identify, experiment with and eventually realize more sustainable models of the enterprise**."
Bocken et al. (2014, p. 44)	"Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society**, through changes in the way the organization and its value-network create, deliver value and capture value** (i.e. create economic value) or **change their value propositions.**"
Geissdörfer et al. (2016, p. 1220)	"Sustainable business innovation **processes** specifically aim at **incorporating sustainable value and a pro-active management of a broad range of stakeholders** into the BM."
Roome and Louche (2016, p. 12)	"**Process** through which new BMs are developed by businesses and their managers [and] how **companies revise and transform their BM** in order to **contribute to sustainable development**."
Pieroni et al. (2019a, p. 200)	"Sustainability-oriented BMI **incorporates sustainability principles as guidelines for BM design**, adding complexity to the conventional ('business as usual') BMI process."

Despite extant differences, a common denominator in the SBMI definitions presented constitutes the emphasis on the process of transformation that aims to realize a more sustainable type of BM. It incorporates certain principles and characteristics of sustainability (e.g., sustainable value or stakeholder integration), which are parallel to those discussed thoroughly in the context of SBM in Section 2.2.1. In analogy to the BMI literature (e.g., Saebi, 2015; Wirtz, Pistoia, et al., 2016), SBMI has been viewed as both an outcome and a process.

A prevalent stream of scholars focuses on the outcomes of SBMI in the form of novel SBM types in particular firms or industries (e.g., mobility, energy, or food), which are typically achieved through a reconfiguration of SBM components, integrating sustainability-driven strategies and patterns (Bocken et al., 2014; Brehmer et al., 2018; Lüdeke-Freund et al., 2018; Olofsson et al., 2018). However, the underlying SBMI *process* that firms undergo to transition to a novel SBM largely remains a black box (Geissdörfer et al., 2017; Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a; Roome & Louche, 2016). By adopting a dynamic, process-oriented perspective, an emerging stream of SBMI scholars has begun to examine the process of change itself (Pieroni et al., 2019a). In this study, a process-oriented view of SBMI is adopted, which will be detailed further in Section 2.3.

Another way of conceptualizing SBMI has arisen from scholarly attempts to classify the concept. Geissdörfer, Vladimirova, and Evans (2018) differentiate between *SBMI types, SBM types, and SBM strategies*.

A grouping into the following four SBMI types is proposed (Geissdörfer, Vladimirova, & Evans, 2018):

i. Sustainable start-ups (creation of a new organization with an SBM),
ii. SBM transformation (change of the existing BM into an SBM),
iii. SBM diversification (novel SBM is established without changing the existing BM),
iv. SBM acquisition (acquisition of an additional SBM integrated into the organization).

These SBMI types are further intended to incorporate different SBM strategies and realize different SBM types.

SBM types represent possible outcomes of SBMI that include, for example, social enterprises, product-service-systems, or circular BMs (Geissdörfer, Vladimirova, & Evans, 2018).

SBM strategies refer to Bocken et al.'s (2014) eight generic archetypes for sustainability-oriented BMs that delineate mechanisms and solutions for the development of SBMs. To date, they represent the most influential classification in extant SBMI literature (Aagaard & Lodsgård, 2019; Pieroni et al., 2019a). Bocken et al. (2014) stress that the achievement of sustainable outcomes may require a combination of several archetypes.

Ritala et al. (2018) extend this archetypal classification by adding "inclusive value creation" to the eight existing archetypes. The revised nine archetypes are shown in Figure 3. Examining the adoption of the archetypes by the largest S&P 500 index-listed corporations based on a longitudinal content analysis, Ritala et al. (2018) find SBMI in large corporations to be largely linked to material and energy efficiency, substitution with renewable and natural processes, and closing resource loops. This indicates a dominance of environmental-focused archetypes in comparison to social or organizational ones in its adoption (Ritala et al., 2018).

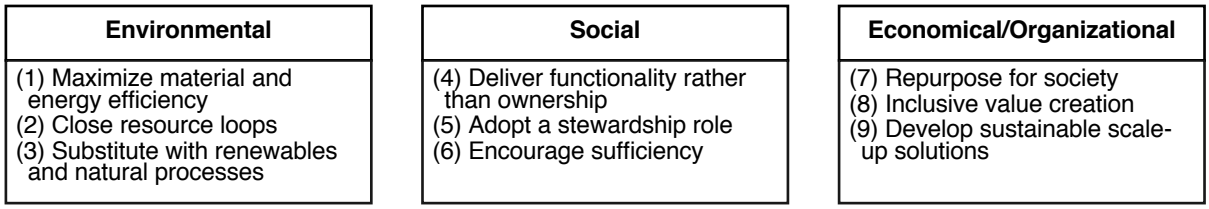

Figure 3. Updated SBM archetypes.
Adapted from Bocken et al. (2014) and Ritala et al. (2018).

Building on the conceptualizations presented, this thesis defines SBMI as

> *a process of change guided by sustainability-oriented strategies that firms undergo to transition to a more sustainable type of BM through the creation, acquisition of new SBMs, or the modification of value-creation, delivery, and capture mechanisms in established ones.*

2.2.2.2 Drivers and challenges of SBMI

The potential to secure competitive advantage and organizational stability while attaining a positive contribution to the environment and/or society is widely recognized as a critical motivation for pursuing SBMI (Bocken et al., 2014; Geissdörfer, Vladimirova, & Evans, 2018; Ritala et al., 2018; Stubbs, 2017; Täuscher & Abdelkafi, 2018; P. Wells, 2015). Studies show a positive link between sustainability-driven innovation and long-term financial performance (Kiron, Kruschwitz, Reeves, & Goh, 2013; Scarpellini, Valero-Gil, Rivera-Torres, & Garcés-Ayerbe, 2017; Stubbs & Cocklin, 2008; Zollo et al., 2013). However, Rauter et al.'s (2017) study on organizational drivers for SBMI points towards the fact that sustainable competitive advantage may not be the sole factor that encourages the pursuit of SBMI. Their study results show that the motives behind SBMI are often value-oriented and personal. In this regard, Stubbs and Cocklin (2008) stress the central role of visionary sustainability leaders that drive a sustainability mindset in the organization. Closely linked to that, a sustainability-conscious organizational culture and work environment as well as consistency between corporate strategy and BM have been identified as additional internal drivers for SBMI. In addition, Rauter et al. (2017) mention changes in legal regulations as a critical external driver for SBMI.

Notwithstanding the opportunities associated with SBMI, its diffusion remains slow (Laukkanen & Patala, 2014). As SBMI is logically founded on conventional BMI, it is not surprising that firms attempting to navigate the sustainable business modeling process are confronted with similar challenges (see Section 2.1.2.3). These obstacles, however, are intensified in SBMI by the complexities of adding sustainability to the already challenging endeavor of conventional BMI (Geissdörfer, Vladimirova, & Evans, 2018; Long et al., 2018; Morioka et al., 2017). These complexities are entrenched in the conceptual extensions present in SBMs, such as a multifaceted value notion or a wider integration of stakeholders, systems, and externalities but also the emergence of unforeseen consequences in SBMI (Breuer et al., 2018; Dembek et al., 2018; Lüdeke-Freund & Dembek, 2017). In fact, a firm could have initiated SBMI with the best possible intention in mind but still may experience a diminished impact of their sustainability efforts due to negative rebound effects (Antikainen & Valkokari, 2016; Bocken, Boons, et al., 2019; Bocken & Geradts, 2020; Breuer et al., 2018; Mortimer, 2016). A negative rebound effect in SBMI can, for example, be an induced reduction in public transport use from adopting of a car-sharing model or increased consumption as result of implementing of a sharing platform (Bocken & Geradts, 2020; Leenheer & Kuijten, 2018).

2.3 Adopting a process perspective

2.3.1 The roots of processes and process models in innovation management

The use of processes is a well-established practice in innovation management literature where it has been of scholarly interest since the 1950s (Garud, Tuertscher, & Van de Ven, 2013; Godin, 2015; Read, 2000; Usher, 1955). As a consequence, numerous process models for innovation have been developed over time (e.g., Cooper, 1990, 2008; Padmore, Schuetze, & Gibson, 1998; Rothwell & Zegveld, 1985; Tidd & Bessant, 2013; Usher, 1954; Van de Ven, Polley, Garud, & Venkataraman, 1999). A prominent grouping of innovation process models is proposed by Rothwell (1992, 1994) that categorizes them into five generations.[3]

The first and second generation of models, as illustrated in Figure 4, perceive innovation processes to be strictly *sequential* and *linear* in nature with either technological progress ("technology push") or customer needs ("market pull") being the vital innovation drivers (Myers & Marquis, 1969; Rothwell, 1992, 1994; Salerno, Gomes, Silva, Bagno, & Freitas, 2015; Usher, 1955).

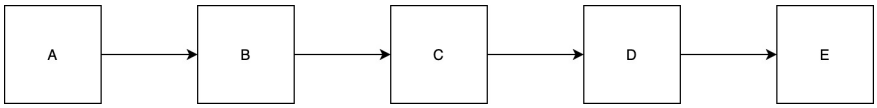

Figure 4. Linear model (1. and 2. Generation).
Adapted from Read (2000), Reinhold (2014), and Rothwell (1992, 1994).
Note. Generic phases/functions in the innovation process are titled with the letters A through E.

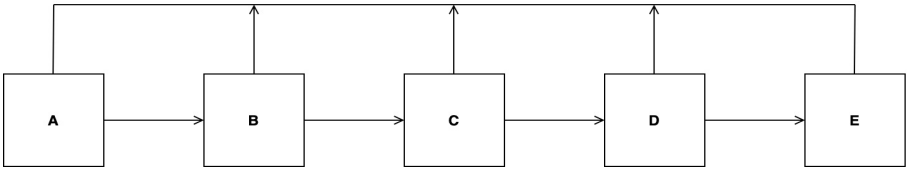

Figure 5. Coupling model (3. Generation).
Adapted from Read (2000), Reinhold (2014), and Rothwell (1992, 1994).
Note. Generic phases/functions in the innovation process are titled with the letters A through E.

[3] See also Marinova and Phillimore (2003), Tidd, Bessant, and Pavvit (2005), Berkhout, Hartmann, Van Der Duin, and Ortt (2006) for alternative classification approaches that build on and/or extend Rothwell's (1992, 1994) work.

The third generation of interactive "coupling" models, as shown in Figure 5, combines both "technology-push" and "market-pull" models. Following the linear logic postulated by the preceding two generations, the innovation process is still divided into discrete stages of functional activities and moments of decisions (Cooper, 1990, 1994; Meissner & Kotsemir, 2016; Rothwell, 1992, 1994). However, Rothwell and Zegveld (1985) extend the first and second-generation models by acknowledging their interdependencies through the *addition of feedback and interaction loops* between the different stages.

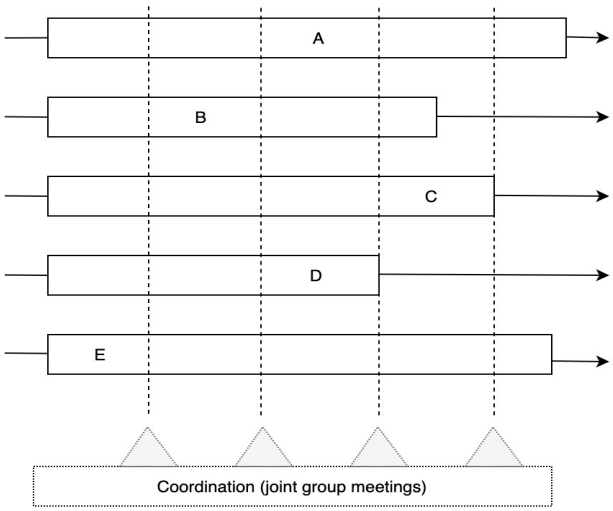

Figure 6. Integrated model (4. Generation).
Adapted from Read (2000), Reinhold (2014), and Rothwell (1992, 1994).
Note. Generic phases/functions in the innovation process are titled with the letters A through E.

The subsequent fourth generation of "integrated" models shifts from a sequential to a parallel perception of innovation processes (Galanakis, 2006; Rothwell, 1992, 1994) as illustrated in Figure 6. Such processes encompass a *cross-functional integration and parallel activities* within the different departments of a firm and with external upstream and downstream partners through strategic alliances (Contractor & Lorange, 1988; Dodgson, 1993; Hagedoorn, 1990; Kline & Rosenberg, 1986; Rothwell, 1991, 1992, 1994; Tidd et al., 2005).

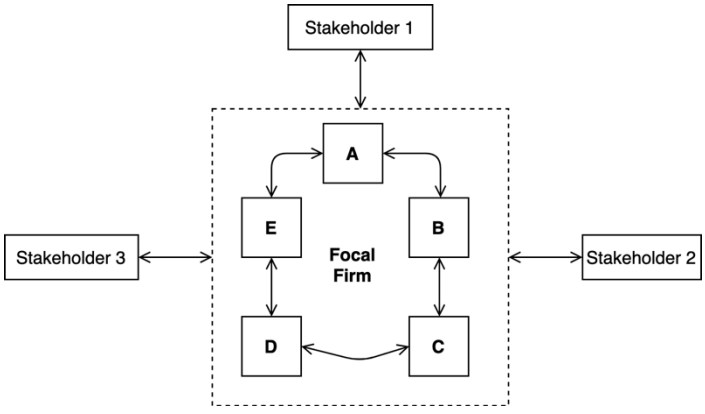

Figure 7. Networking model (5. Generation).
Adapted from Read (2000), Reinhold (2014), and Rothwell (1992, 1994).
Note. Generic phases/functions in the innovation process are titled with the letters A through E.

Building on the fourth-generation models, the fifth generation of "networking" models, as illustrated in Figure 7, is characterized by flexible, interconnected development processes and a strong emphasis on continuous change. Innovation is facilitated through *greater networking with external stakeholders* and the *added use of new electronic tools*, such as simulation modeling, computer-aided design, and manufacturing or rapid prototyping (Galanakis, 2006; Meissner & Kotsemir, 2016; Rothwell, 1994).

The generational evolution of process models presented indicates that, over time, researchers have acknowledged the inherent complexity of innovation processes in the real world and the growing relevance of interdependencies with the external environment, in particular with more radical and comprehensive types of innovation (Bucherer et al., 2012; Cheng & Van De Ven, 1996; Garud et al., 2013; Tidd & Bessant, 2013; Van de Ven, 2017; Van de Ven et al., 1999). However, the codification of process models in the literature is confronted with a trade-off between simplicity and pertinence (Reinhold, 2014; Tidd & Bessant, 2013). As a result, all generations of process models are still in use with scholars debating about the ideal degree how processes can or shall be organized (Stampfl, 2016). In addition, a hybridization can be observed with models that borrow elements from different generations to construct new process models (Herstatt & Verworn, 2014; Stampfl, 2016; Verloop, 2004).

Despite extant differences between the generations, the following two characteristics are shared across all generations of innovation process models. The first common trait refers to a depiction of the innovation process through certain process components. Most commonly, this includes process phases, functional activities, tools, or roles (Beausoleil, 2018; Bucherer, 2010). The second common denominator refers to the delineation of the innovation process in line with Cooper's (1994, 2008) "idea-to-launch" paradigm that portrays the process of innovation in a holistic manner.

While insights from innovation management literature are useful to get an understanding about the conceptual roots and evolving characteristics of different process-model generations, the process models developed focus predominantly on new product development, service, and process innovations. These types of innovations, however, tend to be less complex and far-reaching compared to innovations linked to BMs (Geissdörfer, Vladimirova, Fossen, & Evans, 2018; Tesch, 2019; Visnjic, Wiengarten, & Neely, 2016; Winterhalter et al., 2017).[4]

Therefore, an overview of process models that are specifically designed for BMI and SBMI will be presented in the following section.

[4] See Section 2.1.2.2 for a delineation of the link between BMI and other types of innovation.

2.3.2 Review of holistic process models in BMI and SBMI literature

While BMI and SBMI have both been conceptualized as an outcome and a process in the literature, it is the *process-oriented, dynamic perspective* that is further investigated in this thesis.

Within the process-oriented body of BMI and SBMI literature, one stream puts a strong emphasis on understanding the iterativity present in the business modeling process, scrutinizing experimentation, trial-error learning, and effectual thinking as pivotal capabilities that are necessary to mitigate the inherently high uncertainty in the process (Baldassarre et al., 2017; Chesbrough, 2010; Sarasvathy, 2001; Sosna et al., 2010; Weissbrod & Bocken, 2017). The other stream focuses on a systematic examination of the processual black box that attempts to organize and comprehend the process of BMI and SBMI in its entirety (Bucherer, 2010; Bucherer et al., 2012; Pieroni et al., 2019a; Roome & Louche, 2016). These approaches bear substantial resemblance to the "idea-to-launch" paradigm from innovation management literature and entail some of the generational characteristics discussed in the preceding section.

In this section, the focus will be placed on the latter stream by reviewing holistic process models in BMI and SBMI literature. Such models do not discard the importance of experimental capabilities and existence of uncertainty in the process but rather put a stronger emphasis on providing a holistic depiction of the process through the use of different process components. A number of holistic process models for SBMI and BMI have emerged in the literature. Appendix A presents a detailed overview of the process models reviewed.[5] The examination of a total of 16 process models reveals a number of differences in terms of their composition i.e., process phases, elements as discussed in Sections 2.3.2.1 and 2.3.2.2, and characteristics as outlined in Section 2.3.2.3. Additionally, differences in the methodologies utilized to construct the process models reviewed are presented in Section 2.3.2.4. Lastly, Section 2.3.2.5 discusses discrepancies in the availability of process models in SBMI compared to BMI literature. The insights gained through the review conducted are further used to develop the conceptual process framework of this study in the subsequent section.

[5] The selection criteria for the process models reviewed are discussed in more detail in the methodology chapter (see Section 3.2.1.1).

2.3.2.1 Process phases

First, a difference in the number of process phases is observed. Appendix B provides a detailed overview of the BMI and SBMI process models reviewed, structured along the corresponding number of process phases.

More than half of the process models identified in the literature aggregate the business modeling process into *four phases* (e.g., Bucherer, 2010; Bucherer et al., 2012; Frankenberger et al., 2013; Gassmann, Frankenberger, & Csik, 2014; Laudien & Daxböck, 2017; Mitchell & Bruckner Coles, 2004b; Roome & Louche, 2016; Stampfl, 2016). In conventional BMI literature, Bucherer (2010) and Bucherer et al. (2012), for example, divide the business modeling process into analysis, design, implementation, and control. The analysis phase aims to detect flaws in the current business. This entails the evaluation of the firm's BM and relevant influencing factors on a micro and macro level. The design phase is concerned with the development and feasibility assessment of alternative BM scenarios. The implementation phase entails the necessary measures to realize the BM changes designed. A subsequent phase of control ensures that the newly implemented BM runs smoothly through continuous monitoring of potential incidents in the environment and the firm. This ensures that a new cycle of BMI is initiated if relevant changes occur (Bucherer, 2010; Bucherer et al., 2012).

Similarly, Frankenberger et al.'s (2013) 4I-framework of BMI and Gassmann et al.'s (2014) BM Navigator comprise four phases. The latter builds on and further refines the four phases of the 4I-framework. The initiation phase focuses on obtaining an in-depth understanding of the surrounding ecosystem of a firm. This is regarded to be vital since BMs are not isolated constructs but interact closely with players in the ecosystem, which itself is subject to continuous change (Frankenberger et al., 2013; Gassmann et al., 2014). It is followed by the ideation phase in which ideas for new BMs are produced through creativity-stimulating tactics. In this regard, Gassmann et al. (2014) further specify the particular relevance of pattern adaptation in ideation, arguing that 90 percent of BMIs occur through a recombination of patterns from existing BMs in other industries, contexts, or markets. In the integration phase, a new BM is developed based on ideas that are substantiated and different BM components being integrated into a viable BM. Finally, the new BM is realized in the implementation phase (Frankenberger et al., 2013). Likewise, Mitchell and Bruckner Coles (2004b) suggest four dimensions for a continuous BMI process that include the understanding and optimal application of an existing BM, creation and following of an appropriate BMI vision, continuous design and testing, and the installation of BM improvements or replacements.

In SBMI literature, Roome and Louche (2016) propose a process model of BM change for sustainability that consists of four spirally interlinked phases. “Identifying” necessitates a problem-driven exploration that acknowledges fundamental internal beliefs and the relevance of learning combined with the ability to challenge existing assumptions and the utilization of ideas from the external environment. This leads to the emergence of a novel BMI vision that in the phase of “translating” is detailed and adapted to the company setting while developing necessary competences and collaborative arrangements. “Embedding” integrates the novel insights and relationships into a revised BM. This BM is further concretized and prepared for execution, which leads to the abandonment of the old BM. The final phase of “sharing” amalgamates the BM network into a collaborative structure and communicates the finalized BM to a wider internal and external audience. This transformation process is accompanied by a management performance system (Roome & Louche, 2016).

Some scholars provide a more detailed depiction of the business modeling process, structuring it into five to eight phases (e.g., Eurich, Weiblen, & Breitenmoser, 2014; Fallahi, 2018; Geissdörfer et al., 2017; Osterwalder et al., 2005; Stampfl, 2016; Tesch, 2019; Wirtz & Daiser, 2018; Zott & Amit, 2015). For example, Osterwalder and Pigneur (2010) propose *five phases* for the BMI process. “Mobilize” serves as a preparation phase in which awareness for BMI is raised, the team is assembled, and project goals are outlined. “Understand” entails the collection of information about the context in which the BM is embedded. “Design” involves the generation and testing of viable BM options and the selection of the most suited one. “Implement” is concerned with the execution of the selected BM. “Manage” advocates the need for continuous evaluation and adaptation of the new BM.

Tesch (2019) structures the BMI process into *six phases*: initiation, ideation, prototyping, validation, implementation, and scaling. Wirtz and Daiser (2018) suggest an even more meticulous division of the process into *seven phases*: analysis, ideation, feasibility, prototyping, decision-making, implementation, and sustainability. While the initial and final phases of these more detailed process models are overlapping with those found in the more abstract process models discussed before, the “middle part” deviates in a way that BM development is finer divided into, for example, feasibility, prototyping, and decision-making (Wirtz & Daiser, 2018) or prototyping and validation (Tesch, 2019).

Finally, the most detailed process model is located in SBMI literature. Geissdörfer et al.'s (2017) Cambridge BMI process structures the SBMI process into a total of *eight phases:* ideation, concept design, virtual prototyping, experimenting, detail design, piloting, launch and adjustment, and diversification. Ideation entails the identification of essential stakeholders and the generation of initial ideas. Concept design is concerned with conceptualizing and documenting a first draft of vital BM elements. Virtual prototyping entails the creation of different prototypes used to communicate the BM concept and to benchmark it against alternative solutions. A testing of main assumptions and variables is performed in the phase of experimenting "in simulations and field experiments, ideally through randomized and controlled trials" (Geissdörfer et al., 2017, p. 265). Detail design consists of a thorough analysis of BM elements and their interactions. Piloting advocates a more extensive testing of the entire BM concept. Launch entails the final execution of the new BM across organizational units and the target market. Finally, adjustment and diversification are concerned with matching the new BM against initial expectations and potentially reiterate the business modeling process depending on the discrepancies identified.

To conclude, the examination of the process models reveals that more than half of all process models identified in SBMI and BMI literature consist of four higher-level phases. From the comparison, it can further be observed that the process models identified *vary considerably in terms of specificity levels.* This manifests itself in the prevalence of process models with a small number of higher-level process phases and those with one up to eight more fine-grained process phases, mirroring the trade-off between simplicity and pertinence acknowledged in the innovation management literature (Reinhold, 2014; Tidd & Bessant, 2013).

2.3.2.2 Process elements

Second, a variation in the process elements included in the BMI and SBMI process models is reviewed.

All of the process models studied depict BMI and SBMI processes through phases, sometimes also referred to as "steps" (Eurich et al., 2014) or "dimensions" (Mitchell & Bruckner Coles, 2004b). Mostly, however, these phases are delineated in a concise manner, as outlined in the previous section, without providing a detailed empirically grounded narrative of the activities performed in the business modeling process from "idea to launch."

In addition to activities, many of the process models reviewed put an emphasis on further exploring process elements that relate to barriers and/or success factors (e.g., Frankenberger et al., 2013; Geissdörfer et al., 2017; Laudien & Daxböck, 2017; Osterwalder & Pigneur, 2010), tools (e.g., Geissdörfer et al., 2017; Osterwalder & Pigneur, 2010), artefacts or results (e.g., Bucherer, 2010; Laudien & Daxböck, 2017; Schallmo, 2013) linked to different process phases. An element that only few process models focus explicitly on are actors that participate in the business modeling process. More generally, the importance of top management involvement in the business modeling process is emphasized by Stampfl (2016) and Bucherer et al. (2012). In SBMI literature, Roome and Louche (2016) stress the need for a "collaborative structure of actors and communities" (Roome & Louche, 2016, p. 31) in their empirically grounded SBMI process model. However, none of the process models analyzed maps actors, participating in the process, to the different process phases as it is typically the case with the other process elements outlined before. As such, only limited scholarly attempts exist to specifically locate responsibilities and understand the ways in which process actors engage and perform necessary activities in the different phases of the business modeling process.

To conclude, phases, activities, critical factors (barriers and success factors), tools, artefacts, results, and actors were identified as the main process elements used to a varying extent to describe the business modeling process. The review further shows that while all of the BMI and SBMI process models reviewed are depicted through phases, *limited attention to a detailed narrative of process activities and profound insights into actors*, *participating in the business modeling process* exists.

2.3.2.3 Process characteristics

Third, a difference in how the overall business modeling process is characterized in the BMI and SBMI process models reviewed is found.

In conventional BMI literature, some of the BMI process models studied decompose the business modeling process into steps that need to be followed to arrive at a novel BM , being presented in the form of a sequential "step-by-step" approach that is illustrated in a linear flow (e.g., Eurich et al., 2014). Other BMI process models, however, indicate that business modeling processes are more complex. For example, Stampfl (2016) describes the process of BMI to be very dynamic and further postulates that it cannot be adequately reflected by linear innovation process models.

Similarly, Bucherer et al. (2012) outline that the BMI process is rarely sequential but rather iterative in nature. In this context, several iterations between process phases have been acknowledged by scholars (Fallahi, 2018; Frankenberger et al., 2013; Schallmo, 2013). Moreover, many of the process models reviewed include experimental elements in the form of prototypes, trials, and pilots that by their nature call for a certain degree of iteration in the process (e.g., Fallahi, 2018; Geissdörfer et al., 2017; Wirtz & Daiser, 2018). In addition to characterizing the BMI process as iterative and dynamic, Osterwalder and Pigneur (2010) and Mitchell and Bruckner Coles (2004b) further point to potential simultaneous occurrences within the BMI process.

The limited SBMI process models reviewed stress the importance of interlinkages between the phases and exchange with the external environment. For example, Roome and Louche (2016) highlight that phases in their process model of BM change for sustainability are spirally interlinked and receptive to interactions with the network. Geissdörfer et al. (2017) describe the eight process phases of their Cambridge BMI process to be generally followed in a consecutive yet cyclical manner, implying that firms may move bidirectionally between phases of the sustainable business modeling process.

Also, while many of the process models reviewed acknowledge the iterativity of the business modeling process in both conventional and sustainable BMI literature, the exact manifestation is not further specified empirically with the exception of Frankenberger et al. (2013), who found iterations to occur in both early and late phases of the process in their examination of BMI in established, multinational firms.

To summarize, there is an *inconsistent view how the nature of the overall process of SBMI and BMI is characterized* in the process models reviewed. In this regard, the author's examination of process characteristics agrees with Wirtz and Daiser (2018, p. 54), who postulate the need for "empirical research [that] should shed light on the question, whether the BMI process really is a linear process or linear sequence of steps… or a whether it rather is a retrograde process or cycle."

2.3.2.4 Methods and theoretical underpinning

Fourth, a difference in the methods and theoretical underpinnings utilized to construct process models for BMI and SBMI is recognized.

Many of the process models identified are derived from *empirical case studies*. For example, Laudien and Daxböck (2017) study the process of BMI in the context of ten small and medium-sized average market players in the German business-to-business market. Bucherer et al.'s (2012) process model is inductively derived from 11 cases of incumbent and emerging firms. In a multiple case study of seven established Swedish firms from six different industries, Fallahi (2018) derives a process model for purposeful and emergent BMI. In SBMI literature, Roome and Louche (2016) examine the process of BM change towards sustainability in a comparative case study of two sustainability pioneers in the textile and construction industry.

Other scholars developed *conceptual process models*. For example, Eurich et al. (2014) propose a six-step process to BMI based on principles of network thinking and Drucker's (1994) "theory of business." Zott and Amit (2015) apply design research to create a generally applicable normative BMI process model. Other conceptual models build on process models from extant BMI literature (e.g., Schallmo, 2013; Tesch, 2019; Wirtz & Daiser, 2018).

A combination of both methodologies, what may be called a *hybrid approach*, is also found in the literature. Having identified a scarcity of process models in conventional BMI literature at the time of the publication, Frankenberger et al. (2013) synthesize process phases from process models in innovation management literature. To allow an adaptation to the novel context of BMI, the phases are utilized to guide the empirical investigation of the process content (i.e., structure and challenges in each phase) through the use of a multiple case study of 14 cases.

To develop a process model for BMI in incumbent firms, Stampfl (2016) combines the concepts of "sensebreaking" and "sensegiving" rooted in identity literature (Ashforth, Harrison, & Corley, 2008) and Lewin's (1951) classic "unfreeze-change-freeze" model from change management with two in-depth, retrospective case studies of established firms. In SBMI literature, Geissdörfer et al. (2017) construct the Cambridge BMI process based on a synthesis of process models from conventional BMI literature and expert interviews and further test the newly developed process model in a single case study of an early-stage social start-up.

To conclude, *different methodologies* are applied to examine sustainable and conventional business modeling processes. Mostly, process models are empirically derived from multiple case studies. Sometimes, a hybrid approach, combining a derivation of phases based on the literature with empirical case studies, is utilized. The remaining conceptual process models build on various theoretical underpinnings (e.g., design research, extant BMI literature, network thinking).

2.3.2.5 Scarcity of holistic SBMI approaches

Lastly, the review conducted displays a scarcity of holistic process models for SBMI with only two of the sixteen generic process models reviewed belonging to SBMI literature.

The scarcity of process models, examining the sustainable business modeling process from "idea to launch," indicates that the *holistic perspective on SBMI is still in its infancy*. Recent literature reviews by Geissdörfer, Vladimirova, and Evans (2018) and Pieroni et al. (2019a) support this observation. Pieroni et al. (2019a) note that albeit methodological support for SBMI is provided in the literature, only few holistic process models, covering the entire SBMI process, have been developed. In fact, only 14 percent of the sustainability and circular economy (CE)-focused approaches (e.g., frameworks, methods, tools, and models) studied in their literature review are process-oriented, representing the least frequent category identified in the literature. They further indicate that the sustainable business modeling process has primarily been examined through the lens of "business experimentation for sustainability" (BES), a stream of literature rooted in effectual reasoning (e.g., Sarasvathy, 2001), start-up thinking (e.g., Ries, 2011), and research on organizational change (e.g., Chesbrough, 2010). It belongs to the stream of literature that emphasizes the necessity of developing sustainable business experimentation capabilities and methods to account for the high uncertainty and iterativity in the process (Baldassarre et al., 2017; Weissbrod & Bocken, 2017) as introduced in the beginning of this section.

On the other hand, process models that focus on a holistic depiction of the SBMI process are rare (Pieroni et al., 2019a). In a similar vein, Geissdörfer, Vladimirova, and Evans (2018) point to the fact that extant approaches in the literature focus mostly on the examination of static components or single process phases, offering little guidance in terms of the remaining process of SBMI.

In contrast to the scarcity identified in SBMI literature, this review reveals that a *substantial number of holistic process models exists in conventional BMI literature*, which the concept of SBMI logically builds on.

In addition to the two holistic SBMI process models identified and reviewed in the previous sections, recent publications in the body of SBMI literature demonstrate an increasing academic interest in the process-oriented, holistic perspective on SBMI. For instance, Naor, Drühl, and Bernardes (2018) apply the eight-phase Cambridge BMI process developed by Geissdörfer et al. (2017) to holistically explore the process of SBMI in a single case study that attempts to introduce a servitized pay-per-use model in sustainable transportation. Some SBMI scholars have begun to "borrow" process models from conventional BMI literature. For instance, Prendeville and Bocken (2017) adapt Frankenberger et al.'s (2013) 4I-framework to the SBMI context, mapping different service design tools to the process of SBMI that is depicted through the phases of initiation, ideation, integration, and implementation.

This process review further shows that *processes of SBMI in large firms are rarely discussed* with the exception of Roome and Louche (2016), who examine such process in the context of both a small textile firm and a large construction firm. In general, extant process-oriented SBMI research, which includes the limited holistic process models reviewed and the work of BES scholars, is mostly focused on the empirical context of emerging firms or remains on a conceptual level. The empirical focus on emerging firms is, for example, evident in the generic Cambridge BMI process by Geissdörfer et al. (2017). It was first tested by the researchers in the case of a social start-up and later applied in the context of a mobility start-up in another study by Naor et al. (2018).

To conclude, there is a *scarcity of holistic, generic process models in SBMI research*, whereas a plethora of process models, depicting the business modeling processes from "idea to launch," exist in conventional BMI literature. Nonetheless, there is an increasing interest in the holistic perspective on SBMI with more studies beginning to either apply the limited generic process models developed in SBMI or borrowing process models from conventional BMI literature. Lastly, the review conducted also shows that processes of SBMI in large firms are hardly discussed.

2.4 Summary of the literature review and research gaps

A number of scholars have ascribed SBMs the potential to contribute to sustainable development and secure competitive advantage and organizational stability (Bocken et al., 2014; Geissdörfer, Vladimirova, & Evans, 2018; Ritala et al., 2018; Stubbs, 2017; Täuscher & Abdelkafi, 2018; P. Wells, 2015).

The addition of sustainability to the already difficult endeavor of BMI confronts firms with an extended value dimension, the need for a wider integration of stakeholders, networks, and externalities as well as potential rebound effects that require to be taken into consideration (Antikainen & Valkokari, 2016; Bocken, Boons, et al., 2019; Breuer et al., 2018; Dembek et al., 2018; Jørgensen & Pedersen, 2015; Lüdeke-Freund & Dembek, 2017; Stubbs & Cocklin, 2008). Consequently, SBMI is understood as a challenging yet critically vital undertaking accompanied by a high degree of complexity (Geissdörfer, Vladimirova, Fossen, et al., 2018; Laukkanen & Patala, 2014; Long et al., 2018; Morioka et al., 2017).

In the attempt to explore this phenomenon, SBMI has been conceptualized as both an outcome and process in analogy to conventional BMI literature. However, while a number of scholars have focused on examining the outcomes of SBMI in firm or industry-specific studies (Bocken et al., 2014; Brehmer et al., 2018; Lüdeke-Freund et al., 2018; Olofsson et al., 2018), the literature review showed that the underlying process of SBMI remains largely under-researched (Geissdörfer et al., 2017; Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a; Roome & Louche, 2016). At a fundamental level, the first research gap relates to the dearth of studies, adopting a dynamic process perspective to SBMI.

Within the limited process-oriented body of SBMI literature, scholarly attention to date has predominantly been placed on examining business experimentation capabilities and methods (Baldassarre et al., 2017; Bocken, Boons, et al., 2019; Weissbrod & Bocken, 2017) or particular stages of the SBMI process (Geissdörfer et al., 2016; Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a). However, while the work of these scholars makes an important contribution to understanding fragments of the SBMI process and proposing ways to address the inherent uncertainty in the process, it provides only limited guidance about the process in its entirety, which firms need to ultimately undergo to develop and realize more sustainable BMs (Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a).

The review of 16 process models in BMI and SBMI literature revealed a scarcity of holistic process models in the realm of SBMI. As opposed to an abundance of holistic process models present in conventional BMI literature, only few scholars have so far examined the SBMI process in a systematic manner. Hence, within the process-oriented body of SBMI literature, the second research gap relates to the absence of process models that holistically examine the process of SBMI as a whole. Additionally, differences in how the process models identified in both BMI and SBMI literature are composed and methodologies used to construct them were uncovered through the review conducted. More specifically, the third research gap refers to the fragmented landscape of process models for conventional and sustainable BMI that propose varying process phases and elements, inconsistent overarching process characteristics, and is missing a detailed empirically grounded narrative of activities and actors involved in the business modeling process.

Lastly, extant process-oriented SBMI studies are rarely examined in the context of large firms and either remain conceptual or have mostly been studied in the empirical context of emerging firms. The fourth and final research gap relates to the paucity of empirical studies in SBMI literature that focus on the particular context of large firms.

To address the research gaps outlined, it is vital to develop a deeper understanding of the SBMI process and examine how firms actually navigate the process of SBMI from "idea to launch," examining the main activities, actors, and vital process characteristics. The latter is set out in the three sub-questions of this study's overarching research question and the process elements of the conceptual process framework, which will be presented in the following section.

2.5 Building the conceptual process framework of this study

2.5.1 Derivation of process phases

Based on the review of 16 holistic BMI and SBMI process models presented in Section 2.3.2, a phase derivation was conducted by the author of this thesis through which a plethora of different phases were condensed into the following four higher-level phases: diagnosis, discovery, design, and delivery. In the interest of clarity and given the diversity of terms assigned to process phases in the scholarly literature reviewed, the author retitled them in the attempt to capture the essence of the variety of the process models reviewed.

A description of how the synthesis was performed is provided in Section 3.2.1.2 within the methodology chapter.

Figure 8 illustrates the four phases derived with equivalent exemplary phases from the process models identified in BMI and SBMI literature. A detailed mapping of the phases found in the literature to the four phases derived is further presented in Appendix C.

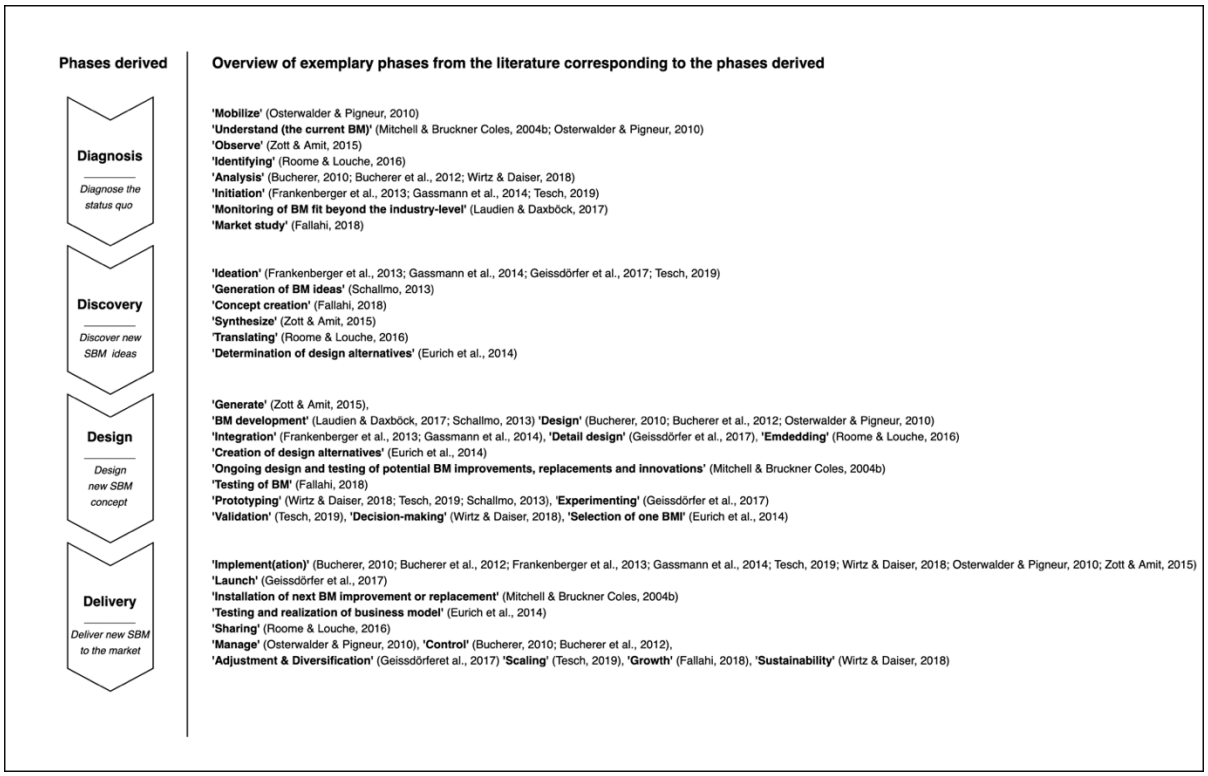

Figure 8. Process phases derived and equivalent exemplary phases from the literature.
Note. References are specified in the figure.

In the following, the objectives of each of the four phases are briefly explained:

Diagnosis: The diagnosis phase is concerned with gaining a better understanding of the status quo inside and outside the firm as well as diagnosing the need for change.

Discovery: The discovery phase intends to rethink the current business situation and allow the discovery of new ideas for potential new SBMs.

Design: The design phase aims to convert the ideas created into concrete SBM concepts.

Delivery: The delivery phase seeks to prepare the SBM concept designed for its launch and manage the novel SBM in the market and across the firm.

2.5.2 Presentation of this study's conceptual process framework

Figure 9 illustrates this study's conceptual process framework that was developed based on insights from conventional and sustainable BMI and general innovation management literature.

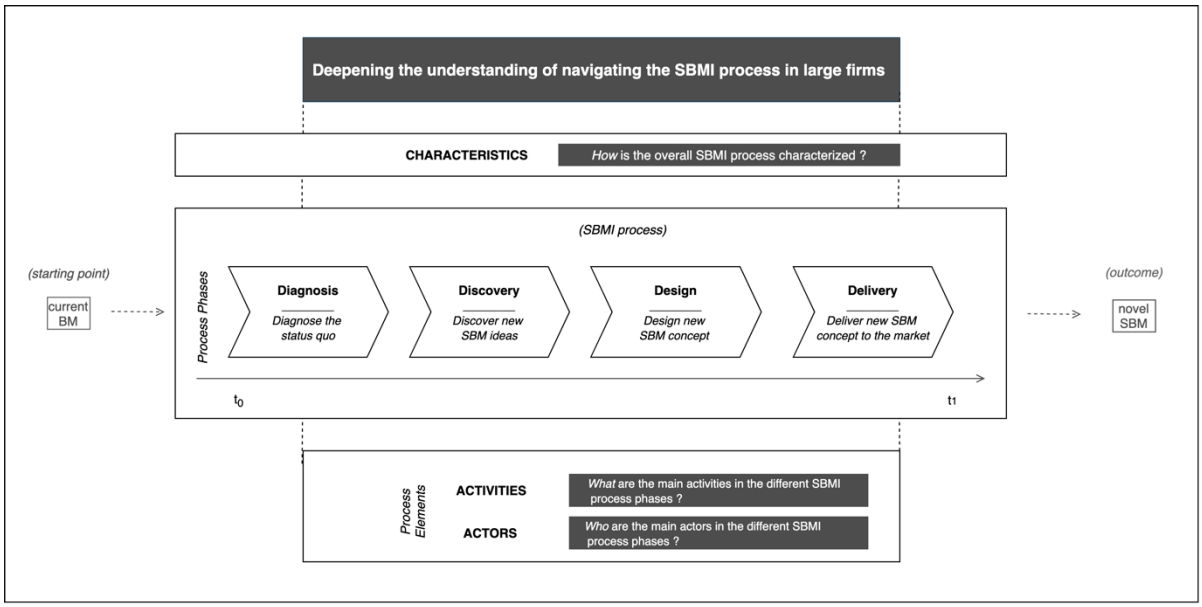

Figure 9. Initial conceptual process framework of this study.

Building on the conceptualization of SBMI and the working definition derived in Section 2.2.2.1, the process begins with an established (yet often unsustainable) BM *(starting point)* that undergoes a process of change, which is envisioned to either revise the established BM or create/acquire a novel BM that exists parallel to or is integrated into the existing BM. This process of change aims to ultimately arrive at a more sustainable type of BM that is delivered to the market, resulting in an SBM with a clear sustainability orientation *(outcome)*. In this process framework, the emphasis is placed on the dynamic business modeling process *(SBMI process)* rather than comparing the initial BM with the process outcome achieved. Hence, a dynamic process view to SBMI is adopted.

The process itself *($t_0 \rightarrow t_1$)* is depicted through the following four phases: **diagnosis, discovery, design, and delivery.** These phases were predominantly synthesized from process models in the adjacent field of conventional BMI given the scarcity of holistic process models identified in SBMI literature. The phases derived build the foundation of the processual framework constructed and guide the empirical investigation of processes through which large firms navigate to develop and realize a novel SBM, representing the main research question

of this study. Adopting a holistic process lens, the content of the processual black box is explored along the following three process elements. These elements were extracted from reviewing 16 process models in BMI and SBMI literature in Section 2.3.2.

Activities (what?)

The first element to study the process of SBMI will be the identification and delineation of process activities performed in the case empirics, which in the review of BMI and SBMI process models was found to lack a detailed empirically grounded narrative, albeit representing a main process element through which all of the process phases reviewed were typically described. The examination of activities is crucial as the synthesis of the process phases performed builds predominantly on process models from conventional BMI literature. As such, it will be critical to empirically investigate the process activities performed in the context of sustainable business modeling processes in large firms.

Actors (who?)

The second element to examine the SBMI process will be the identification of the process actors that perform the activities and locate responsibilities for SBMI in the case empirics. The review of process model elements showed that little insight from the scholarly literature exists into the process participants involved in different phases of the business modeling process. However, the consideration of the needs of all stakeholders represents a principal attribute of SBMs (see Section 2.2.1.2) and SBMI tends to be often driven by personal values and to depend on visionary leaders in the organization (see Section 2.2.2.2). This turns the exploration of actors and their engagement in the SBMI process into a particularly relevant aspect.

Characteristics (how?)

The third element will look at the characteristics of the SBMI process in its entirety. Little is known about the process of SBMI as a whole given the scarcity of holistic process-oriented SBMI studies. In addition, extant process models from BMI and SBMI literature are inconsistent in terms of how the business modeling process is characterized. Hence, it will be critical to empirically determine the nature of the overall SBMI process to understand how process actors move through the different phases of the SBMI process and perform corresponding activities.

3 METHODOLOGY

"Methodology is intuition reconstructed in tranquility." – Lazarsfeld (as cited in Pasanella, 1994, p. 22)

In this chapter, the methodological choices made to address the research question of this study are presented. First, the methodological fit and research design are discussed. Second, the data collection and analysis performed are delineated in greater detail. The chapter finishes with a critical evaluation of the methodology, reflecting on research quality and research ethics.

3.1 Methodological fit and research design

The methodological fit constitutes an overarching criterion to ensure the quality of the research conducted. To make a meaningful contribution, it is crucial that the research design selected is internally consistent with prior work as well as the research questions and purpose of the study (Edmondson & McManus, 2007).

The aim of this study is to enhance current understanding about the process of SBMI. To provide an answer to how large firms navigate such process, representing the overarching research question of this study, an abductive lens of reasoning was adopted, and a thorough literature review was combined with a qualitative multiple case study in which semi-structured interviews represented the primary source of data.

3.1.1 Adopting an abductive lens of reasoning

This thesis adopted an *abductive lens of reasoning*, which is encouraged in Dubois and Gadde's (2002) concept of systematic combining. It is characterized by a simultaneous exploration of theory and the empirical world, which allows the researcher to continuously "move back and forth between framework, data sources and analysis" (Dubois & Gadde, 2002, p. 555) to generate novel or alter and enrich extant theory (Saunders, Lewis, & Thornhill, 2019). Abduction has emerged from criticism towards the inductive and deductive logic of reasoning (Alvesson & Sköldberg, 2018).

As a middle ground between induction and deduction, abduction is increasingly understood as a way to overcome the limitations of these two lenses of reasoning (Bell, Bryman, & Harley, 2018; Coffey & Atkinson, 1996; Järvensivu & Törnroos, 2010). As such, it combines elements of induction and deduction in the research process, which is explicated further in the following paragraphs.

As opposed to a strictly deductive approach, the author of this thesis did not strive to test hypotheses due to the nascency of process-oriented SBMI literature and corresponding perspectival inconsistencies in approaching SBMI processes (Dubois & Gadde, 2002). However, to understand the process of SBMI, holistic process models, predominantly stemming from conventional BMI literature, were reviewed and synthesized to construct an initial conceptual process framework that intended to guide the empirical investigation of this thesis's research question. Then, with continuous progress in collecting and analyzing empirical data from qualitative interviews, the initial frame of reference was further enriched to arrive at the final processual model for SBMI in large firms presented in Section 4.2.1. Since abductive reasoning encourages a comprehensive familiarity with extant theoretical repertoires at the outset and throughout the research process (Timmermans & Tavory, 2012), the final process model generated was less emergent from the empirical data as in a strongly inductive "grounded theory" approach. Yet, the abductive logic allowed additional patterns from the data outside the initial dimensions of the conceptual process framework to be explored, and the framework itself was continuously confronted with the novel and rather under-researched empirical context of large firms embarking on the process of SBMI in the attempt to transition to more sustainable BMs (Dubois & Gadde, 2002; Järvensivu & Törnroos, 2010). The non-linear character of abduction is portrayed in the illustration of this study's research process in Figure 10.

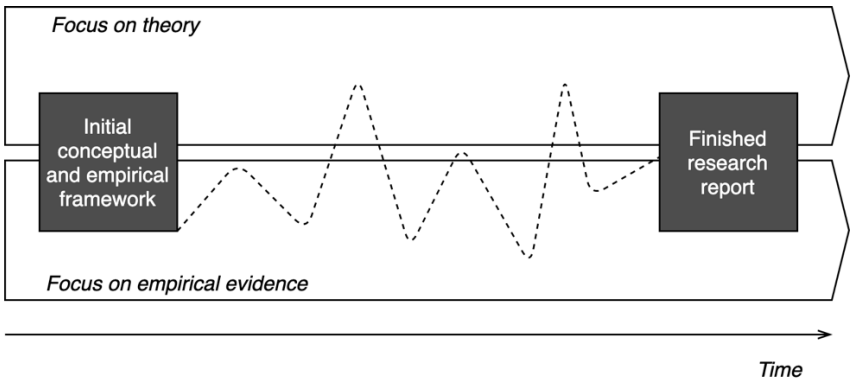

Figure 10. Abductive research process.
Adapted from Järvensivu and Törnroos (2010).

This approach was further chosen because of its potential to foster theoretical innovation, creativity, and its ability to continuously push the researcher to reflect about the research process and challenge the underlying theory or concept-driven framework (Flick, 2014; Ketokivi & Choi, 2014; Kovács & Spens, 2005; Timmermans & Tavory, 2012). Hence, it enabled the researcher's knowledge to expand as well as scope and elements of the initially constructed frame of reference to be reshaped when confronted with empirical observations (Dubois & Gadde, 2002; Ketokivi & Choi, 2014).

Furthermore, the abductive logic of reasoning alleviated the danger of forcing empirical data into a rigid, predetermined theoretical framework, a potential weakness associated with a strictly deductive approach (Dubois & Gadde, 2002). At the same time, the use of a conceptual process framework for guiding the empirical investigation of different SBMI process trajectories addressed a common risk linked to induction that relates to an overload of heterogeneous data, potentially impeding strong theory building (Dubois & Gadde, 2002; Eisenhardt, Gräbner, & Sonenshein, 2016).

With an outlook on the research strategy discussed in the following section, adopting an abductive approach also exploited the benefits of a case study by circumventing a rigidly standardized research process with a series of sequential steps (Dubois & Gadde, 2002).

3.1.2 Combining an extensive literature review with a qualitative multiple case study

In this thesis, a comprehensive literature review was combined with a multiple case study. Appendix D provides an overview of the objectives related to the literature review and the multiple case study and the corresponding data collection methods utilized. In the following two subsections, the combined research strategy chosen is explained in greater depth.

3.1.2.1 The role of the literature review in an abductive approach

The exploration of a research subject through an abductive lens of reasoning, as applied in this thesis, requires an extensive familiarity and appreciation of the extant body of literature. This is considered to be crucial even if current research is not capable of fully explaining the phenomenon under investigation (Taylor, Torugsa, & Arundel, 2018). According to Timmermans and Tavory (2012, p. 180), "researchers should enter the field with the deepest and broadest theoretical base possible," which the author of this thesis attempted to achieve by conducting a two-fold literature review.

For a *broad familiarity* with the knowledge base, the author provided a comprehensive overview of concepts (BM, BMI, SBM, and SBMI), that are relevant to this study (see Sections 2.1 and 2.2). This aimed to clarify their meaning and relations to each other and to adjacent concepts, such as strategy and other types of innovation. In addition, working definitions were derived for SBMs and SBMI, which was considered necessary given the presence of conceptual ambiguity identified in the literature surrounding these concepts.

For a *deep familiarity* with the knowledge base, the author focused intensely on process-oriented knowledge within the broad concepts reviewed as processes play a central role in the overarching research question of this study. The exploration of process origins in innovation management literature and the review of 16 process models in SBMI and BMI literature (see Sections 2.3.1 and 2.3.2) served as a foundation to synthesize process phases and build the initial conceptual process framework of this study. The search criteria for the process models reviewed and the procedure of synthesis performed are further detailed in Section 3.2.1.

3.1.2.2 A qualitative multiple case study

Given that knowledge on how to develop and realize SBMs is scarce and extant approaches and theories are partially inconsistent and insufficient to provide a holistic understanding of the SBMI process from "idea to launch," the author chose to conduct *qualitative research*. This is supported by a number of scholars, advocating its beneficial use for theory building in nascent research fields (Bell et al., 2018; Edmondson & McManus, 2007; Yin, 2003). A main advantage of qualitative research in the investigation of processes, such as the SBMI process in this study, is its richness. It enables the researcher to make sense of the processual black box that consists of multifaceted, temporally unfolding events and interactions. Moreover, it also supports the recognition of details and finest nuances in the process that in a quantitative study may easily remain unnoticed (Gräbner, Martin, & Roundy, 2012; Weick, 2007).

This thesis further adopted a *case study*, representing a commonly used strategy in qualitative research (Eisenhardt, 1989; Merriam, 2009; Stake, 1995; Yin, 2003). Yin (2003, p. 13) defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within a real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident." The main attributes of a case study and its suitability for this research are discussed in the following paragraphs.

First, a case study is exceptionally well-suited for research questions that relate to "how" or "why" a phenomenon occurs (Yin, 2003). This aligns with this thesis's overarching research question aimed at understanding *how* large firms navigate the process of SBMI.

Second, a case study design wishes to make sense of a phenomenon that is difficult to control and is multifaceted and contemporary (Yin, 2003). This matches with the study's purpose to gain a holistic understanding about the process of SBMI, representing an inherently complicated yet vital undertaking for firms to secure competitive advantage and contribute to sustainable development (Bocken et al., 2014; Geissdörfer, Vladimirova, & Evans, 2018; Ritala et al., 2018; Stubbs, 2017; Täuscher & Abdelkafi, 2018; P. Wells, 2015). In light of the alarming severity and ubiquity of today's serious sustainability challenges as highlighted in the introductory Section 1.1, it also becomes evident that examining the process of SBMI is a current and increasingly relevant topic in both academia and practice.

Third, while case studies can be used for theory testing, the generation of new theory and modification or extension of existing theories are equally valid reasons to pursue a case study (Ketokivi & Choi, 2014; Piekkari, Welch, & Paavilainen, 2009), which is in line with the objectives of the abductive logic of reasoning adopted in this thesis.

Besides that, the review of holistic processual approaches revealed that case studies represent a common methodological choice when studying the business modeling process in conventional and sustainable BMI literature (see Section 2.3.2.4). This is supported by Dentchev et al.'s (2018) synthesis of novel insights from the most recent special issue on SBMI, pointing to the fact that the field of SBMI as a whole is still in an early-theory-development stage that favors the use of information-rich case studies.

The author opted for a *multiple case study.* This choice was motivated by scholarly publications that indicate the ability of multiple cases to mitigate some of the shortcomings commonly associated with a case study design, such as the lack of replicability, subjectivity, or strong context specificity (Yin, 2003). For that purpose, a multiple case study compares several cases and relies on a wider range of empirical evidence, which contributes to a higher level of robustness and analytical strength (Bell et al., 2018; Eisenhardt, 1989; Eisenhardt & Gräbner, 2007; Yin, 2003). Applying criterion sampling, further described in Section 3.2.2, a case sample of three SBMI processes in large German firms was chosen.

Since this thesis explores the sustainable business modeling process, it is concerned with a phenomenon that develops over time (Winterhalter et al., 2017; Wirtz, 2011). Processual case research can be conducted retrospectively (i.e., following the process backwards into the past) or in real time (i.e., a forward-looking process tracking in real time) (Pettigrew, 1990). Considering the limited time frame for this research, a longitudinal process study in real time was not feasible. Therefore, the author decided to retrospectively examine several SBMI processes in large firms. This was helpful to gain post-hoc knowledge about the "bigger" picture of the entire process leading to more sustainable BMs (Poole, Van de Ven, Dooley, & Holmes, 2000).

3.2 Data collection and analysis

3.2.1 Literature search

As outlined in Section 3.1.2.1, the literature review consisted of a broad review of concepts relevant to this study and a narrow process-focused review, which included, inter alia, the review of 16 process models in BMI and SBMI literature. The selection criteria for the process models identified and the procedure conducted to synthesize phases to construct the initial conceptual process framework and later the final process model are explained in the following.

3.2.1.1 Criteria for process model selection

To identify relevant approaches that holistically examine the process of SBMI, a review of existing process models in the literature was conducted.

Given that the process-oriented stream of SBMI literature is in an embryonic state and holistic process models are scarce, the author proceeded with reviewing process models in the adjacent field of conventional BMI, representing a field that SBMI logically builds on and where a plethora of process models have emerged. In total, 16 process models were identified according to the following four criteria.[6]

[6] To illustrate the selection procedure, the author presents in the following paragraphs some examples of process models that were initially identified yet rejected and not included in the review conducted in Section 2.3.2 as they did not fulfil the criteria established.

First, the author concentrated on process models with a *generic focus on SBMI and BMI*, excluding any kind of process models developed for specific BM types. In SBMI literature, for instance, the process model for developing circular BMs by Antikainen, Aminoff, Kettunen, Sundqvist-Andberg, and Paloheimo (2017) and the conceptual process of CE-oriented BMI by Pieroni, McAloone, and Pigosso (2019b) were both excluded given their specific focus on circular BMI processes. In conventional BMI literature, the author of this thesis included neither, for instance, the scenario-based process model by Pateli and Giaglis (2005) due to its specific focus on BM change induced by technology nor the process by Pynnönen, Hallikas, and Ritala (2012) specifically developed for customer-driven BMI.

Second, only process models that holistically depict processes from "idea to launch" were considered for further analysis. As a result, approaches developed in BMI and SBMI literature, which are concerned with partial stages of the process, were not examined any further. For example, the value ideation process by Geissdörfer et al. (2016) was excluded given its limited focus on the ideation phase. Similarly, the work of Karlsson, Hoveskog, Halila, and Mattsson (2018) was not considered in the review given its emphasis on the starting phase of the BMI process for sustainability. While these models were not included because of their restricted focus on the early phases of the business modeling process, Bocken, Boons, et al. (2019) and Winterhalter et al. (2017) were excluded as they mainly focused on process phases concerning BM development without further specifying the later realization phase of the BM concept developed.

Third, the author followed a *process-oriented search* that excluded any literature centered predominantly on the outcomes of BMI and SBMI and related componential changes. Hence, any publications that solely concentrated on the comparison of newly developed BMs to extant ones were not studied further.

Lastly, the author favored *peer-reviewed* journals to identify relevant process models. However, given the scarcity of processual approaches particularly in the body of SBMI literature, the results were supplemented with process models from *conference proceedings* and *scientific books*. Any process models from non-academic sources, including consultancy, industry, or company reports, were excluded from the search.

Table 3 displays the databases screened, the fields and search strings used, and types of publications included in the search, which was inspired by the methodological procedure adopted by Pieroni et al. (2019a).

Moreover, the author applied the snowball technique by searching for relevant sources in the reference lists of articles identified through the electronic database search (Van Aken & Berends, 2018).

Table 3

Parameters for process model identification in BMI and SBMI literature.

Database	Scopus, ScienceDirect, Emerald Insight, Google Scholar
Field	Title, keywords, abstracts
Search string	BMI: (business model OR business model innovation) AND (process OR procedure OR phases OR approach OR method OR methodology OR approach OR framework) SBMI: (sustainable OR sustainab*) AND (business model OR business model innovation) AND (process OR procedure OR phases OR approach OR method OR methodology OR approach OR framework)
Type of publications	Peer-reviewed articles Conference proceedings Scientific books

3.2.1.2 Synthesis of process phases

Building on the comprehensive review of 16 process models identified in BMI and SBMI literature, the author performed a synthesis of corresponding process phases to derive four higher-level phases. By doing so, the author followed the hybrid approach applied in the 4I-framework developed by Frankenberger et al. (2013), a well-established and methodologically robust process framework from conventional BMI literature. It combines a theoretical derivation of process phases from an adjacent field of literature to guide the empirical investigation of processes in a novel context with the integration of the empirical findings into a process framework.

Similarly, in this study, the author derived phases from process models predominantly belonging to the neighboring field of conventional BMI literature to guide the empirical investigation of a multiple case study in the context of SBMI processes in large firms and integrated the empirical findings into this study's final process model. The use of an adjacent body of literature for the derivation of process phases was deemed necessary given that holistic process models in SBMI literature are scarce. In support of that, Dentchev et al. (2018) encourage scholars to actively utilize knowledge from neighboring research fields to create synergies and foster constructive discourse to advance the field of SBMI.

While Frankenberger et al. (2013) did not specifically outline how the derivation of process phases shall be performed, Wirtz and Daiser (2018) provide a three-step method that this study's derivation approach builds on. First, the descriptive content of the process phases identified was examined. Second, the numerous phases identified were arranged in a chronological order. Third, process clusters were delineated based on the previous two steps, resulting in a division of the SBMI process into the following four higher-level process phases: diagnosis, discovery, design, and delivery. These phases represent a critical part of the initial conceptual process framework developed in Section 2.5.2 and also this study's final process model presented in Section 4.2.1.

3.2.2 Case and interview sample

In this thesis, a *non-probability, purposeful sampling technique* was followed to identify and choose insightful cases (Patton, 2002; Lincoln & Guba, 1985). It is consistent with the essence of qualitative research and the case study strategy adopted in this thesis. In this regard, an appropriate sample is evaluated in terms of whether sampling of the case facilitates and deepens the understanding of the research problem, as opposed to pursuing mere statistical generalization (Patton, 2002; Bailey, 2018). More specifically, the author applied *criterion sampling.* This sampling method uses predetermined criteria that need to be fulfilled for the selection of suitable cases and interviewees (Patton, 2002). To identify adequate cases of SBMI processes, representing the main unit of analysis in this thesis, the author applied the following criteria: First, the process should encompass a clear sustainability orientation that aims to incorporate one or a combination of multiple archetypal SBM strategies developed by Bocken et al. (2014) and Ritala et al. (2018) and belongs to one of the four SBMI types proposed by Geissdörfer, Vladimirova, and Evans (2018), as explained in Section 2.2.2.1.

Second, the process should either be completed by the time of the interview or currently be in the final realization phase.

Third, following the recommendations provided by Eisenhardt (1989), variation in the cases was constrained by the size and geographic location of the case companies. As a result, all of the selected case companies are large corporations headquartered in Germany with more than 250 employees and an annual turnover of over 40 million euro and/or a balance sheet total exceeding 20 million euro.[7] However, the author made sure that the cases still differ from each other in terms of their sustainability orientation and the industry that they operate in, as parallels across cases of varying nature provide a more sophisticated understanding of the phenomenon explored (Eisenhardt, 1989). Selecting large firms as the pivotal context of this study was driven by the paucity of studies in the realm of SBMI in established large firms. It was further motivated by recent findings from conventional BMI literature, postulating that a systematic, process-oriented approach to BMI increases the likelihood of success in large corporations (Winterhalter et al., 2017).

Besides the criteria presented for case selection, the author applied two additional criteria for the selection of suitable interview partners. First, interview partners, preferably holding a managerial position, should demonstrate a strong familiarity with the overall SBMI process in which the firm is/was involved. Second, an active participation in the majority of the process phases was desirable.

Potential interview candidates were mainly contacted via email or LinkedIn messaging (see Appendix E) and provided with information about the research project, including the research purpose, requirements for participation, processing of personal data, and a consent form to be signed. If no response was registered after one week, a “friendly reminder” message was sent to them to obtain a higher response rate. In a few cases where phone numbers were indicated on the company websites, potential interviewees were contacted via telephone to allow a more personal relationship to be established and motivate participation.

[7] The size criteria applied to delineate large firms are adopted from the German Commercial Code and the Statistical Office of the European Union and are outlined in Section 1.3.

3.2.3 Interview design

For constructing the multiple case study, *interviews* served as the primary source of data. According to Merriam (2009), interviews can be depicted on a spectrum from being unstructured to highly structured. In this thesis, a *semi-structured* format with an interview protocol to guide the interviews conducted was applied (Bell et al., 2018; Merriam, 2009; Yin, 2003). The interview protocol, which can be found in Appendix F, served as a structural foundation for the questioning route. However, it still allowed questions to be adapted and continuously revised based on insights developed from the progressing number of interviews completed (Creswell, 2013; Easterby-Smith, Thorpe, Jackson, & Jaspersen, 2018).

To establish trust and build rapport with interviewees, the author applied a *responsive interviewing technique* based on conversational partnership in which the researcher "gently guides a conversational partner in an extended discussion… to elicit depth and detail about the research topic" (Rubin & Rubin, 2005, p. 4). It requires reflective listening and probing questions to follow meaningful paths, emerging from an interviewee's response. The author found this interviewing technique to be useful as it encouraged the interview partner to share his or her experience more openly and, paired with open-ended questions, prevented answers that were too simplistic or short (Flick, 2014).

Before beginning the interview, the interviewer engaged in "off-topic" discussions with the interviewee to create a friendly ambiance, used a script to explain the interview procedure, and clarified any questions or concerns by the interview partner (Burke & Miller, 2001; Flick, 2014). Interviews were conducted in the interviewee's mother language, German, to make him or her feel more comfortable and avoid misunderstandings due to potential language barriers (Welch & Piekkari, 2006). In addition, all interviewees received a short questionnaire to be filled out one to three days prior to the interview (see Appendix G).[8] The purpose of the *pre-interview questionnaire* was to trigger the recollection of a specific SBMI process that aimed to be discussed in greater detail in the following interviews.

[8] Note that the pre-interview questionnaire served as a preparation tool for the interviewee to recollect a specific SBMI process and become familiar with the research subject and for the interviewer to retrieve contextual information about the SBMI process to be discussed and the interviewee's role. Hence, no quantitative analysis of the questionnaire data was conducted.

The pre-interview questionnaire briefly delineated the research topic and further anticipated to retrieve background information about the SBMI process and determine the interviewee's role in the business modeling process. Hence, it served as a means to prepare both the interviewee and interviewer for the forthcoming interview. This was considered particularly important given that the author of this thesis aimed to retrospectively examine the process of SBMI, which can be a lengthy endeavor. It also helped to evaluate the suitability of the SBMI process indicated by the interviewee in the questionnaire along this study's case sampling criteria. Furthermore, the author gathered secondary data about case companies and interview partners. Based on the information received through the questionnaire and desk research, the interview protocol was tailored to the respective case company before each interview to maximize the quality of the interviews conducted.

In total, twelve interviews were conducted in the pre-study and main study, providing seven case studies, of which three were included in the empirical analysis of this thesis. One case served as a pilot to test the length of the interview protocol and practice the interview process. Three other cases were excluded as they did not satisfy this thesis's working definition of SBMI established in Section 2.2.2.1 or did not fulfil the sampling criteria presented in the preceding section or were facing substantial confidentiality constraints.[9] The initial number of interviews was extended as the author required further information to construct information-rich case studies and clarify inconsistencies and missing gaps that remained unclear after consulting secondary data and e-mail exchanges. Hence, the interview process and acquisition of interview partners was continued until saturation was reached (i.e., continuous sampling until new cases no longer added any new essential information to the theoretical understanding) (Miles & Huberman, 1994).

The majority of the interviews were conducted between the end of February and the beginning of June and lasted between 32 and 61 minutes. Although the author planned to conduct all interviews in person at the organizations' headquarters in Germany, the worsening of the global pandemic situation allowed only three interviews to be held face-to-face. The remaining interviews were postponed to an alternative date and conducted via telephone, which aligned with the interviewees' contact preferences.

[9] See the footnotes of Table 4 for a more detailed description of the different reasons for exclusion.

The superiority of personal interviews has traditionally been emphasized in the scholarly literature given the interviewer's ability to display visual cues, observe the body language of their interviewees, and build rapport with them (Bell et al., 2018). However, Sturges and Hanrahan's (2004) findings indicate that there are no substantial differences between face-to-face and telephone interviews. Building on that, the author of this thesis found telephone interviews to be a versatile instrument for collecting qualitative data to construct the multiple case study. It was particularly useful to circumvent time and cost constraints and provided greater flexibility for the scheduling process (Bell et al., 2018; Burke & Miller, 2001). The latter was deemed particularly important as many of the interviewees contacted were holding managerial roles and worked remotely from home. Background information on each case company and the related SBMI project under investigation will be provided in case profiles as part of the in-case analysis in Section 4.1.

Table 4 provides an overview of the interview partners. The names of the interviewees were replaced with numerical IDs and pseudonyms were used for the companies that they work for. This was done to accommodate for the interviewees' wish to remain anonymous and adhere to the ethical principle of confidentiality and privacy, which will be discussed in Section 3.3.2. Background information on each case company and the related SBMI project under investigation will be provided in case profiles as part of the in-case analysis in Section 4.1.

Table 4

List of interviewees.

Interviewee ID	Organization	Position	Interview Type	Interview Duration	Study
1	Alpha Beauty	Chief BM Development Officer	Telephone (individual)	1x37 min, 1x 32 min	Main study
2	Alpha Beauty	Senior Associate, New Business Solutions	Telephone (individual)	1x 61 min	Main study
3	Beta Air	Manager, Sustainability, Technology, Innovation	Telephone (individual)	1x 52 min	Main study

4	Beta Air	Head of Sustainability, Technology, Innovation	Telephone (individual)	1x 48 min	Main study
5	Gamma Sweets	Consultant, Sustainable Supply Chains	Face-to-Face	1x 59 min	Main study
6	Gamma Sweets	Sustainability Manager	Telephone (individual)	1x55 min, 1x 32 min	Main study
7	Delta Chocolate	Sustainability and Safety Manager	Telephone (individual)	1x 33 min	Pre-study[10]
8	Epsilon Tools	Sustainability Manager	Face-to-face	1x 55 min	Pre-study[11]
9	Zeta Energy	BM Development Designer	Face-to-face	1x 37 min	Pre-study[12]
10 + 11	Eta Cleaning	Director Sustainability & Senior Investment Manager	Telephone (conference call with two participants)	1x 33 min	Pre-study[13]

[10] Delta Chocolate was used as a pilot case. The interview conducted helped to test the interview process and interview protocol developed.

[11] Epsilon Tools was not included in the case analysis as the case described by the interviewee did not satisfy the definition of SBMI applied in this thesis as outlined in Section 2.2.2.1. It instead referred to a project related to a sustainability management reporting tool. The insights gained were used to refine the pre-interview questionnaire and interview protocol.

[12] Zeta Energy was not included in the case analysis. The case was excluded due to confidentiality constraints that resulted in a limited availability of information to reconstruct the SBMI process and hindered data triangulation due to a dearth of secondary data.

[13] Eta Cleaning was not included in the case analysis as the project described by the interviewees was still in the early stage of the SBMI process, which did not meet the sampling criteria specified in Section 3.2.2. The insights gained were used to refine the pre-interview questionnaire and interview protocol.

3.2.4 Data processing and analysis

All of the interviews conducted were audio-taped and transcribed verbatim within 24-48 hours of completion (Flick, 2014). The author used the software "f4transkript" to transcribe the audio recordings. The software facilitated the transcription process by having the option to pause and adapt the speed of the recording. The selected citations used in the empirical part of this study were translated from German to English.

The author applied Eisenhardt's (1989) *in-case analysis and cross-case analysis.*

Each case was first analyzed as an isolated unit in an in-case analysis (Eisenhardt, 1989). Following the essence of Langley's (1999, p. 695) *narrative strategy* aimed at constructing "a detailed story from the raw data," the author developed a thorough narrative for each of the three SBMI processes studied based on the interview transcripts, answers from the pre-interview questionnaire and supplementary secondary data obtained. The case narratives emphasized on holistically depicting the SBMI process through which each of the case companies navigated. To enhance the understanding of the SBMI processes that each company underwent, they were categorized into tables, summarizing the process with a particular focus on process activities and actors performing these activities. This was followed by a *pattern-matching* cross-case analysis along all three dimensions (phase-specific process activities and actors and overarching process characteristics) of the initial conceptual process framework of this study. It compared all three cases to each other to discover similarities and differences across the cases.

For both analyses, the author of this thesis applied elements from template analysis, using the phases and dimensions of the conceptual process framework as *a priori themes* preceding the coding of the data. According to King and Brooks (2016), a priori themes are useful to accelerate the initial and oftentimes lengthy coding part of the analysis. These themes are typically chosen with the belief that certain facets of the research question examined should be concentrated on. In this thesis, these dimensions were identified by the author through the analysis of 16 SBMI and BMI models presented in Section 2.3.2. However, it is critical to note that a priori themes are not fixed and remain subject to changes. This implies that they can be refined, extended, or discarded, if necessary, throughout the analysis process. Hence, they provided a starting point for the analysis yet also allowed new codes to emerge from the data (King & Brooks, 2016), which is in line with the abductive logic adopted in this study.

3.3 Evaluation of methodology and ethics

3.3.1 Research quality

Contrary to quantitative research, a uniform set of evaluation criteria for qualitative research is missing in the literature (Bell et al., 2018; Flick, 2014). While some researchers argue that the criteria developed for quantitative research are equally suitable to assess qualitative studies (Yin, 2003), others point to the incompatibility of quantitative criteria in the evaluation of qualitative research given its diverging nature and purpose (Kirk & Miller, 1986; Krefting, 1991). In this section, the scientific rigor of the research conducted is evaluated, utilizing Lincoln & Guba's (1985) highly influential work that substitutes validity, reliability, and objectivity, three common criteria in positivistic quantitative research, with the criterion of trustworthiness. In the following, trustworthiness is judged by assessing the credibility, transferability, dependability, and confirmability of the research (Lincoln & Guba, 1985).

Credibility, which echoes internal validity in quantitative research, refers to the extent to which this study's research findings can be trusted and are congruent with reality (Bell et al., 2018; Lincoln & Guba, 1985, 1989; Merriam, 2009). To accomplish a high level of credibility, the following binary approach, consisting of triangulation and member checking, was applied in this study.

First, the author triangulated the information obtained about the process of SBMI by cross-checking primary data from the interviews conducted with multiple sources of secondary data in the form of process documentations, sustainability reports, and further digital sources identified. As a result, multiple sources of evidence, which were contrasted and compared to each other, supported this study's findings. In conjunction with adhering to the ethical guideline of confidentiality and privacy, this also assisted in mitigating the risk of informant bias (Flick, 2014; Lincoln & Guba, 1985; Merriam, 2009; Patton, 2002).

Second, member checking was performed by making the material transcribed and the draft version of the analysis available to designated interview partners (Creswell, 2013; Lincoln & Guba, 1985; Merriam, 2009). The feedback received was subsequently used to correct any factual and interpretive errors while also strengthening the understanding from a practitioner's perspective (Erlandson, Harris, Skipper, & Allen, 1993). Krefting (1991) argues that the selection of participants for member checking has to be done carefully.

Hereby, it is vital to avoid causing any harm to the participants selected in the process of exposing them to particular information, which is read and may potentially be internalized. Taking this issue into account and the busy schedules of interview partners, the author chose to pursue member checking partially in cases where secondary data was limited and where inconsistencies were identified that demanded further clarification.

Transferability, which parallels external validity in quantitative research, is concerned with the extent to which findings can be generalized or are transferable to another setting (Bell et al., 2018; Lincoln & Guba, 1985, 1989; Merriam, 2009). The context-specific nature of case studies with small sample sizes is typically not suited to allow any universally binding conclusions to be drawn for a larger population (Yin, 2003). Given the abductive approach adopted and the largely exploratory nature of the qualitative study with a purposive sampling technique applied, the author did not attempt to achieve statistical generalization. Yet, an analytical generalization can be assumed as patterns were identified across cases in the cross-case analysis presented in Section 4.2 (Yin, 2003).

Furthermore, the author aimed to provide sufficiently rich contextual information to assist the reader in determining whether the findings can be applied to an alternative context of interest (Bell et al., 2018; Lincoln & Guba, 1985, 1989).

Dependability relates to research consistency, which parallels reliability in quantitative research. It is principally concerned with the question whether this study's findings are consistent with the data collected and could be repeated (Lincoln & Guba, 1985, 1989; Merriam, 2009).

To ensure dependability, the author established an "audit trail" by thoroughly documenting the methodological choices taken in the different phases of the research process (Flick, 2014; Lincoln & Guba, 1985; Merriam, 2009). As a result, the author critically justified the research design, explaining the rationale behind adopting an abductive lens of reasoning and combining a comprehensive literature review with a qualitative multiple case study (see Section 3.1). In addition, choices regarding the data collection and analysis (see Section 3.2) were delineated, specifying how relevant literature was identified, cases and interviewees were sampled, and primary data in the form of interviews and secondary data were collected and processed before evaluating the rigor of the research in this section and reflecting on the ethical considerations taken in the subsequent section.

Moreover, utilizing an interview protocol for the semi-structured interviews conducted and transcribing the interviews enhanced consistency. Albeit the time-consuming nature of transcribing data, it was considered a critical element since it allowed a backward tracing of findings to its data roots. This enabled the author to clearly distinguish between own interpretation and the interviewees' statements (Flick, 2014; Kirk & Miller, 1986). The author also cross-checked transcripts with audio recordings and selected translations into English with the transcripts in German to ensure that the original information provided was conveyed accurately (Gibbs, 2007).

Confirmability examines the extent to which personal beliefs, values, or theoretical predispositions impact the research process and the analysis of the findings (Bell et al., 2018; Lincoln & Guba, 1985; Merriam, 2009). Due to the fact that research is carried out by humans that are subject to human error and bias, it is argued that research can never be fully objective (Patton, 2002). Nonetheless, the following strategies were applied to increase confirmability.

In addition to triangulating data sources as discussed in the assessment of credibility, the author also performed theory triangulation. The exposure to varying theoretical perspectives ensured that the research subject was explored in a sufficiently diversified manner (Lincoln & Guba, 1985, 1989). To prevent the manifestation of a dominant theoretical inclination, the author derived working definitions for SBM and SBMI based on several characteristics and definitions proposed in the literature and synthesized the process phases of the initial process framework and the final process model from 16 different process models identified in SBMI and BMI literature.

To build awareness about the author's own role in the research process, a reflexive journal was utilized throughout the research journey to write down any feelings, personal thoughts, or preferences that might have influenced the interpretation of the data. Reflexivity in combination with the "audit trail," as discussed in the assessment of dependability, assisted in reducing the researcher's bias and ensured that the findings reflect the views of the research participants (Creswell, 2013; Erlandson et al., 1993; Lincoln & Guba, 1985).

3.3.2 Research ethics

During a research project, researchers are confronted with a number of ethical considerations and dilemmas (Creswell, 2013). In the following, the ethical issues that were encountered in this study are reflected upon.

Prior to conducting the interviews for data collection, the author sought approval from the Norwegian Centre for Research Data to proceed with the interviews.

From the initial contact onwards, the author made sure to fully inform potential interview candidates about the purpose and corresponding research methods of this study, requirements for participation, and storage and processing of personal data in an information letter, which also included a consent form (see Appendix E). Through signing the written consent, the interviewees entered into a voluntary agreement to participate in this study but were still given the chance to withdraw the consent at any time without any consequences. Before the interviews, the author asked for permission to record the conversation and reminded interviewees about their rights, which included the right to withdraw from any question they felt uncomfortable answering or the right to review any interview data and make adjustments after completion.

The context-rich nature of a case study design required the author to balance the dilemma of providing enough detail while simultaneously excluding certain specifics in the provision of contextual information to adhere to the principle of confidentiality and privacy (Creswell, 2013; Denzin & Lincoln, 2011). To safeguard the research participants' identity against unsolicited exposure (Denzin & Lincoln, 2011), the author substituted the names of the interviewees and their companies with numerical IDs and pseudonyms and excluded any personal characteristics that could potentially reveal their identities. Furthermore, personal data was stored safely on an encrypted server to ensure privacy and, in accordance with the informed consent, data recorded and transcribed was deleted after completion of the thesis.

The measurements taken and the opportunity given to interviewees to contact the researcher at any time established a trustful relationship between the researcher and the research participants. As a result, any form of deception or harm to the interviewees was consistently avoided (Bell et al., 2018).

4 EMPIRICAL FINDINGS AND ANALYSIS

"In theory, there is no difference between theory and practice. But in practice, there is."
– Brewster (1882, p. 202)

This chapter aims to present the findings of the multiple case study conducted in this thesis, by investigating the SBMI processes of each case in an in-case analysis presented in Section 4.1 and identifying differences and similarities across the cases in a cross-case analysis presented in Section 4.2.

4.1 In-case analysis

In the following section, case empirics are introduced to the reader. First, background information about each case company and the corresponding SBMI project pursued are presented in a tabular case profile. The categorization of the SBMI project in the case profiles is based on SBMI types and archetypal SBM strategies that were explained in Section 2.2.2.1. This is followed by a detailed narrative of the SBMI trajectory, describing each case company's process from "idea to launch." At the end of each case, a table is provided, summarizing each SBMI process along the two phase-specific dimensions (process activities and actors) of this study's conceptual process framework introduced in Section 2.5.[14]

4.1.1 Alpha Skin

4.1.1.1 Case profile of Alpha Skin

Alpha Skin is a German cosmetics company that employs over 1 000 people. The current BM of the company is mainly concerned with the sale of skincare and decorative cosmetics worldwide. In response to Alpha Skin's novel growth strategy and parallel to its established BM, the SBMI project pursued is centered on the introduction of a digital database that educates customers about cosmetic ingredients along the dimensions of skin health safety,

[14] Given the overarching character of the third dimension of the conceptual process framework related to the characteristics of the SBMI process as a whole, it will be examined part of the cross-case analysis in Section 4.2.6.

ecological hazards, and animal cruelty. It is promoted to support customers in making well-informed, conscientious decisions about the cosmetic ingredients present in their daily personal care products. The case profile is briefly summarized in Table 5.

Table 5

Case profile of Alpha Skin.

Industry	Cosmetics
Employees	1 000
Current BM	Sale of skincare and decorative cosmetics
SBMI project	Digital database of cosmetic ingredients to educate customers about their environmental, social, and health-related effects
SBMI type	SBMI diversification
SBM strategy	Adopt a stewardship role

4.1.1.2 Alpha Skin's SBMI process from "idea to launch"

The process of SBMI was initiated and steered by a dedicated BMI "New Business Solutions" unit located within Alpha Skin's innovation department. The main purpose of the BMI unit was to identify opportunities for future-oriented BMs beyond the firm's primary business and support the newly established responsible growth strategy. To enable a more efficient way of developing new BMs, a process roadmap was established a year ago, intended to be used for guidance and tailored to each individual BM project initiated.

At the beginning of the process, the BMI unit engaged in an extensive screening of current consumer and technology trends in the beauty market and conducted research regarding the health-related and environmental effects of the cosmetic ingredients utilized in Alpha Skin's current product lines. Interviewee 1 described the latter using an example of the firm's sunscreen line: *"If we look at sun care. We studied every of our sunscreen filters . . . what impact they have on the environment and our body. You know oxybenzone and octinoxate got banned in Hawaii because they destroy the coral reefs, some can also disrupt the endocrine system. . . . These are all issues we had to think about."*

Having completed the trend assessment and research on the ingredients utilized, the results were summarized in an interim report as described by Interviewee 2: *"When we had a good picture of the latest trends and our INCIs [International Nomenclature of Cosmetic Ingredients], we documented everything and added new insights to the report as we moved forward."*

Building on the knowledge generated, the BMI unit formulated what Interviewee 2 termed as an *"opportunity space"* that was identified at the intersection of an increasing demand for transparency from the customers' side and a heightened relevance of digital, sustainability-driven innovations in the cosmetics industry. Interviewee 2 described the formulation of the opportunity space as follows: *"What was even more important, and I think everyone in the team can agree. . . to define an opportunity space we could actually act on and at some point, transform into a unique business model."*

Following that, the opportunity space was announced within the company. Employees from other departments joined to temporally support the BMI unit, together forming the core team for the SBMI project.[15] The importance of seeking cross-functional support was emphasized by Interviewee 2: *"If you're really serious about the project, you need to get bright, creative minds on board with different perspectives and know-how. We couldn't do it on our own . . . specialists from R&D, procurement and marketing joined us."*

To stimulate ideas for the opportunity space formulated, the SBMI team conducted a brainstorming meeting. Initially, the ideas of each team member were compiled in an unfiltered manner on a whiteboard. Then, they were openly discussed by the entire SBMI team. The brainstorming meeting was guided by an assigned moderator who made sure that the wealth of ideas was captured adequately, clustered into areas of interest and narrowed down to a manageable extent based on what Interviewee 1 described as *"a check-list to see if the suggestions are desirable, suitable and sustainable."* This was followed by a workshop event with external stakeholders. Customers, university students and technology start-ups from the region were invited, to whom the opportunity space and the best three ideas from the brainstorming meeting were presented.

[15] In the following paragraphs the author will refer to the core team for the SBMI project, which consists of the BMI unit and additional specialists from R&D, procurement, and marketing as the "SBMI team."

Group discussions were held to receive feedback from participants regarding the ideas created and debate critical sustainability concerns. Based on the strong popularity among workshop participants, the SBMI team agreed to further pursue the idea of a digital type of encyclopedia that informs users about animal testing, ecological hazards, and the potential adverse health effects of cosmetic ingredients. Interviewee 2 explained the value of the workshop as follows: *"The input from the workshop really helped us to polish our early proposals and make a choice. When we first started out with the project, we didn't pay much attention to the controversies around animal testing, but participants mentioned that all the time, how difficult it is to find cruelty-free options on long INCI lists. We learned that it's so important to really listen and understand their expectations, so we returned to our report and did some more research on the topic. . . . At the end of the day, the digital INCI checker was the right way to go."*

Given the relevance of animal testing signaled by the participants of the workshop, the SBMI team conducted additional research on this topic to ensure a strong incorporation of stakeholder expectations into the idea selected. The collaborative workshop and research conducted was followed by a continuous refinement of the idea in a series of testing. In a first step, the SBMI team created a mockup of the INCI checker. It was intended to *"give the concept some form and really show what this new digital solution could look like"* as described by Interviewee 2.

By adding an interactive component, the idea was advanced, resulting in a click dummy. The latter was tested within organizational boundaries to elicit feedback from letting employees navigate parts of the digital solution to identify potential shortcomings and make improvements. In this regard, Interviewee 1 noted: *"First, we tested it internally and got lots of valuable comments from colleagues. Our chemists helped a lot and filled the gaps in INCI descriptions about skin irritation levels and animal-derived additives. Our design and sales guys helped to make it more user-friendly and intuitive."*

The SBMI team then engaged in detailing further components of the novel SBM concept. While the value proposition was already articulated and discussed to a great extent prior to experimenting with the novel idea, particularly in the stakeholder workshop, questions around value delivery needed further consideration. The SBMI team realized that a partnership was required to fully develop the novel SBM concept.

This was delineated by Interviewee 2 in the following way: *"We wanted to be clear about the value our new model would add. We strived to take responsibility and provide that education and INCI transparency. The stakeholder workshop was really important here, we asked ourselves how they [stakeholders] can benefit from it in different ways. . . . At some point, we knew that we needed a strong partner for the digital infrastructure to provide the INCI checker, that's how we got in touch with a start-up from the workshop to help us."*

In addition, the SBMI team considered how value from the SBM concept developed could be captured. To ensure the financial viability of the novel SBM concept, the INCI checker was supplemented with product recommendations and add-on services, which Interviewee 1 described as follows: *"Educating customers about clean cosmetic ingredients is great but at the end of the day, we still need to reach break-even. We decided to link product recommendations from our product range to the different entries in the INCI checker and provide some additional fee-based services such as skincare routine advice."* Having developed a sophisticated beta version of the INCI checker and aligned value delivery and capture mechanisms of the novel SBM concept, the team sought approval from the executive board that gave the green light to progress with the final realization stage in the SBMI process.

While the novel SBM is not yet fully launched, a pilot with customers in the German and French market was already initiated in March of this year. It is intended to run for at least five months. Based on the pilot outcomes, the SBMI team plans to decide whether a full implementation by the end of this year is likely to occur or a return to adapt the novel SBM concept will be needed. In this regard, Interviewee 2 noted: *"With our pilot we want see how customers like the INCI checker. Germany and France are very important markets for us, that's why we chose them. Our next steps really depend on the results . . . if they [customers] won't like something, we have to go back, improve, test again before we can think of scaling up in the fourth quartal."*

Parallel to the pilot, the SBMI team is currently working on adapting standard key performance indicators (KPIs) as part of their performance measurement toolbox to accommodate for the sustainability focus of the business modeling project. They are anticipated to be used to effectively monitor the results from the pilot and accompany the final roll-out of the INCI checker. In addition, the team is attempting to better understand the synergies between the novel SBM concept and the current BM and evaluate the need for organizational adaptations

to be able to manage both BMs after the implementation. Although initially the SBMI project was organized independently from Alpha Skin's established BM related to the sale of skincare and cosmetic products, the value capture component of the novel SBM builds on the use of product recommendations from their extant product lines, hence affecting Alpha Skin's primary business. In Table 6, the SBMI process of Alpha Beauty is analyzed and summarized along the four process phases and phase-specific dimensions related to the actors and activities of this study's conceptual process framework.

Table 6

SBMI process of Alpha Skin.

Phase	Actors	Activities
Diagnosis	- SBMI team: BMI unit within innovation department, temporally supported by employees from other functional areas (R&D, marketing, and procurement)	- Extensive screening of consumer and technology trends - Analysis of health-related and environmental hazards in the extant cosmetic ingredients utilized - Creation of an interim report
		- Formulation of an opportunity space for the new SBM
Discovery	- SBMI team - External stakeholders: customers, university students, and technology start-ups	- Idea collection and prioritization in a moderated brainstorming meeting
		- Discussion and final idea selection in a workshop with external stakeholders
Design	- SBMI team - External stakeholder: technology start-up - Internal stakeholders: chemists from R&D, designers, and sales staff - Executive board	- Prototyping and a series of internal testing: o Mock-up, click-dummy, and advanced prototype - Feedback request from internal stakeholders
		- Specification of value delivery and capture: o Cooperation with technology start-up for digital infrastructure o Added fee-based services and product recommendations
		- Approval of new SBM concept by executive board
Delivery	- SBMI team - External stakeholder: customers	- 5-month pilot with customers in Germany and France
		- Adaptation of standard KPIs for performance measurement
		- Evaluation of synergies between the novel and the established BM and respective organizational adjustments needed

4.1.2 Beta Air

4.1.2.1 Case profile of Beta Air

Beta Air is a manufacturer specialized in the provision of climate control appliances. The company operates in the heating, ventilation, and air-conditioning industry (HVAC) and employs nearly 2 200 people. With a broad portfolio of fans and air conditioners, Beta Air's existing BM is mainly focused on the production and sale of air-filtering and air-cooling products to both end consumers and industrial firms.

The novel SBMI project intends to address the firm's decreasing revenues in the end consumer segment by providing a new service offering aimed at giving end consumers on-demand access to the firm's product portfolio against a periodical fee instead of an up-front purchase. It is promoted to provide end consumers with a sustainable and cost-effective alternative to ownership. The case profile is briefly summarized in Table 7.

Table 7

Case profile of Beta Air.

Industry	HVAC
Employees	2 200
Current BM	Production and sale of climate control appliances
SBMI project	Provision of a service offering that allows end consumers to access air-cooling products on demand
SBMI type	SBMI transformation
SBM strategy	Deliver functionality rather than ownership

4.1.2.2 Beta Air's SBMI process from "idea to launch"

The project was induced by the chief executive officer (CEO) of Beta Air who was concerned with the firm's declining sales in the European end-consumer segment. Recognizing that most end-consumers utilized Beta Air's climate control appliances only in the warmer summer months, the CEO envisioned a novel BM that incorporated this temporal dimension of usage.

Leveraging his long business experience and personal interest in minimalism, he developed a BM vision aimed at preventing excessive ownership by providing end-consumers with access to the firm's air-cooling products on demand. Interviewee 3 described this as follows: *"Our CEO saw the problem that they [end consumers] weren't willing to pay so much money to use our products just in the summer months when it gets really warm here. He wanted to provide them with easy access without the big investment to own a product they don't really need . . . something that was very much inspired by his interest in a minimalist lifestyle."*

Given extant time constraints, the CEO approached the firm's specialized NTI[16] unit. It was established with the ambition to *"deal with emerging projects related to sustainability, technology and innovation"* as Interviewee 4 outlined. The NTI unit comprised five employees with long-standing expertise from working in different departments of Beta Air and who directly reported to the CEO.

Having become acquainted with the CEO's vision, the NTI unit conducted an internal evaluation, using the BM canvas as an accompanying instrument to illuminate the firm's existing BM. Building on that, they attempted to further understand how the CEO's vision fits in the current BM and conducted additional research to get a clearer understanding about the decline in sales in the end-consumer segment. Interviewee 4 described the analysis conducted in the following way: *"We used the canvas to better understand where we stand and how his [the CEO's] vision aligns with our current business situation. But then, it was also important for us to get a better grasp of the market and the drop in sales in B2C [business to consumer] before taking any further steps."*

[16] NTI is a German acronym that stands for N = Nachhaltigkeit (Sustainability), T = Technologie (Technology), I = Innovation (Innovation).

"Idea lab sessions" as labeled by Interviewee 4 followed. They attempted to turn the CEO's vision into more tangible ideas by drawing inspiration from other innovative, service-oriented BMs applied in the firm's own as well as adjacent and unrelated industries.
Interviewee 3 described this as follows: *"We looked at our peers but also companies in other industries . . . see how they do it to come up with creative solutions for our own business model. The main challenge we faced, I would say, was to understand how we can transfer and apply the knowledge to our company."*

In the form of small sketches, these ideas were further documented. Before proceeding with the selection of ideas, new insights about market outlooks in the end-consumer segment forced the NTI unit to further investigate the changes and led to the amendment of some suggestions created. Although the succeeding selection of ideas did not follow any codified sustainability principles, the NTI unit paid great attention to sustainability, as Interviewee 4 explained: *"We didn't use any 'eco' criteria to pick ideas, but sustainability is deeply engrained in our culture, and very important to the CEO. . . . It was natural for us to think of something that was sustainable and not just a quick fix to correct the our [sales] figures."*

Through a resulting intensive dialogue with the CEO and assessment of the sketches compiled, the idea of an on-demand offering, which allowed end-consumers to access mobile air-cooling solutions through different seasonal service packages, emerged as the preferred choice for further exploration. The idea was strongly inspired by a pioneering, service-oriented BM in the tooling industry. Interviewee 4 explained this as follows: *"Our CEO joined our final idea lab session to choose the best concept. The fleet service we discovered in tool manufacturing was a great example. We wanted to provide that kind of flexibility to our customers . . . so the idea with the summer package, for example, was that they [end consumers] could access our mobile air-con[ditioning] products for June, July and August and we would take care of everything else after use."*

In what Interviewee 6 described as *"casual roundtables*,*"* this idea was briefly discussed with external consultants, industry experts, university students, and a number of typical early adopters registered in the firm's market research database to get a first impression about the attractiveness and acceptance of the idea, which showed high scores in both categories.

As a manufacturing firm with little experience in service-oriented BMs, the NTI unit decided *"to team up with advisors from our partner consultancy"* as outlined by Interviewee 4. As such, the collaboration with the consultancy firm assisted in the refinement of the idea developed and the corresponding specification of BM components. The insights from multiple prototypes created for the website of the new service offering and the mutual exchange led to the understanding that the provision of different on-demand service packages would require a substantial alignment of Beta Air's current value delivery and capture mechanisms. To deliver the new service offering, external consultants suggested service agents to be trained in a more comprehensive manner. In addition, a subscription approach with periodical payments was recommended as the value-capturing mechanism of a fixed product price in the extant BM did not allow for more flexible pricing arrangements to provide the seasonal service packages.

Further experiments occurred in Beta Air's innovation test lab, conducting mock purchases and simulations of around-the-clock customer service. The NTI unit collaborated closely with a group of developers and designers from the IT and R&D department and customer service agents from the sales department. The experimental activities performed were described by Interviewee 3 in the following manner: *"We developed low and high-fi[delity] prototypes of the website with the new service packages. Later, we also prototyped the buying decision with mock purchases and simulated 24/7 customer support."*

As a result, the new BM was presented to the CEO who encouraged the NTI unit to proceed with the concretized SBM concept and approved additional funding to initiate what Interviewee 3 described as *"a learning launch to put the new service packages to the acid test."*

In the beginning of this year, a two-month pilot was launched in collaboration with 200 end-consumers that were selected from the firm's market research database based on their satisfaction levels with the current product portfolio.

The pilot results revealed that while the majority of the pilot participants favored the idea of a cost-effective service offering that would reduce the need to own an underutilized product, the subscription model with the binding use period of three months, such as in the summer package, was perceived as too rigid. Hence, *"test users were worried that the summer package was a subscription trap"* as outlined by Interviewee 4.

Also, some of the participants expressed their concerns as to whether a purchase in the long run might be more economical, and others regarded the sustainable value being offset by the constant need to return the product after usage. Interviewee 3 described this as follows: *"We realized that our minimum use periods in the subscription model were not what customers wanted. . . . Some even wondered if it wouldn't be cheaper in the long run to just buy the product. Then, our German test users were really skeptical about the sustainability of our offer because of the added transportation after each service period."*

These results led to an abandonment of the initial plan to launch the novel SBM shortly after the completed pilot. The NTI unit returned to adapting the SBM concept to accommodate for the heightened flexibility demands in pricing and the need for a clearer communication of the sustainable value.

Recently, a refined SBM with more flexible use periods and a clearer sustainable value, guaranteeing a carbon-neutral delivery of the climate control appliances, was developed. A second pilot, which incorporates these modifications, is anticipated to be launched in October of this year. In addition, the NTI unit conducted a materiality assessment to identify the most critical sustainability concerns of the novel SBM concept and implement ways to measure their impact through suitable KPIs.
Also, a new training facility is in preparation to be established. It aims to coach customer sales agents to cope with increased responsibilities and their more prominent role in the novel service-oriented SBM. Interviewee 4 described this as follows: *"The service agents are really important in the new business model and the plan with the new training center is to properly prepare them for this role."* Although an exact date for the full roll-out is missing, the NTI unit expects a launch to occur after a successful completion of the second pilot.

In Table 8, the SBMI process of Beta Air is analyzed and summarized along the four process phases and phase-specific dimensions related to the actors and activities of this study's conceptual process framework.

Table 8

SBMI process of Beta Air.

Phase	Actors	Activities
Diagnosis	- Specialized unit for sustainability, technology, and innovation (NTI) - CEO	- Problem identification: declining sales in the end-consumer segment - BM vision formulation by CEO and presentation to NTI unit
		- Assessment of current BM and its fit with the new BM vision - Detailed B2C market analysis
Discovery	- Specialized NTI unit - CEO - External stakeholders: end-consumers from market research database, consultants, industry experts, and university students	- Idea gathering through multiple creative idea lab sessions: o Use of analogies for inspiration, i.e., innovative BMs from peers and firms in other industries o Documentation of ideas through sketches
		- Evaluation of ideas in dialogue with the CEO - Roundtables with external stakeholders
Design	- Specialized NTI unit - CEO - External stakeholders: consultants specialized in BM development - Internal stakeholders: developers and designers from the IT and R&D department and customer service agents from the sales department	- Concretization of SBM components in cooperation with external consultants
		- Experimentation with the novel SBM concept: o Prototypes of website with new service packages, mock purchases, and simulations of 24/7 customer service
		- Approval of the new SBM concept and the pilot funds granted by the CEO
Delivery	- Specialized NTI unit - External stakeholder: end-consumers - Internal stakeholders: customer sales agents	- Two pilot rounds with early adopters from the firm's market research data base
		- Sustainability-focused materiality assessment and impact measurement
		- Planned establishment of test center for customer service agents

4.1.3 Gamma Sweets

4.1.3.1 Case profile of Gamma Sweets

Gamma Sweets is a global producer of confectionery that employs over 7 000 people. Through its well-known brands, the company offers a diverse product portfolio, ranging from chocolate specialties and candies to sweet baked goods. The current BM of Gamma Sweets is centered on the sales of sweets. The new SBMI project aims to contribute to the firm's sustainability strategy by introducing a channel-dependent, sustainable packaging solution for the candy product line. It is promoted to support circularity by cutting the amount of plastics used and substituting them with eco-friendly materials and zero-waste options.

The case profile is briefly summarized in Table 9.

Table 9

Case profile of Gamma Sweets.

Industry	Confectionery
Employees	7 000
Current BM	Sale of chocolate specialties, candies, and sweet baked goods
SBMI project	Channel-dependent, sustainable packaging solution
SBMI type	SBMI transformation
SBM strategy	Closing resource loops

4.1.3.2 Gamma Sweets' SBMI process from "idea to launch"

The starting point of the SBMI process was the introduction of a novel sustainability strategy, which entailed a strong focus on sustainable material flows and waste management in the supply chain. As a consequence, a small team within the sustainability department started to explore how Gamma Sweets could accomplish the newly set sustainability ambitions. The members of the team had access to an extensive intra-organizational network from their long-standing experience of collaborating with different departments on sustainability matters.

Interviewee 5 described the beginning of the SBMI process as follows: *"It all started with our new sustainability strategy. In previous years, we did a lot to improve energy efficiency in the production, but the new strategy really pushed us to think more about sustainable supply chains . . . the materials we use for our products and how much waste we produce."*

The sustainability team engaged in an investigation of CE trends when screening Gamma Sweets' wider context before examining the firm's material usage with a particular focus on the packaging materials. This resulted in the observation that the percentage of plastics used in candy products was disproportionally high compared to other product categories, which the team defined as the main obstacle to the new sustainability strategy. Interviewee 5 explained this in the following way: *"What struck us the most was the amount of plastics in the candy range. . . . Each candy is wrapped in individual plastic foils, we have the mid isolation layer and the outer plastic bag. Of course, it's an important material to preserve the freshness and quality of our products but no doubt this was a big hurdle for the new strategy."*

To address the obstacle identified to the new sustainability strategy, informal meetings parallel to the sustainability department's day-to-day operations took place, which Interviewee 5 delineated as follows: *"We were busy with our daily duties, but we discussed ideas in coffee breaks."* The informal meetings evolved into a conscious decision to organize an idea hackathon. It represented an event steered by the sustainability team in which colleagues from supply chain management, R&D, sales, and the marketing department collaborated jointly with suppliers, retailers, research institutions, and partner NGOs specialized in zero-waste initiatives and CE. This was described by Interviewee 6 in the following way: *"We arranged the idea hackathon. Basically, staff from several divisions sat together with suppliers, retailers, researchers and our partner NGOs to think of a better solution to the current packaging situation."*

The participants were divided into mixed teams, each tasked to address the heightened plastics usage in the candy line and pitch the newly developed idea. In a subsequent exchange with the jury, which was constituted by the sustainability team and senior researchers from two NGOs and a research institution invited, ideas were discussed and evaluated, using the evaluation matrix of Gamma Sweets' internal sustainability barometer. Parts of the sustainability barometer, originally developed for product innovations, were further applied to guide other activities performed in the process.

Interviewee 6 delineated the idea hackathon as follows: *"The teams worked on different solutions to resolve the plastic problem and pitched them to the jury. Together with the jury members, we used the matrix from our sustainability barometer to rank the best ideas. We actually developed the barometer some time ago for new products but started using it for other projects too."*

This resulted in the prioritization of the following three ideas that were characterized by varying change requirements. The first idea selected sought to reduce the percentage of the plastic used by removing redundant packaging components. The second idea called for the replacement of plastics with alternative environment-friendly materials. As such, it proposed that the individual plastic foils, which are wrapped around each candy, be substituted with recyclable or biodegradable materials. The third idea advocated a radical abandonment of the plastic packaging as a whole. With a clearer perspective on how the disproportional plastics use in the candy line could be approached, the sustainability team began to fully dedicate their time to exploring the idea alternatives.

To investigate the first and second idea, the sustainability team experimented with extant candy packaging to identify surplus components with support from R&D colleagues. Durability tests showed that the mid isolation layer utilized in extant candy packaging did not significantly contribute to protecting the product as the outer layer on its own was sufficiently robust. In a second, third, and fourth test round, the team cooperated with suppliers to try out natural alternatives to plastic, ranging from calcium carbonate, starch, and sugar cane to cellulose. As a result, a byproduct of sugar cane and stabilized paper were identified as excellent equivalents to petroleum-based plastics, possessing similar capabilities that are necessary to efficiently protect candies from damage caused by moisture, light, or contamination. Interviewee 6 described the test rounds conducted in the following manner: *"We did some testing on durability together with R&D to see where we could save plastics without sacrificing the quality of our products. And results showed that the mid-layer wasn't really necessary. We also worked with our suppliers on new packaging materials and used different natural polymers in four trials. We were quite surprised how well the sugar cane and paper performed in keeping the candies protected from environmental stressors."*

Through continual testing and the learning from each test round, the *"minimum viable packaging"* turned into an *"advanced physical prototype of the new solution"* as described by Interviewee 5.

It combined the essence of the first and second idea from the hackathon event by eliminating the plastic mid-layer and substituting the outer plastic bag with a paper alternative and individual plastic wrappings with biodegradable trays from sugar-cane waste. The latter in particular sought to improve the circularity of the supply chain as sugar represented a critical raw material that was already utilized in the candy manufacturing process.

To explore the third idea of abandoning disposable plastic packaging as a whole, the sustainability team collaborated with a small number of zero-waste shops and larger retailers with installed bulk dispenser systems. In store visits, they experimented with possibilities how the candy could be kept in bulk dispensers without risking quality loss, which Interviewee 6 explained as follows: *"We were worried that the candy aroma and flavor might be affected. We worked with zero waste and larger retail stores that had those bulk dispensers and started first trials to see if that's an issue."*

While the sustainability team did not initiate the project with a clear intention to pursue SBMI, the third idea alternative, in particular, led to the realization that a sustainable packaging solution would require the modification of established BM components. In dialogue with the strategy department, the sustainability team proceeded with articulating the changes needed. Offering any of the idea alternatives solutions proposed required particular adjustments to be made in the value delivery component, including new resources in the form of natural polymers and partnerships with relevant suppliers and retailers with in-store bulk dispenser systems. The team attempted to match the three idea alternatives with different channel reconfigurations and also discussed adjustments of the extant pricing to reflect the new sustainable value provided.

Under the consideration of the sustainability strategy and the current BM of Gamma Sweets, the final decision was taken to combine the three idea alternatives on different distribution channels. This meant that the newly developed packaging prototype from sugar cane and paper was intended to be utilized for products sold through Gamma Sweets' online channels, while providing a zero-packaging alternative to customers buying the products in selected retail stores with bulk dispenser systems. This decision was also supported by the firm's Vice President (VP) Sustainability, who further helped to establish the legitimacy of the novel SBM concept across the organization and paved the way for continuing with its implementation.

Interviewee 6 described the relevance of the support provided in the following manner: *"You need to have people that do believe in the project and are willing to promote it. If that's not the case, it can quickly become a waste of time."*

Subsequently, early this year, a four-month trial, providing candies in bulk dispenser systems to customers in over thirty zero-waste shops and larger retail stores in five different countries, was started. Based on the feedback received from customers, adaptations were made, and the pilot was continued for five additional months. While the pilot related to bulk dispenser systems is still in progress, the sustainable packaging prototype developed from paper and sugar cane was launched in Gamma Sweets' online shop in May of this year.

To monitor the progress of the parallel activities conducted, Global Reporting Initiative (GRI) indicators, which were typically used by the team for sustainability reporting, were screened to identify applicable KPIs and evaluate the novel SBM concept along the triple bottom line. Interviewee 5 described this in the following way: *"GRI indicators are something we like to use. Normally, they're for our sustainability report. But still, I think, they are very useful to monitor the implementation."*

Having achieved a considerable reduction in plastics and customer satisfaction, considerations to transfer the sustainable packaging solution developed to other product lines are currently being discussed by the sustainability team. Besides, the expansion of capabilities to develop sustainable materials in-house is also being planned since the cooperation with some of the suppliers in the design phase turned out to be not as fruitful as expected. To enable the delivery of the combined sustainable packaging solution to the mass market, the sustainability team further mentioned the need to establish a specialized unit. This unit intends to be detached from the daily operations of different departments, where selected employees from sustainability, strategy, R&D, sales, and the marketing department can focus exclusively on dealing with strategic innovations related to sustainability and support the full-scale rollout of new SBMs.

In Table 10, the SBMI process of Gamma Sweets is analyzed and summarized along the four process phases and phase-specific dimensions related to the actors and activities of this study's conceptual process framework.

Table 10

SBMI process of Gamma Sweets.

Phase	Actors	Activities
Diagnosis	- Sustainability team	- Analysis of CE trends - Analysis of the packaging materials used in extant confectionary goods
		- Problem identification: heightened plastics use in the candy line
Discovery	- Sustainability team - Internal stakeholders: supply chain management, R&D, sales, and the marketing department - External stakeholders: suppliers, retailers, research institutions, and NGOs specialized in zero-waste and CE	- Informal internal idea gathering in coffee breaks - Organization of an idea hackathon with internal and external stakeholders
		- Evaluation of ideas by a jury with the matrix from Gamma Sweets' internal sustainability barometer

Design	- Sustainability team
	- VP Sustainability
	- External stakeholders: suppliers and retailers (zero-waste shops and large retail stores)
	- Internal stakeholders: employees from R&D and the strategy department
		- Exploration of the first and second idea alternative:
		  o Four rounds of testing: durability tests of extant packaging and trials with natural plastic alternatives
		- Exploration of the third idea alternative:
		  o In-store visits of zero-waste shops and larger retailers with bulk dispenser systems

		- Specification of changes needed in the current BM in dialogue with the strategy department
		- Approval of the SBM concept by VP Sustainability
Delivery	- Sustainability team - External stakeholders: customers	- Screening of suitable GRI indicators
		- Pilot with bulk dispenser systems in thirty stores across five countries - Launch of a new sustainable packaging from paper and sugar-cane waste in Gamma Sweets' online shop
		- Considerations to expand novel sustainable packaging to other product lines - Planned establishment of a new central division to support roll-out and future strategic innovations related to sustainability

4.2 Cross-case analysis

Based on the depiction of the three SBMI process trajectories studied separately in the in-case analysis and the dimensions of the initial conceptual process framework, the findings of the cross-case analysis, comparing all three cases against each other, are outlined in this section. The section begins with a presentation of the final process model of this study before analyzing the SBMI process in terms of phase-specific activities and actors and characterizing the sustainable business modeling process as a whole.

4.2.1 Presentation of this study's final process model

To provide the reader with a concise overview of the main findings of this study, the final process model is presented in Figure 11. Based on the analysis conducted, the author abductively enriched this study's initial conceptual process framework (see Figure 9 in Section 2.5.2) to develop the final process model for SBMI in large corporations.

The centerpiece is formed by the four theoretically derived phases: diagnosis, discovery, design, and delivery. The author familiarized the interviewees with these phases prior to the interviews. In a short questionnaire (see Appendix G), they were asked to indicate whether the phases reflected the business modeling process that their firm had undergone. No disagreement or concerns in terms of the meaning and adequacy of the phases proposed was expressed by the interview partners. Therefore, the author of this thesis is assured that the four theoretically derived phases constitute an adequate higher-level representation of the SBMI process.

The process model developed delineates the main activities performed and the actors involved in each of the four phases of the business modeling process that large firms navigate to revise their extant BM in the attempt to realize a more sustainable BM or create a novel SBM parallel to the established one. It further illustrates the characteristics of the SBMI process in its entirety, describing its nature (i.e., relationship between phases/activities) and the role of intention and timing when the SBMI process is initiated. The latter emerged as additional patterns from the data in the examination of the overall SBMI process and were included into the final process model in accordance with the abductive reasoning adopted in this study.

Although the process of SBMI is depicted in a linear order for simplification purposes, the added arrows illustrate the interlinkages between process phases and between activities, indicating that they do not necessarily follow a strictly sequential progression but rather interact and iterate in particular ways. In the following, the activities and actors involved in the different phases of the sustainable business modeling process are analyzed in detail in Sections 4.2.2 - 4.2.5 followed by an examination of the overarching process characteristics in Section 4.2.6.

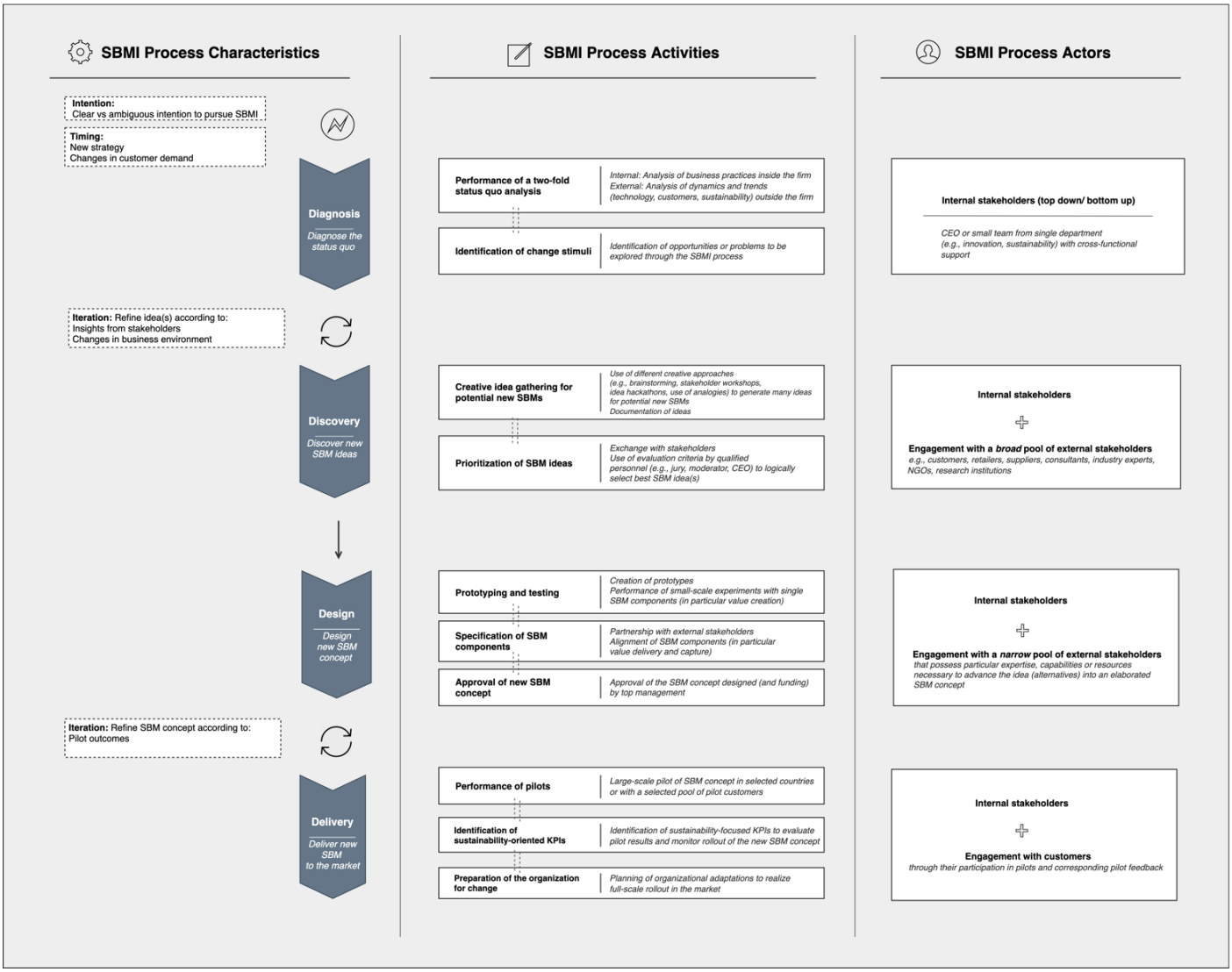

Figure 11. Final holistic process model for SBMI in large firms.

4.2.2 Diagnosis Phase

The first phase, *diagnosis*, focuses on developing an intimate understanding of the firm's status quo and diagnosing the requisite for change to enable the process of SBMI to be initiated effectively. Cross-functional support and knowledge acquisition are critical at the outset of the SBMI process.

This initial phase is characterized by the two following principal activities: the performance of a two-fold status quo analysis and the identification of change stimuli. Internal actors are predominant in this phase with the process of SBMI being initiated either top down by the CEO or bottom up by smaller teams within a particular department, typically requesting cross-functional support from employees of other functional areas with relevant skills, experience, or network to manage the process of SBMI.

4.2.2.1 Main activities in the diagnosis phase

At the outset of the SBMI process, acquiring sufficient knowledge through the **performance of a two-fold status quo analysis** was identified to be a critical activity across all the cases studied. This activity entailed an outward and inward-looking orientation, which is explicated further below.

In all the cases examined, an *external analysis* was performed. The findings indicate that case companies directed their efforts towards observing dynamics in the business environment, studying different contextual factors to sense trends, cautionary signals or positive prospects related to technology, consumers, and sustainability. In the case of Gamma Sweets, the analysis was explicitly focused on sustainability, which entailed the examination of different CE trends related to sustainable packaging. In the other two cases studied (Alpha Skin and Beta Air), the external analysis concerned major changes and trends in technology and consumer demands. Yet, the findings indicate that these broader studies were nonetheless guided by sustainability considerations. For instance, in the case of Alpha Skin, the assessment of technological trends was closely linked to the topic of sustainability as digital progress was regarded as a major catalyst for pursuing SBMI. In Beta Air's case, the interest of the CEO in minimalism and the resulting BM vision, aimed at reducing unnecessary ownership, considerably framed the analysis conducted.

In addition to the external analysis, an *internal analysis*, which focused on studying the firm's current business practices, was completed in all three cases studied. Alpha Skin, for instance, investigated the health- and environment-related risks of ingredients utilized in their extant skincare and decorative cosmetic products, while Gamma Sweets thoroughly analyzed the packaging materials of their current confectionary product lines. Beta Air's internal analysis illustrated components of the current BM, making use of the BM canvas to ease the understanding of the fit between the CEO's novel BM vision and the established BM.

As another critical activity that was prevalent across all cases, the **identification of change stimuli** was identified. Change stimuli can be understood as *opportunities or problems* aimed to be defined and potentially explored in the succeeding phase of idea discovery. Several interviewees acknowledged the relevance of this activity given the support it provided in setting boundaries for the SBMI project.

In the case of Alpha Beauty, an opportunity space at the crossroad of a heightened customer demand for information and transparency and a growing significance of technological, sustainability-driven solutions in the cosmetic market was recognized and articulated to be further explored in the SBMI process. Beta Air and Gamma Sweets, on the other hand, proceeded problem-driven and defined problems that aimed to be addressed by the novel SBM concept, which in the case of Gamma Sweets was a heightened plastics use in their candy line and a drop in sales in the end-consumer segment at Beta Air. In Beta Air's case the identification of change stimuli was accompanied by a sustainable BM vision formulated by the CEO, which intended to reduce unnecessary ownership.

Table 11 provides quotes from the interviews conducted related to the main activities of this phase.

Table 11

Representative quotes related to the main activities in the diagnosis phase.

Main activities	Case	Representative quotes
Performance of a two-fold status quo analysis (external/internal)	Alpha Skin	*"When we had a good picture of the latest trends and our INCIs [International Nomenclature of Cosmetic Ingredients], we documented everything and added new insights to the report as we moved forward." (Interviewee 2)*
	Beta Air	*"We used the canvas to better understand where we stand and how his [the CEO's] vision aligns with our current business situation. But then, it was also important for us to get a better grasp of the market and the drop in sales in B2C [business to consumer] before taking any further steps." (Interviewee 4)*
	Gamma Sweets	*"Trends in circular economy were a big topic. We studied them and tried to understand the implications for our business." (Interviewee 6)*
Identification of change stimuli (opportunity/problem)	Alpha Skin	*"What was even more important, and I think everyone in the team can agree . . . to define an opportunity space we could actually act on and at some point, transform into a unique business model." (Interviewee 2)*
	Beta Air	*"Our CEO saw the problem that they [end consumers] weren't willing to pay so much money to use our products just in the summer months when it gets really warm here." (Interviewee 3)*
	Gamma Sweets	*"I would say we were quite problem-driven in our approach." (Interviewee 6)*
	Gamma Sweets	*"What struck us the most was the amount of plastics in the candy range. . . . Each candy is wrapped in individual plastic foils, we have the mid isolation layer and the outer plastic bag. Of course, it's an important material to preserve the freshness and quality of our products but no doubt this was a big hurdle for the new strategy." (Interviewee 5)*

4.2.2.2 Main actors in the diagnosis phase

In all the three cases examined, it was found that the initial diagnosis phase was dominated by the **presence of internal actors.** While in all cases the diagnosis phase included an analysis that examined the context surrounding the firm, an active participation of external stakeholders did not occur in this process phase.

The results suggest that the process of SBMI was initiated either *top down* by the CEO or *bottom up* by a small group of employees within a single functional area of the firm, such as the innovation or sustainability department. In addition, the actors responsible for initiating the SBMI process recognized oftentimes early their inability to steer the process of SBMI on their own. Two main factors that trigged this realization were missing skills and capabilities or time constraints. As a result, the initiators requested *cross-functional support* from employees of different departments, typically possessing relevant knowledge, capabilities, or a good intra-organizational network.

In the case of Alpha Beauty, the SBMI process was started by a dedicated BMI unit part of the firm's innovation department. The BMI unit announced the project and temporarily recruited specialists from R&D, procurement, and marketing to support the SBMI process. In Gamma Sweets' case, a small team of employees within the sustainability department, with access to an extensive intra-organizational network, began to explore ways in which the newly established sustainability strategy could be realized. At Beta Air, on the other hand, it was the CEO who initiated the SBMI process. Due to time constraints, he assigned a specialized unit, comprising personnel with long-standing experience from working in different functional areas of the company, to manage the process of SBMI by collaborating with and directly reporting to him.

4.2.3 Discovery Phase

The second phase, *discovery*, shifts the attention from comprehending to rethinking the firm's current business practices with the objective of discovering ideas for potential new SBMs based on the formerly articulated change stimuli and the analysis conducted. It requires the use of creativity to allow ideas to flourish as well as logic to judge and narrow them down.

The discovery phase is centered on the following two core activities: the creative gathering of ideas for potential new SBMs and their subsequent rational prioritization.

As opposed to the diagnosis phase, which is dominated by internal stakeholders involved in initiating the SBMI process, a principal characteristic of this phase constitutes the opening of the process to allow engagement with a broad variety of external stakeholders for a joint discovery of new SBM ideas.

4.2.3.1 Main activities in the discovery phase

In all the cases examined, the **creative gathering of ideas for potential new SBMs** was reported to be a vital activity in the discovery phase, building on insights from the preceding two-fold status quo analysis and attempting to turn the change stimuli articulated into actual ideas for novel SBMs.

The interviews conducted reveal *several creative approaches* that case companies applied to generate ideas. Alpha Skin, for instance, organized a moderated internal brainstorming meeting. In this meeting, ideas were first gathered independently by each team member before a joint discussion with the entire SBMI team took place. In creative idea lab sessions, Beta Air utilized analogies to discover ideas, drawing inspiration from other BMs applied in the industry that they operate in but also adjacent and entirely unrelated industries. Gamma Sweets initially collected ideas in an informal setting, namely coffee breaks, before organizing an idea hackathon. Here, employees from different departments collaborated with several external stakeholders to pitch ideas for novel sustainable packaging solutions. Frequently, the idea gathering entailed a documentation of the ideas generated, for example, in the form of whiteboard notes (Alpha Skin) or idea sketches (Gamma Sweets).

The findings further suggest that this activity typically resulted in a *high number of ideas* being produced. The relevance of not discarding ideas too early in the SBMI process was mentioned recurrently by interview partners and was considered to be critical for allowing creativity to unfold in this phase, which Interviewee 6 highlighted as follows: *"When we started, the purpose was not to limit ourselves or become too fixated on just one good idea. I think being open to many different ways of thinking is very important. That's when you become most creative."*

The second vital activity identified in this phase was the **rational prioritization of SBM ideas**, which intended to evaluate the plethora of SBM ideas produced in a logical manner. Typically, it entailed exchange with stakeholders and the use of generic and/or sustainability-focused criteria, being evaluated by qualified individuals, such as a designated moderator, jury, or the CEO.

For example, in the case of Alpha Skin, an internal evaluation with an assigned moderator from the BMI unit and a checklist with predefined criteria (desirability, suitability, and sustainability) was combined with a stakeholder workshop, in which the most promising three previously internally prioritized ideas were discussed with a number of external stakeholders before a final selection was made. Similarly, at Gamma Sweets' idea hackathon event, a jury, consisting of the initiators of the event from the sustainability department and scholars from NGOs and the research institutions invited, applied the evaluation matrix of the firm's internal sustainability barometer, which allowed the ideas produced to be ranked along additional ecological and social factors. In the case of Beta Air, the selection of ideas occurred through an intense dialogue with the CEO combined with causal roundtables with external stakeholders to discuss and assess the formerly selected idea in terms of both attractiveness and acceptance.

The findings further suggest that, in most cases, the prioritization activity reduced the plethora of ideas generated from the creative idea gathering to either a *single idea or few idea alternatives* that aimed to be explored and detailed through the remaining process of SBMI.

In two out of the three cases examined, this task resulted in selecting one final idea. At Alpha Skin, it was the idea related to a digital encyclopedia of cosmetic ingredients, allowing customers to review daily care products along the dimensions of skin health safety, ecological hazards, and animal cruelty. At Beta Air, the final idea for further exploration were seasonal service packages, offering mobile air-cooling solutions to end-consumers on demand. In the case of Gamma Sweets, on the other hand, three idea alternatives, namely the removal of redundant packaging, replacement with environmental-friendly materials and the radical abandonment of the plastic packaging as a whole, were selected by the jury to be substantiated in the subsequent design phase of SBMI.

Table 12 provides quotes from the interviews conducted related to the main activities of this phase.

Table 12

Representative quotes related to the main activities in the discovery phase.

Main activities	Case	Representative quotes
Creative gathering of ideas for potential new SBMs	Alpha Skin	*"So, we had a brainstorming meeting with the team to think of new ideas. At first, it's usually an individual task where everyone writes down their thoughts but, of course, we also discuss them as a team." (Interviewee 2)*
	Beta Air	*"We looked at our peers but also companies in other industries . . . see how they do it to come up with creative solutions for our own business model." (Interviewee 3)*
	Gamma Sweets	*"We were busy with our daily duties, but we discussed ideas in coffee breaks." (Interviewee 5)*
	Gamma Sweets	*"We arranged the idea hackathon. Basically, staff from several divisions sat together with suppliers, retailers, researchers and our partner NGOs to think of a better solution to the current packaging situation." (Interviewee 6)*
Rational prioritization of SBM ideas	Alpha Skin	*"Together with our moderator, we use the checklist with questions to see if the suggestions are desirable, suitable and sustainable." (Interviewee 1)*
	Alpha Skin	*"The input from the workshop really helped us to polish our early proposals and make a choice." (Interviewee 2)*
	Beta Air	*"Our CEO joined our final idea lab session to choose the best concept." (Interviewee 4)*
	Beta Air	*"We didn't use any 'eco' criteria to pick ideas, but sustainability is deeply engrained in our culture, and very important to the CEO. . . . It was natural for us to think of something that was sustainable and not just a quick fix to correct our [sales] figures." (Interviewee 4)*
	Gamma Sweets	*"The teams worked on different solutions to resolve the plastic problem and pitched them to the jury. Together with the jury members, we used the matrix from our sustainability barometer to rank the best ideas." (Interviewee 6)*

4.2.3.2 Main actors in the discovery phase

The discovery phase is characterized by a strong **engagement with a broad pool of external stakeholders.** As opposed to the initial diagnosis phase, which was strongly dominated by the sole presence of internal stakeholders, findings indicate that the process of SBMI was opened up in the discovery phase. This fostered exchange with a broad variety of external stakeholders to encourage the discovery of novel SBM ideas.

In the case of Alpha Skin, the SBMI team invited customers, university students, and technology start-ups to discuss the most promising ideas from the preceding internal brainstorming meeting by the SBMI team. Similarly, in Beta Air's case, roundtables were held with early adopters registered in the firm's market research database, external consultants, industry experts, and university students to debate the idea of seasonal service packages for on-demand, air-cooling solutions to end-consumers, which was selected beforehand by the NTI unit in close dialogue with the CEO in the final idea lab session.

While in both of the aforementioned cases external stakeholders were integrated to discuss and evaluate ideas that were previously prioritized within the firm, Gamma Sweets engaged in an even more open, co-creative approach. It entailed that a number of external stakeholders (suppliers, retailers, researcher institutions, and NGOs) formed mixed teams with employees from supply chain management, R&D, sales, and the marketing department to jointly create ideas for novel SBMs from scratch and pitch them to a designated jury.

4.2.4 Design Phase

The third phase, *design*, is concerned with the gradual refinement of the ideas generated and prioritized in the discovery phase with the objective of developing them into a well-designed, elaborated SBM concept.

The principal three activities in the design phase are: prototyping and testing, specification of SBM components, and approval of the novel SBM concept by top management. While the discovery phase encouraged the involvement of a broad variety of external stakeholders in the SBMI process, the design phase favors engagement with a narrow group of external stakeholders, possessing particular expertise, capabilities, or resources that are necessary to form a viable SBM concept. A particularly relevant role is assigned to the top management that through its approval decides whether the novel SBM concept is going to proceed with practical implementation.

4.2.4.1 Main activities in the design phase

A crucial activity performed across all three cases examined was **prototyping and testing,** aimed at gradually refining the single SBM idea or the few idea alternatives selected during the discovery phase. It was found that advancing ideas typically required several rounds of *smaller-scale experiments at different levels of specificity* and initially was mainly focused on the sustainable value-creation constituent.

Alpha Skin, for example, began with building a simple mock-up to visualize the idea of a digital INCI checker followed by a click dummy with interactive components, which was tested and improved through internal feedback elicited within the organization before a sophisticated beta version was developed. Similarly, at Gamma Sweets, a series of testing turned the minimum viable packaging into an advanced sustainable prototype solution. This included durability tests of extant packaging to identify redundant material components and experimenting with environment-friendly plastic alternatives (e.g., calcium carbonate, starch, sugar cane, and cellulose), both aimed at refining the first two idea alternatives. In addition, visits of retail stores with bulk dispenser systems were executed to substantiate possibilities in which plastic packaging as a whole could be eliminated without sacrificing product quality, which represented the essence of the third idea alternative. In Beta Air's innovation test lab, low and high-fidelity prototypes of the website with the new service packages for air-cooling solutions were initially created before further experiments with value delivery and capture components, including mock purchases with different package fees and simulations of around-the-clock customer service, followed.

As another critical activity that was central across the cases examined, the **specification of SBM components,** in particular *value delivery and capture mechanisms*, was identified.

The findings reveal that while the value-creation component of the novel SBM was already extensively discussed in the discovery phase and continued to be a principal focus in the prototyping and testing activity in the design phase, value delivery and capture mechanisms received less attention. In this regard, interviewees often mentioned that discussing novel ideas concerning a sustainable value creation and initially experimenting with them led to the alertness that value delivery and capture mechanisms also required specification to allow alignment between the different components and ultimately form a complete SBM concept.

Gamma Sweets, for instance, realized that the three idea alternatives surrounding sustainable packaging solutions could only be further advanced by cooperating with suppliers that produce natural plastic alternatives and retailers (both smaller zero-waste shops and larger retailer chains) that have bulk dispenser systems installed in their stores. Similarly, the SBMI team at Alpha Skin recognized that the digital infrastructure needed to provide the INCI checker outside organizational boundaries required a partnership, for which a technology start-up, which participated in the firm's stakeholder workshop, came into question. At Beta Air, the cooperation with external consultants, aimed at developing the novel service-based SBM concept, produced recommendations that indicated the need for a stronger integration of service agents into the SBMI process to enable the provision of around-the-clock service.

Analogous to the value delivery component, specifying the value capture component was found to be equally important. This is exemplified by the following statement of Interviewee 1 from Alpha Skin: *"Educating customers about clean cosmetic ingredients is great but at the end of the day, we still need to reach break-even. We decided to link product recommendations from our product range to the different entries in the INCI checker and provide some additional fee-based services such as skincare routine advice."* The quote highlights the necessity in SBMI diversification processes such as at Alpha Skin to develop the value capture component in a way that the novel SBM concept is nonetheless financially sound. In the case of SBMI modification processes, such as at Beta Air or Gamma Sweets, the value-capture component required to be adjusted to allow higher flexibility and a better reflection of the sustainable value. For example, at Beta Air, the value-capture component needed to be altered from a fixed to a more adaptable pricing arrangement to accommodate for the higher flexibility demands of the novel seasonal service packages designed.

Another principal activity identified in the design phase was to **obtain approval from top management**. With the completion of testing and prototyping and the final harmonization of the SBM components, it was found that in all three cases studied approval from top management was sought to proceed with the final realization of the novel SBM concept. Several interviewees stressed the significance of this activity as it oftentimes was linked to *additional funds* and helped to *establish legitimacy*, particularly in SBMI processes that were initiated bottom up.

At Alpha Skin, for instance, approval from the executive board was sought before progressing with the pilot of the novel SBM concept.

In the case of Gamma Sweets, the VP Sustainability approved the decision to combine the three idea alternatives developed into a channel-dependent SBM concept. The approval further contributed to establish the legitimacy of the novel SBM concept across the organization and paved the way to proceed with its implementation. At Beta Air, the novel SBM concept was presented to the CEO who encouraged its continuation and further approved extra funding for a larger pilot to be conducted prior to a potential full rollout.

Table 13 provides quotes from the interviews conducted related to the main activities of this phase.

Table 13

Representative quotes related to the main activities in the design phase.

Main activities	Case	Representative quotes
Prototyping and testing	Alpha Skin	*"We created a mockup to give the concept some form and really show what this new digital solution could look like." (Interviewee 2)*
	Alpha Skin	*"First, we tested it internally and got lots of valuable comments from colleagues." (Interviewee 1)*
	Beta Air	*"We developed low and high-fi[delity] prototypes of the webpage with the new service packages. Later, we also prototyped the buying decision with mock purchases and simulated 24/7 customer support." (Interviewee 3)*
	Gamma Sweets	*"We did some testing on durability together with R&D to see where we could save plastics without sacrificing the quality of our products. And results showed that the mid-layer wasn't really necessary. We also worked with our suppliers on new packaging materials and used different natural polymers in four trials." (Interviewee 6)*
Specification of SBM components	Alpha Skin	*"At some point, we knew that we needed a strong partner for the digital infrastructure to provide the INCI checker, that's how we got in touch with a start-up from the workshop to help us." (Interviewee 2)*
	Beta Air	*"We had some great ideas, but not much experience in the service field. I thought it would be best to team up with advisors from our partner consultancy." (Interviewee 4)*

Approval of novel SBM concept from top management	Alpha Skin	*"It was a long journey, but the board was convinced and gave us the green light to take the next steps towards implementation." (Interviewee 1)*
	Beta Air	*"We presented him the draft and he [CEO] really liked. He allocated more funding to the project so that's when we really started to talk about a larger pilot." (Interviewee 4)*

4.2.4.2 Main actors in the design phase

In contrast to the preceding discovery phase, the actors responsible for steering the SBMI process did not intend to engage with a broad variety of external stakeholders. Instead, they reached out to a **narrow pool of external stakeholders**, *holding particular expertise, capabilities, or resources* that assisted in advancing the idea (alternatives) into an elaborated SBM concept.

For example, at Alpha Skin, the SBMI team got in touch with a technology start-up to build the digital infrastructure needed to deliver the novel INCI checker. At Gamma Sweets, the sustainability team collaborated internally with the firm's R&D department to conduct durability tests, but suppliers of natural plastic alternatives and retailers, utilizing bulk dispenser systems, were also integrated into the development of the novel SBM concept. At Beta Air, the NTI unit worked closely with external consultants that assisted in providing recommendations in terms of how the different SBM components, in particular the value delivery and capture, should be designed to realize the idea of on-demand service packages for air-cooling solutions to end-consumers. Additionally, a series of experiments was conducted in collaboration with Beta Air's IT and R&D department and customer service agents from the sales department.

Worth emphasizing is also the **top management** in this phase given its critical role in approving the newly designed SBM concept and ultimately deciding whether the groundwork for delivering the new SBM concept to the market is going to occur in the final stage of the SBMI process. As evidenced in the cases of Beta Air and Gamma Sweets, the approval was further vital for granting additional funds and assisted in establishing acceptance for the new SBM concept across the organization.

4.2.5 Delivery Phase

The fourth phase, *delivery*, is centered on managing the realization of the new SBM concept developed and ends with its delivery to the market. Changes on the organizational level, new capabilities, resources, and structures are often needed to accommodate for the added requirements of the novel SBM concept.

The main three activities conducted prior to an anticipated launch of the novel SBM concept are: performance of pilots, identification of sustainability-oriented KPIs, and the preparation of the organization for change. Customers play a significant role in this phase as their participation in pilots and the resulting feedback are decisive to whether the firm can proceed with a full-scale rollout of the novel SBM concept or adjustment of the SBM concept developed and additional piloting activities are needed. Furthermore, it poses a strong communication requirement with internal stakeholders to prepare the firm for the transformation towards a more sustainable BM.

4.2.5.1 Main activties in the delivery phase

In all the cases examined, the **performance of pilots** *before delivering the novel SBM to the market* was found to be a vital activity. This activity intended to test the newly developed SBM concept on a *larger scale* prior to its full realization, as opposed to the smaller-scale experiments conducted during the preceding design phase, which often faced more restrictions (e.g., tests were limited to single SBM components or performed within organizational boundaries). More specifically, findings show that piloting was typically executed in selected countries or with a selected pool of pilot customers. The prior applies to the case of Alpha Skin that initiated a five-month pilot in March of this year in two of their most important markets, namely France and Germany. Similarly, a pilot in five different countries was launched in the case of Gamma Sweets. The latter occurred in the case of Beta Air that used 200 early adopters from their market research database to conduct a first pilot round, which was followed by a second round due to unsatisfactory customer feedback.

Another critical activity identified across the cases analyzed was the **identification of appropriate sustainability-oriented key performance indicators (KPIs)**, which aimed to be used for evaluating pilot results but also for monitoring the full-scale rollout of the novel SBM. *Performance measurement* was repeatedly mentioned to be a critical factor in the final phase of the SBMI process.

Interview partners highlighted, however, the difficulty of identifying relevant KPIs since existing ones were often insufficient for the assessment of the novel SBM concept due to their strong focus on financial viability. As a consequence, new or adapted KPIs, capable of capturing positive and negative environmental and social BM effects, were required.

For example, in Gamma Sweets' case, where the SBMI process originated in the sustainability department, suitable KPIs were identified by screening GRI indicators that were applicable to the novel SBM concept. At Alpha Skin, the BMI unit adapted KPIs used in previous business modeling projects by including ecological and social dimensions to their existing performance measurement toolbox. Beta Air, on the other hand, attempted to first map the most material sustainability issues against the novel SBM, and then proceeded with searching for suitable indicators.

Although none of the cases examined were fully delivered to the market yet, **preparation of the organization for change** was reported to be a critical activity to be pursued prior to the final rollout.

After having performed the simulations of around-the-clock customer service in the design phase, Interviewee 4 from Beta Air delineated the need for setting up a new training facility prior to the planned launch that was intended to thoroughly prepare customer sales agents for their increased responsibilities in the novel service-oriented SBM. In the case of Alpha Skin, the evaluation of synergies between the novel SBM concept and the current BM was found to be critical to initiate organizational adaptations, allowing for a successful management of both BMs in the case of a full-scale rollout. Gamma Sweets, on the other hand, advised on the possibility to duplicate the sustainable packaging solution developed for other product lines and expand capabilities for the development of sustainable materials in-house. In addition, a central unit detached from the operations of the different departments was considered to enable a clearer focus on strategic innovations related to sustainability in the organization and support future rollouts of novel SBMs.

Table 14 provides quotes from the interviews conducted related to the main activities of this phase.

Table 14

Representative quotes related to main activities in the delivery phase.

Main activities	Case	Representative quotes
Performance of pilots	Alpha Skin	*"With our pilot, we want see how customers like the INCI checker. Germany and France are very important markets for us, that's why we chose them. Our next steps really depend on the results . . . if they [customers] won't like something, we have to go back, improve, test again before we can think of scaling up in the fourth quartal." (Interviewee 2)*
	Beta Air	*"We did some sort of early prototyping when we developed the concept . . . sometimes we skip parts there just to move forward and improve faster. But the pilot is much larger. We are talking about almost 200 test subjects we chose from our market research data base." (Interviewee 4)*
	Beta Air	*"We like to think of it as a learning launch to put the new service packages to the acid test." (Interviewee 3)*
	Gamma Sweets	*"I always prefer a pilot first. It just helps to keep the uncertainty at bay and see if we move in the right direction." (Interviewee 5)*
Identification of appropriate sustainability-oriented KPIs	Alpha Skin	*"The biggest problem was to measure the sustainable side of the business model. We realized that our standard KPIs didn't capture that at all. . . . But at the end of the day, the board wants to see numbers that speak for themselves." (Interviewee 1)*
	Alpha Skin	*"We are now trying to adjust them [KPIs] to reflect the value we want to provide with the new INCI checker." (Interviewee 2)*
	Beta Air	*"We did have sort of a materiality check. We asked ourselves what our main sustainability concerns are before we looked at how we can measure the impact in the best possible way." (Interviewee 3)*
	Gamma Sweets	*"GRI indicators are something we like to use. Normally, they're for our sustainability report. But still, I think, they are very useful to monitor the implementation." (Interviewee 6)*

Preparation of the organization for change	Alpha Skin	*"We will probably have to implement changes in the organization. Even with a launch soon, we still have to consider the effects on our cosmetic products, I mean they still remains the heart of our business." (Interviewee 1)*
	Beta Air	*"The service agents are really important in the new business model and the plan with the new training center is to properly prepare them for this role." (Interviewee 4)*
	Gamma Sweets	*"The experience with the new sustainable packing solution for the candy line is just the start, the idea is to use similar solutions for our other products." (Interviewee 5)*
	Gamma Sweets	*"When this gets bigger, I am sure that we will need a central division in the company to manage the implementation process and continue to push future projects like that." (Interviewee 6)*

4.2.5.2 Main actors in the delivery phase

The delivery phase is characterized by a **strong engagement with customers**. In all the cases examined, customers played a vital role and their *feedback through the pilots* conducted was of high relevance to the decision whether the new SBM concept is ready for a full rollout in the market or potentially needs further adjustments. At Alpha Skin, for instance, customers from the German and French markets participated in a five-month pilot that is currently still ongoing. At Beta Air, 200 early adopters from the firm's market research database participated in the pilot of the novel service packages for air-cooling solutions, while Gamma Sweets conducted a pilot with customers that tested the firm's plastic-free candies stored in bulk dispenser systems in zero-waste shops and large retail stores across five different countries.

Moreover, the activity of preparing the organization for change naturally called for a **strong communication with internal stakeholders** to familiarize them with the necessary changes and potentially prepare them for new responsibilities. The latter is particularly evident in the case of Beta Air where the new service-oriented SBM concept also implied a more prominent role and increased duties for customer service agents.

4.2.6 Characteristics of the overall SBMI process

In addition to analyzing the activities and actors involved in the different SBMI process phases, the process as a whole is characterized in the following two subsections.

4.2.6.1 Nature of the overall SBMI process

Several interviewees (e.g., Interviewee 2/Alpha Skin, Interviewee 4/Beta Air, Interviewee 6/Gamma Sweets) described repeatedly the overall process of SBMI to be *"dynamic," "complex,"* and *"sometimes a bit overwhelming."* While in the pre-interview questionnaire all interview partners reported the four theoretically derived phases of the conceptual process framework to be an adequate higher-level representation of the process that they underwent, the findings from the interviews conducted highlight that the way the actors involved in the SBMI process actually navigated these phases was far from straightforward. The results of this study suggest that the process of SBMI did not follow a fully linear progression and involved interactions between some of the phases. More specifically, the following *two main iterative patterns* were identified.

The first iteration was observed between the phases of delivery and design. Typically, the feedback from the pilots conducted was pivotal whether a step backward to adapt the SBM concept in the design phase was required or a step forward to deliver the novel SBM to the market was going to occur. For example, in the case of Beta Air, the unsatisfactory results from the pilot performed prompted a return to the design phase after pilot users expressed their dissatisfaction with the subscription model and sustainability concerns emerging from the increased shipping requirements of the novel service offering. This was described by Interviewee 3 in the following way: *"We realized that our minimum use periods in the subscription model were not what customers wanted. . . . Some even wondered if it wouldn't be cheaper in the long run to just buy the product. Then, our German test users were really skeptical about the sustainability of our offer because of the added transportation after each service period."*

As a result, the planned launch was postponed and the novel SBM concept was redesigned to accommodate for heightened flexibility demands in pricing and the need for a clearer communication of the sustainable value. The revisited SBM concept, which incorporated more flexible use periods and carbon-neutral delivery, moved then forward to the delivery phase and is currently anticipated to be tested in a second pilot before a potential full rollout.

While in Alpha Skin's case the pilot is not yet fully completed, Interviewee 2 stressed that further actions would depend on the pilot outcomes, potentially requiring a return to the design phase as outlined in the following statement: *"With our pilot, we want see how customers like the INCI checker. Germany and France are very important markets to us, that's why we chose them. Our next steps really depend on the results . . . if they [customers] won't like something, we have to go back, improve, test again before we can think of scaling up in the fourth quartal."*

The second iteration was located between the phases of discovery and diagnosis in the SBMI process. It was found that oftentimes the ideas created needed to be adjusted due to changes in the surrounding business environment or insights from stakeholders obtained in collaborative events, which required additional analysis to be conducted before proceeding with the prioritization of ideas. At Beta Air, for instance, the preparation for the final idea lab session required the NTI unit to go back to the diagnosis phase to make adjustments in some of the ideas created as expectations in the end-consumer market changed. Similarly, at Alpha Skin, the relevance of animal testing, about which stakeholders raised strong concerns in the workshop organized, required the SBMI team to conduct further analysis into the topic. Interviewee 2 from Alpha Skin described this as follows: *"When we first started out with the project, we didn't pay much attention to the controversies around animal testing, but participants mentioned that all the time, how difficult it is to find cruelty-free options on long INCI lists. We learned that it's so important to really listen and understand their expectations, so we returned to our report and did some more research on the topic."*

As opposed to the two iterative patterns identified between the delivery and design phase as well as the discovery and diagnosis phase, the progression from the discovery to the design phase occurred mostly in a linear manner across the cases studied. Once ideas were prioritized, they were gradually turned into an elaborated SBM concept. In none of the cases examined were ideas fully rejected at a later point in the design phase nor did they require a return to the discovery phase. Instead, interviewees mentioned that potential adjustments of the SBM concept occurred through additional prototyping and testing activities. The latter was highlighted by Interviewee 5 from Gamma Sweets: *"I think, we put a lot of effort into choosing really good ideas. Later in the development, we did not throw any of them completely overboard. But, of course, sometimes you need do more testing, we had like four trials to make improvements and tweak the pieces that are not working."*

In addition, the analysis of activities in the different process phases reveals that interaction not only existed between the phases, but the activities performed within these phases did not always follow a sequential order. In the case of Gamma Sweets and Alpha Skin, the identification of problems and opportunities related to the current BM followed the analysis conducted in the initial diagnosis phase. Yet, in the case of Beta Air, a reverse order was found where the articulation of the problem, i.e., decreasing sales in the end-consumer market, served as an input for the analysis to examine the problem more carefully. Comparably, in the design phase, Alpha Skin and Gamma Sweets started with a predominant focus on prototyping and testing the value-creation component before proceeding with the specification of the value delivery and capture components. Beta Air, on the other hand, began the design phase with specifying SBM components with the assistance of external consultants prior to conducting a series of corresponding prototypes and experiments. The results further indicate that process activities were often also managed simultaneously, which is highlighted by the statement of Interviewee 2 from Alpha Skin about the activities performed in the delivery phase: *"It all happened somewhat in sync. So, we have launched the pilot but at the same time we are still working on adapting our KPIs."*

Albeit the presence of iterative patterns, the case companies examined embarked on the process of SBMI by using some type of *organized scheme or documentation for guidance*. At Alpha Skin, where responsibilities for the project were located in a dedicated BMI unit, an internal process roadmap was used to steer the process of SBMI. It was developed to approach BMI projects in a more systematic manner and become better at sensing novel opportunities beyond the company's primary business related to the sale of skincare and cosmetic products. In the remaining cases, the SBMI process phases were partially guided by adapted configurations, originally utilized for other innovation types, such as product development. For instance, Gamma Sweets used their sustainability barometer as a guidance for organizing certain process activities (e.g., idea prioritization) within the SBMI process, which was described by Interviewee 6 as follows: *"Together with the jury members, we used the matrix from our sustainability barometer to rank the best ideas. We actually developed the barometer some time ago for new products but started using it for other projects too."*

4.2.6.2 Intention and timing when to embark on the SBMI process

The *intention and timing* when the process of SBMI was initiated emerged as additional patterns from the data analyzed, which in accordance with the abductive approach were included into the final holistic process model for the SBMI processes in large firms presented in Section 4.2.1.

Interestingly, it was found that despite applying certain schemes for guidance, not all case companies embarked on the process with a clear intention to pursue SBMI. While in the case of Alpha Skin and Beta Air, the process was consciously initiated to create a novel SBM or revise the established BM, Gamma Sweets was less clear about their intention. As opposed to a dedicated BMI unit aimed at sensing novel BM opportunities as in Alpha Skin's case or a BM vision formulated by Beta Air's CEO, the process of Gamma Sweets started out as a more open, ambiguous project that attempted to support the newly implemented sustainability strategy. It was only at a later point in the design process that the sustainability team of Gamma Sweets understood that advancing the idea alternatives proposed for new sustainable packaging solutions required substantial adjustments to be made in the BM components.

The results of this study further suggest that the timing when the process of SBMI was initiated was either when a novel strategy was introduced or a change in customer demand occurred. In the case of Gamma Sweets, the process of SBMI was triggered by the introduction of a novel sustainability strategy related to sustainable supply chains. Interviewee 5 described this as follows: *"It all started with our new sustainability strategy. In previous years, we did a lot to improve energy efficiency in the production, but the new strategy really pushed us to think more about sustainable supply chains . . . the materials we use for our products and how much waste we produce."* Similarly, at Alpha Skin, the process of SBMI was initiated when the firm introduced a novel responsible growth strategy, which Interviewee 1 described as follows: *"The goal was to support the new strategy. For us, it was more or less a commitment to more responsible growth. Our team was looking for exciting business model opportunities outside skincare, so our work went beyond just improving cosmetic formulations of our products."* On the other hand, at Beta Air, it was a decline in sales in the end-consumer segment that constituted the critical moment when the CEO decided to initiate the process of SBMI. Interviewee 4 explained this in the following way: *"The B2C market has been our number one concern for a while now and the sharp decline in sales was what got the ball rolling."*

5 DISCUSSION

"Data not defined by theory is empty, and theory not defined by data is blind."
– Givón (1989, p. 321)

This chapter discusses the three sub-questions of the overarching research question, which simultaneously represent the main dimensions of this study's final process model for SBMI in large firms, in relation to extant literature.

5.1 The "What": Main activities in the SBMI process

SIMILARITY TO CONVENTIONAL BUSINESS MODELING

Many of the principal SBMI process activities identified in this study show similarities to the delineations of different process phases of process models from conventional BMI literature.

The performance of a two-fold analysis of the status quo, which was identified as a core activity in the initial diagnosis phase, extends some of the process models in conventional BMI literature, concentrating on a one-sided analysis related to either the ecosystem (e.g., Eurich et al., 2014; Frankenberger et al., 2013; Osterwalder & Pigneur, 2010) or the current BM (e.g., Mitchell & Bruckner Coles, 2004b). This study's findings indicate that both external and internal analysis are critical to acquiring sufficient knowledge to initiate the process of SBMI. As such, it aligns with Bucherer (2010) and Wirtz and Daiser (2018), who underline the importance of considering the current business but also influencing factors beyond organizational boundaries.

The other activity recognized in the diagnosis phase is related to the identification of change stimuli. It is partially in line with Zott and Amit's (2015) explanation of the "synthesize" phase in their normative BMI process model that entails the comprehension and definition of a problem to be solved. It also partly supports Bucherer (2010) and Bucherer et al. (2012), who similarly stress the need to investigate weaknesses and deficiencies, which bring the current BM under pressure, at the outset of the business modeling process.

However, while the findings of this study indicate that the change stimuli formulated can be problem-driven, as illustrated in the case of Beta Air and Gamma Sweets, they further add that firms may also define opportunity-driven change stimuli. This is exemplified by the case of Alpha Skin that articulated an opportunity space at the crossroad of a rising customer demand for information and transparency on cosmetic ingredients and a growing significance of digital, sustainability-driven solutions in the cosmetics industry.

The creative gathering of potential SBM ideas identified as a critical activity in the discovery phase captures the essence of ideation proposed by Frankenberger et al. (2013), Gassmann et al. (2014), Tesch (2019), and Wirtz and Daiser (2018), which focuses on generating ideas for novel BM solutions. Next to brainstorming, the stakeholder workshop, and idea hackathon event mentioned by this study's interviewees, the use of analogies, entailing the examination of BMs in both related and unrelated industries, was identified as another creative approach to gather potential SBM ideas. The latter supports Gassmann et al. (2014), who postulate that BM ideas are not necessarily developed from scratch but frequently emerge through a recombination of patterns from existing BMs in other industries, contexts, or markets. Besides the creation of new ideas, the findings explicitly recognize the prioritization of the typically high number of ideas produced as a vital activity in the SBMI process. It fosters dialogue with internal and external stakeholders and the use of generic and sustainability-focused criteria utilized by qualified personnel, such as the CEO, a designated moderator, or a jury. This is in line with Schallmo (2013) and Winterhalter et al. (2017), who highlight the need for a criteria-based assessment of ideas to reduce complexity and concentrate resources on the most prolific BMI ideas before proceeding with the development of a more elaborated BM concept.

Many of the BMI process models reviewed (e.g., Bucherer, 2010; Bucherer et al., 2012; Eurich et al., 2014; Osterwalder & Pigneur, 2010) suggest to explore multiple ideas and develop different scenarios of the novel BM. In this study, only Gamma Sweets proceeded with three idea alternatives for sustainable packaging solutions into the design phase, whereas the remaining two case companies chose a single idea for the SBM, which in the design phase was refined and gradually advanced into a complete SBM concept. Contrary to the BMI process models mentioned, this finding supports Stampfl's (2016) observation that in practice established corporations tend to adopt a single idea that is turned into one BM prototype rather than continuing with several alternatives.

The identification of prototyping and testing as a central activity in the design phase aligns with process models that integrate experimentation into wider phases related to the design or development of novel BMs (e.g., Bucherer, 2010; Bucherer et al., 2012; Laudien & Daxböck, 2017; Mitchell & Bruckner Coles, 2004b; Osterwalder & Pigneur, 2010), as opposed to more fine-grained BMI process models that assign an entire process phase to this activity (e.g., Fallahi, 2018; Schallmo, 2013; Stampfl, 2016; Tesch, 2019; Wirtz & Daiser, 2018). The findings further indicate that experimentation in the design phase typically occurs on a smaller scale at different specificity levels. At a lower level of specificity, the development of simple mock-ups and click dummies as in the case of Alpha Skin, minimum viable packaging solutions as in Gamma Sweets' case, or Beta Air's low-fidelity prototypes of the website for the new seasonal service packages reflect the idea of rapid prototyping that constitutes a low-risk, iterative way to quickly envision novel BM ideas and make them more tangible (Zott & Amit, 2015).

They are subsequently integrated into more sophisticated SBM concepts, which require all BM components to be harmonized. The latter is achieved through the specification of SBM components, which was identified as another critical activity in the design phase. It takes up the challenge related to integrating different BM mechanisms into one viable BM mentioned by Frankenberger et al. (2013). In this regard, findings indicate that the specification of the value-creation component, which typically already occurs when ideas are generated in the discovery phase and the initial testing conducted in the design phase, often leads to the necessity to adjust the remaining components. This aligns with Laudien and Daxböck (2017), who propose the development of BMs to be initially concerned with the value creation or delivery component. Additionally, this finding further supports scholarly publications that highlight the need to consider interdependencies between BM components in the business modeling process (Berends et al., 2016; Schallmo, 2013; Wirtz, Pistoia, et al., 2016).

The performance of pilots in the delivery phase prior to the launch in certain countries (e.g., Alpha Skin's pilot with customers in France and Germany or Gamma Sweets' pilot with bulk dispenser systems in retail stores across five different countries) or with certain customers (e.g., Beta Air's pilots with early adopters from the firm's market research database) aligns with Bucherer et al.'s (2012) findings that suggest pilots to be launched in either geographically restricted test markets or with a carefully selected amount of pilot customers.

The need to prepare the organization for change, which was identified as a further vital activity in the delivery phase, is supported by extant BMI literature that highlights the relevance of organizational adaptations within the firm for the realization of novel BMs. While in all the cases studied, particular provisions were planned to be established (e.g., training facilities for customer change agents, acquisition of new resources and capabilities, or establishment of a new division), the urgency to make organizational adaptations is particularly evident in SBMI diversification processes, such as in the case of Alpha Skin, in which the firm is confronted with the complex decision whether to organizationally integrate or separate the novel BM from the established one (Björkdahl, Fallahi, & Holmén, 2018; Markides & Charitou, 2004).

Additionally, this study identified critical activities that have not been explicitly delineated in extant BMI process models.

The approval of the novel SBM concept by top management is an activity that was not explicitly mentioned in extant process-oriented BMI studies. However, it points to the importance of decision-taking and validation as postulated by Tesch (2019) and Wirtz and Daiser (2018) before progressing to the final implementation phase, which typically requires larger investments to be made.

The identification of suitable, sustainability-focused KPIs is another activity that was not explicitly discussed in BMI literature. Yet, the identification of KPIs in general constitutes a critical prerequisite for an effective monitoring and performance measurement of the novel BM prior to and after delivering it to the market, which in many conventional BM process models is included as a separate phase following the implementation stage (e.g., Bucherer et al., 2012; Osterwalder & Pigneur, 2010; Tesch, 2019; Wirtz & Daiser, 2018).

SUSTAINABILITY EMBEDDEDNESS IN PROCESS ACTIVITIES

Although the SBMI activities identified from the multiple case study conducted show parallels to conventional BMI literature as outlined in the preceding paragraphs, the findings of this study indicate that they are nonetheless not equal. This aligns with Rauter et al.'s (2017) observation that SBMs require particular adjustments and extensions albeit not differing considerably from conventional BMs.

The findings show that sustainability plays a central role in most of the main activities completed in the different phases of the SBMI process. As such, a blind adoption of activities from conventional BMI is clearly avoided, which may "dilute" a strong sustainability orientation in the business modeling process (Bocken, Strupeit, Whalen, & Nußholz, 2019). The specific ways how sustainability was embedded in the different process activities are illustrated in the following paragraphs.

In the diagnosis phase, sustainability was found to be embedded in the process activities through an explicit integration of economic, environmental, and/or social factors into the analysis conducted (e.g., the examination of CE trends at Gamma Sweets and of ecological and social hazards in existing products at Alpha Skin) or an implicit, value-driven guidance (e.g., through a sustainable BM vision at Beta Air), influencing more universal analyses linked to technology and consumers. In addition, the problems and opportunities formulated through the identification of change stimuli were often strongly concerned with environmental and social matters, such as the heightened plastic use identified at Gamma Sweets or the increasing interest of customers in knowledge on health-related, ecological, and social hazards of cosmetic ingredients at Alpha Skin.

The generation and, in particular, prioritization of ideas for novel SBMs in the discovery phase was guided by specific sustainability-oriented evaluation criteria (e.g., the sustainability barometer at Gamma Sweets or the desirability/suitability/sustainability-checklist for idea assessment at Alpha Skin) or, similar to the diagnosis phase, influenced by sustainable values and beliefs (e.g., the sustainable BM vision and culture at Beta Air).

Although sustainability was not particularly highlighted by the interviewees in the activities of the design phase, the ideas entering this phase were based on a sustainability-conscious selection, ensuring that only those with a clear sustainability orientation were further developed into more elaborated SBM concepts.

In the final delivery phase, sustainability was found to be strongly embedded into the performance measurement of the novel SBM concept. All three case companies attempted to identify KPIs capable of assessing the novel SBM across the triple bottom line by using GRI indicators (Gamma Sweets), adapting standard KPIs from conventional business modeling (Alpha Skin), or using a materiality matrix (Beta Air) to determine the most pressing sustainability concerns of the newly developed SBM concept.

PRESENCE OF EXPERIMENTAL AND ANALYTICAL PROCESS ACTIVITIES

The examination of the process activities identified in this study further indicates the presence of both analytical and experimental activities in the SBMI process. This, in particular, is exemplified by the phase of discovery. As outlined in detail in Section 4.2.3.1, the main activities in the discovery phase relate to the creative gathering of ideas for new SBMs and the rational prioritization of the most promising SBM ideas that aimed to be developed further into an elaborated SBM concept in the design phase.

Traditionally, there has been a tendency in the literature to divide business modeling processes and their corresponding activities into two opposing "extremes" (Günzel & Holm, 2013). This is illustrated by McGrath (2010), who distinguishes between analytical and discovery-driven approaches in BMI. Similarly, Björkdahl, Holmén, and Fallahi (2016) discuss cognitive search and experimentation as traditionally idiosyncratic stands to pursuing BMI in established firms. This study's findings contradict this traditional division. Instead, they support Berends et al. (2016), who postulate the need for both cognitive and experiential activities in the business modeling process.

5.2 The "Who": Main actors in the SBMI process

INITIATORS OF THE SBMI PROCESS: TOP DOWN AND BOTTOM UP

The findings of this study indicate that the process of SBMI is typically initiated either top down or bottom up. Extant SBMI literature, however, predominantly focuses on the former, postulating the central role of visionary sustainability leaders that drive a sustainable mindset in the organization, or describes the motivating factors behind SBMI to be personal and value-based (Rauter et al., 2017; Stubbs, 2017; Stubbs & Cocklin, 2008). Although this was found to be applicable for Beta Air at which the process of SBMI was instigated by the CEO and shaped by his belief in minimalism and the sustainable BM vision formulated, in the other two cases studied (Gamma Sweets and Alpha Skin), the process emerged bottom up, initiated by employees from either the sustainability or innovation department.

As such, this contradicts partially the evidence from conventional BMI literature that diagnoses BMI as a task of the top management or the CEO (Bucherer et al., 2012; Chesbrough, 2007; Mitchell & Bruckner Coles, 2004a; Stampfl, 2016).

In this regard, the results support Winterhalter et al. (2017), who find the perception of BMI as a sole CEO task to be unrealistic in practice, specifically in the context of large, multinational firms, given the time constraints and the high workload that executives in such businesses are confronted with. Nonetheless, this study's findings suggest that top management, while not always being the only initiator of SBMI, still occupies a vital role in the process.

This becomes particularly evident in the late design phase in which the approval of the novel SBM concept by top management constitutes a principal process activity that decides whether proceeding with the final delivery to the market is going to occur. This aligns with Stampfl (2016) and Roome and Louche (2016), who signal the need for a strong senior management commitment for a successful realization of the novel BM.

In this regard, persuading top management to commit and ultimately approve the SBM concept designed is a critical issue, especially in projects that are initiated bottom up. The results of this study point to the prevalence of "issue selling" in the sustainable business modeling process. The concept of "issue selling" depicts the organization as a marketplace in which issues are "sold" by organizational members through persuasion, and "bought" by top management, whose attention represents a scarce, valuable resource (Dutton & Ashford, 1993; Dutton, Ashford, O'Neill, & Lawrence, 2001). In the context of SBMI, this implies that employees outside the upper echelons of the organization sell sustainability improvements in the form of newly developed SBM concepts through persuasive efforts in the attempt to capture top management's attention. This attention is crucial for the SBM concept designed as it assists, inter alia, in mobilizing funds or in establishing legitimacy for the new SBM concept across the organization.

CROSS-FUNCTIONAL SUPPORT IN THE MANAGEMENT OF THE SBMI PROCESS

Moreover, findings indicate that the initiating actors, both the CEO and the employees within a department, realize early in the process that they require cross-functional support from employees of other departments, which turns navigating the process of SBMI into a cross-functional undertaking. In BMI literature, this is supported by Winterhalter et al. (2017), who regard the management of the BMI process in established corporations as a complex, cross-functional task, and Fallahi (2018), who proposes allocating a cross-functional team to enhance process management and performance in emerging BMI.

Similarly, in SBMI literature, Bocken and Geradts (2020) highlight that cross-functional collaboration is a central element in innovating BMs towards sustainability.

STAKEHOLDER INTEGRATION AND DIFFERENT MODES OF ENGAGEMENT IN THE SBMI PROCESS

The examination of actors further indicates that not only cross-functional collaboration inside the organization is vital but also the integration of external stakeholders into the process of SBMI, which, with the exception of the initial diagnosis phase, was found to occur across all three remaining process phases. This aligns with Bocken et al.'s (2014) value-network perspective and Roome and Louche (2016), who advocate the relevance of multi-actor engagement beyond firm boundaries in the SBMI process. Essentially, these approaches attempt to connect actors from inside the organization to outside actors to form cooperative structures aimed at innovating the BM towards sustainability. The findings further support Breuer et al.'s (2018) guiding principles and process-related criteria among which stakeholder integration and a collaborative modeling process are seen as critical requirements for SBM development.

However, while extant literature acknowledges the importance of collaborative arrangements with internal and external stakeholders as a default mode for developing and implementing new SBMs (Breuer et al., 2018), it fails to specify the particular type of involvement in the different stages of the business modeling process. The findings of this study show that the actors involved in the process of SBMI vary across the four phases and require *different modes of engagement.* While the initial diagnosis phase is dominated by internal stakeholders that instigate the process of SBMI and study the firm's status quo, the phases of discovery, design, and delivery all integrate external stakeholders to a varying extent.

The dominance of internal actors found at the outset of the SBMI process aligns with Roome and Louche's (2016) initial "identifying" phase of their process model of BM change for sustainability in which a tight network of actors inside the organization engages with topics and challenges present in the surrounding external environment.

In the discovery phase, an engagement with a broad variety of external stakeholder is favored to generate and prioritize ideas for novel SBMs.

This engagement attempts to incorporate different stakeholder expectations into the novel SBM ideas generated, which supports extant conceptualizations of SBMs and SBMI that advocate the importance of considering the needs and aligning the interests of a wide range or even all stakeholders through a proactive multi-stakeholder dialogue and co-creation (Evans et al., 2017; Geissdörfer, Vladimirova, & Evans, 2018; Stubbs & Cocklin, 2008; Upward & Jones, 2016).

The design and delivery phase, on the other hand, encourage engagement with a narrow rather than broad stakeholder pool. In the design phase, this comprises stakeholders that hold specific know-how, capabilities, or resources. They are necessary to advance the idea developed into an elaborated SBM concept and stimulate progress in the process of SBMI. This supports the theory of BMs as boundary-spanning activity systems. The theory underlines the vital role of stakeholders and related social interactions for the access and acquisition of resources and competences that are essential for developing and realizing novel BMs (Brehmer et al., 2018; Breuer et al., 2018; Velter, Bitzer, Bocken, & Kemp, 2020; Zott & Amit, 2010). In conventional process-oriented BMI research, this becomes evident in Laudien and Daxböck's (2017) four-phase BMI process. It stresses that average market players are typically not capable of pursuing BMI on their own. Hence, they require assistance from network partners to realize changes in the extant BM, which aligns with the observations made in the three case companies examined in this study. For example, Alpha Skin entered into a partnership with a digital start-up to secure the digital infrastructure needed for the realization of the INCI checker. Beta Air's missing experience in service-based BMs was compensated by the knowledge of experienced consultants that assisted in the development of the novel SBM concept. Gamma Sweets, on the other hand, involved suppliers and retailers to offset the lack of resources that were necessary to test plastic alternatives and bulk dispenser systems for the novel sustainable packaging solutions.

In the final delivery phase, engagement with customers becomes important, particularly in the piloting activity conducted that attempts to test the novel SBM concept on a larger scale. The relevance of customers and the alignment with their value preferences is highlighted by Magretta (2002) and Pynnönen et al. (2012) in conventional BMI literature, warning that BMI failure is often a result of wrong assumptions about customer needs. This stresses the relevance of a diligent use of customer feedback from the pilots to prevent the prevalence of possible wrong assumptions.

In addition, this study's results align with Fallahi (2018), who advocates the need to expose the novel BM to customers prior to a full implementation in both emerging and purposeful BMI processes.

ORGANIZATIONAL ANCHORING OF SBMI RESPONSIBILITIES

Lastly, while the author of this thesis was able to locate internal actors responsible for initiating the process of SBMI, the findings reveal an absence of a uniform organizational anchoring of responsibilities for SBMI across the cases studied. While in the case of Alpha Skin, the responsibility for SBMI was situated within the innovation department, in Gamma Sweets' case, it was employees from the sustainability department that initiated and steered the SBMI project. At Beta Air, on the other hand, responsibility for SBMI resided on a higher level of hierarchy as the CEO instigated the process and collaborated with a specialized, central unit within the firm, dealing with projects related to sustainability, technology, and innovation. This observation aligns with the findings by Bucherer et al. (2012) and Bucherer (2010), postulating that a clear ownership and organization of BMI is often missing as opposed to other more traditional types of innovations, such as product development. In this regard, these scholars warn that despite the absence of a clear organizational anchoring, the business modeling process shall not be treated as an isolated activity or a rare event.

5.3 The "How": Characteristics of the SBMI process

SBMI: A MULTIFACETED PROCESS WITH ITERATIVE PATTERNS

The recurrently stated dynamic and complex nature of the SBMI process in this study is consistent with extant conceptualizations of SBMI in scholarly literature, describing the development and realization of SBMs as a highly challenging task accompanied by a multitude of difficulties (Dentchev et al., 2018; Evans et al., 2017; Laukkanen & Patala, 2014).

The findings of this study further demonstrate that while the four theoretically derived phases (diagnosis, discovery, design, and delivery) were found to be an adequate higher-level representation of the SBMI process, the way that process actors navigate these process phases is characterized by particular iterations.

This non-linear progression aligns with the perspective of BES scholars that portray SBMI as a highly iterative and uncertain endeavor (Baldassarre et al., 2017; Bocken, Boons, et al., 2019; Weissbrod & Bocken, 2017) as well as the few extant holistic process models in SBMI literature that describe process phases to be interlinked in a cyclical or spiral manner (Geissdörfer et al., 2017; Roome & Louche, 2016).

However, while interlinkages between the phases are underlined by process-oriented SBMI scholars, their exact manifestation is not further described. In this regard, this study's results were able to specify how these dynamics manifest themselves.

They indicate the existence of two particular iterative patterns in the process of SBMI, which are located between the delivery and design phase as well as the discovery and diagnosis phase. The iteration between the delivery and design phase typically occurs in the case of unsatisfactory pilot outcomes that require the novel SBM concept to be adjusted. The other iteration takes place when changes in the firm's environment or insights from collaborative events with stakeholders necessitate additional information to adjust the ideas produced before proceeding with their prioritization.

These patterns are partially in line with Frankenberger et al.'s (2013) portrayal of conventional BMI in established firms through iterations between both later and earlier phases of the business modeling process. The back and forth between the delivery and design phase as well as the discovery and diagnosis phase identified in this study are congruent with two of the iterations described by Frankenberger et al. (2013), which occur between the phases of implementation and integration (i.e., when planned design of the BM does not work during the implementation) as well as ideation and initiation (i.e., when changed ecosystem conditions require a revision of ideas). While the iterative patterns identified in this study are in line with these two iterations proposed by Frankenberger et al. (2013), the findings do not support their proposition of a third iteration that exists between the integration and ideation phase (i.e., when the development of an idea becomes unattainable). Instead, this study's results indicate that firms progress in a linear manner from the discovery to the design phase in the process of SBMI. This implies that once ideas for new SBMs are selected in the discovery phase, they are not rejected at a later point in the design phase, requiring a return to the preceding phase, but rather are improved through additional testing and prototyping activities.

SBMI: A HYBRID OF SEVERAL GENERATIONS OF INNOVATION PROCESSES

Furthermore, the overall process of SBMI studied through the process trajectories of Alpha Skin, Beta Air, and Gamma Sweets shares characteristics of several innovation process generations from general innovation management literature that are illustrated in greater detail in Section 2.3.1.

The iterative patterns discussed resemble the interaction loops present in the third generation of "coupling" models that acknowledge interdependencies between the different innovation process stages (Rothwell & Zegveld, 1985).

Further findings from this study suggest that not only the phases but also the activities within the different phases are not always sequential, can occur simultaneously, and that the management of SBMI requires cross-functional support. This aligns with the fourth generation of "integrated" models that stress the need for a cross-functional integration and parallel process activities (Galanakis, 2006; Rothwell, 1992, 1994). Finally, the engagement with external stakeholders throughout the process of SBMI as discussed comprehensively in Section 5.2 is in line with the fifth generation of "networking" models that are characterized by open, interconnected development processes facilitated through greater networking with external actors (Galanakis, 2006; Meissner & Kotsemir, 2016; Rothwell, 1994). The presence of different generational elements indicates that the process of SBMI is a multifaceted hybrid construct. This supports the scholarly observation of an increased hybridization of innovation processes, bringing together elements from different generations to reflect the complexity of the real-world process (Herstatt & Verworn, 2014; Stampfl, 2016; Verloop, 2004).

SYSTEMATIC GUIDANCE – ITERATIVITY OXYMORON

Despite the iterative patterns identified, all three case companies traversed the process from "idea to launch" without omitting any of the four phases. The results of this study further indicate that the process of SBMI was to some degree systematized. In the majority of the cases studied, interviewees mentioned that some type of structured scheme (e.g., process roadmap at Alpha Skin or the sustainability barometer at Gamma Sweets) was used to guide the process of SBMI, although it was typically not followed rigidly and required adaptation.

This reflects the inherent paradox between structure and iteration outlined by Frankenberger et al. (2013) in conventional BMI literature. It stresses that managers need systematic guidance to coordinate business modeling efforts while at the same time acknowledging that the process itself is much more complex than the predefined structure. Similarly, in SBMI literature, Geissdörfer et al. (2017) describe the phases of the sustainable business modeling process to be followed both in an orderly and iterative manner, implying that while organizations attempt to proceed through the process gradually, moving back and forth is likely to occur due to the inherent complexity of SBMI.

INTENTION AND TIMING OF THE SBMI PROCESS

The findings of this study underline the relevance of intention and timing of the SBMI process that emerged as additional patterns from the data.

With regards to the aspect of intention, the results indicate that although the process was initiated on many occasions with a clear intention to revise or create a more sustainable type of BM (e.g., Alpha Skin with a dedicated BMI unit aimed at sensing novel BM opportunities or Beta Air with a sustainable BM vision formulated by the CEO), this is not necessarily always the case. As demonstrated by the case of Gamma Sweets, it was only later in the design phase that the sustainability team realized that the sustainable packaging solutions developed necessitated changes to be made in the extant BM. This observation is in accordance with Fallahi (2018), postulating the prevalence of BMI processes that are purposeful or unintentional. In this regard, a new BM is meant to be developed in a conscious manner in the case of a purposeful BMI. In the case of unintentional BMI, on the other hand, early process activities tend to be unaware of the adaptations needed related to the BM and are more strongly associated with product, process, and technological innovations.

With regards to the aspect of timing, the findings further reveal that case companies embarked on the process of SBMI upon the occurrence of changes in either strategic considerations (e.g., introduction of new strategies at Alpha Skin and Gamma Sweets) or customer demand (e.g., declining sales in the end-consumer segment at Beta Air). This supports the existence of external and internal triggers as suggested in BMI and SBMI literature, which influence the timing when the business modeling process is initiated (Bucherer et al., 2012; Carayannis, Sindakis, & Walter, 2015; Demil & Lecocq, 2010; Foss & Saebi, 2017; Rauter et al., 2017).

The identification of changes in customer demand as a central external trigger to instigate the SBMI process contradicts Rauter et al. (2017), who attribute customers and competition a relevant role in exploiting SBM potential, yet disregard related changes as a critical timing to embark on the process of SBMI. At the same time, it aligns with the results from conventional BMI literature that recognize changes in the business ecosystem, which entails, inter alia, the competitive situation or technological progress but also stakeholder demands, including customers, to be vital in driving the business modeling process (Chesbrough & Rosenbloom, 2002; De Reuver et al., 2009; Ferreira, Proença, Spencer, & Cova, 2013; Miller, McAdam, & McAdam, 2014; Pateli & Giaglis, 2005; Voelpel, Leibold, & Tekie, 2004).

The identification of changes in strategic considerations as a critical internal trigger is in line with Rauter et al. (2017), who recognize coherence between corporate strategy and the BM to fuel the sustainable business modeling process. This result also highlights the close relationship between BMs and strategy.

As delineated in greater detail in Section 2.1.1.2, different relationships between the two concepts have been discussed by strategic management scholars in an attempt to distinguish them from each other. While in early conventional BM research, strategy and BMs were regarded as identical concepts (Porter, 2001), they are meanwhile understood as complementary (Magretta, 2002; Mitchell & Coles, 2003; Teece, 2010; Zott & Amit, 2008), nested (Stieglitz & Foss, 2015), or layered concepts (Al-Debei & Avison, 2010; Bask et al., 2010; Cavalcante et al., 2011; Veit et al., 2014). This study's findings support, in particular, the perspective of a nested relationship in which the BM is seen as a reflection of strategic considerations, being specified ex-post based on the strategy established (Casadesus-Masanell & Ricart, 2010; Shafer et al., 2005). This becomes evident in the cases of Alpha Skin and Gamma Sweet where the introduction of new sustainability-focused strategies called for a subsequent alignment to be made in terms of the BM.

Besides aligning with the division into external and internal triggers, this study's findings also support scholarly categorizations in BMI and SBMI literature that further differentiate between opportunity and threat-oriented factors, provoking the need for change (Bucherer et al., 2012; Fallahi, 2017; Jørgensen & Pedersen, 2018). In this study, these change stimuli were identified in the initial diagnosis phase after the firms embarked on the process due to changes in either strategy or customer demand as outlined before.

While in some of the cases the change stimuli identified were evident as growth opportunities, others were perceived as threats or problems. In SBMI literature, this distinction is discussed by Jørgensen and Pedersen (2018) that differentiate between "push" and "pull" factors. "Pull" factors represent positive aspects of alternative, sustainability-focused BMs, which in the case of Alpha Skin, for example, was the potential to explore the opportunity space at the intersection of a rising demand for transparency from customers and a heightened relevance of digital, sustainability-focused innovations in an additional novel SBM. Contrary, "push" factors represent negative aspects present in the existing BM that push the firm to pursue more sustainable solutions, which were, for example, a disproportional use of plastics in the candy line at Gamma Sweets or in Beta Air's case the inflexibility of the current ownership-focused BM to accommodate for end-consumers' periodical product usage that provoked declining sales in B2C.

6 CONCLUSION

"The best way to predict the future is to create it." – Drucker (as cited in Cohen, 2009, p.4)

In this chapter, the conclusions of this study are presented, which includes addressing this study's research question and outlining implications for theory and practice as well as the limitations and avenues for future research.

6.1 Addressing this study's research question

The main objective of this thesis was to enhance the understanding of the SBMI process in large corporations. To answer the overarching research question related to how large firms navigate the process of SBMI, a four-phase process model for sustainable business modeling was proposed. The process model is rooted in a theoretical synthesis of process phases from 16 process models identified in BMI and SBMI literature and draws on empirical evidence from a real-world, multiple case study of SBMI processes in three large German firms. The process model developed concisely provides an overview of the activities and actors involved in the *diagnosis, discovery, design, and delivery* phases, characterizes the nature of the relationship between the phases and outlines the relevance of intention and timing in the overall SBMI process. In the following paragraphs, the main study outcomes are briefly delineated, providing answers to the three sub-questions of this study's overarching research question.

First, in terms of *SBMI process activities*, this study identified ten phase-specific activities in the sustainable business modeling process, which are briefly presented in Figure 12 (see second layer "SBMI Process Activities"). The empirical findings of this study further indicate the presence of both experimental and analytical process activities. Despite their resemblance with conventional BMI, sustainability was found to be strongly embedded in most process activities (e.g., environmental and social aspects incorporated in the analysis conducted at the outset of the process or sustainability-oriented criteria and KPIs utilized later in the process for idea selection and performance measurement).

Second, in terms of *SBMI process actors*, this study's results show that the actors participating in the SBMI process stem from both inside and outside the organization. Depending on the process phases, different modes of engagement were found to exist in the cases studied (see third layer "SBMI Process Actors" in Figure 12). The diagnosis phase in which the process is initiated either top down by the CEO or bottom up by a small team of employees within a single department, seeking cross-functional support to manage the SBMI process, is dominated by internal actors. In the remaining phases, external stakeholders are additionally integrated into the SBMI process to a varying extent. In the discovery phase, the findings reveal that a wider pool of stakeholders is incorporated into the process to foster the gathering of new SBM ideas, whereas in the design phase, engagement is limited to a small number of stakeholders, possessing particular expertise, capabilities, or resources that are necessary to translate the ideas selected into an elaborated, well-designed SBM concept. In the final delivery phase, this number is further narrowed to customers, being predominantly integrated in large-scale pilots. In addition, the empirical findings indicate that a uniform organizational anchoring of SBMI responsibilities tends to be absent in large companies.

Third, in terms of *SBMI process characteristics,* the findings show that while the four theoretically derived phases were found to be an adequate higher-level representation of the sustainable business modeling process by the interviewees, the way that process actors navigate through these phases is not a strictly linear progression (see the bidirectional arrows in Figure 12). Although schemes from other adjacent innovation projects were often used to guide the SBMI process activities in a gradual manner, the results point towards the presence of distinct iterative patterns. This includes a back and forth between the delivery and design phase (i.e., when refinement of the SBM concept is needed due to unsatisfactory pilot outcomes) and between the discovery and diagnosis phase (i.e., when refinement of SBM ideas is needed due to emerging insights from collaborative events with stakeholders or changes in the business environment). Finally, timing and intention emerged as additional patterns from the data when studying the process characteristics (see first layer "SBMI Process Characteristics" in Figure 12). The empirical findings of this study indicate that large firms typically embark the SBMI process upon occurrence of changes in strategic considerations or customer demands. Yet, this does not always happen with a clear intention to change or diversify the BM towards sustainability from the outset of the process.

Figure 12 provides a condensed summary of this study's main findings.[17] By investigating the aforementioned three process elements (activities, actors, and characteristics) from "idea to launch," this study adopts a holistic, process-focused view on SBMI. It provides valuable implications for theory, addressing extant knowledge gaps and opening up several new avenues for future research as well as guidance for practitioners, which will be explained in greater detail in the two concluding sections below.

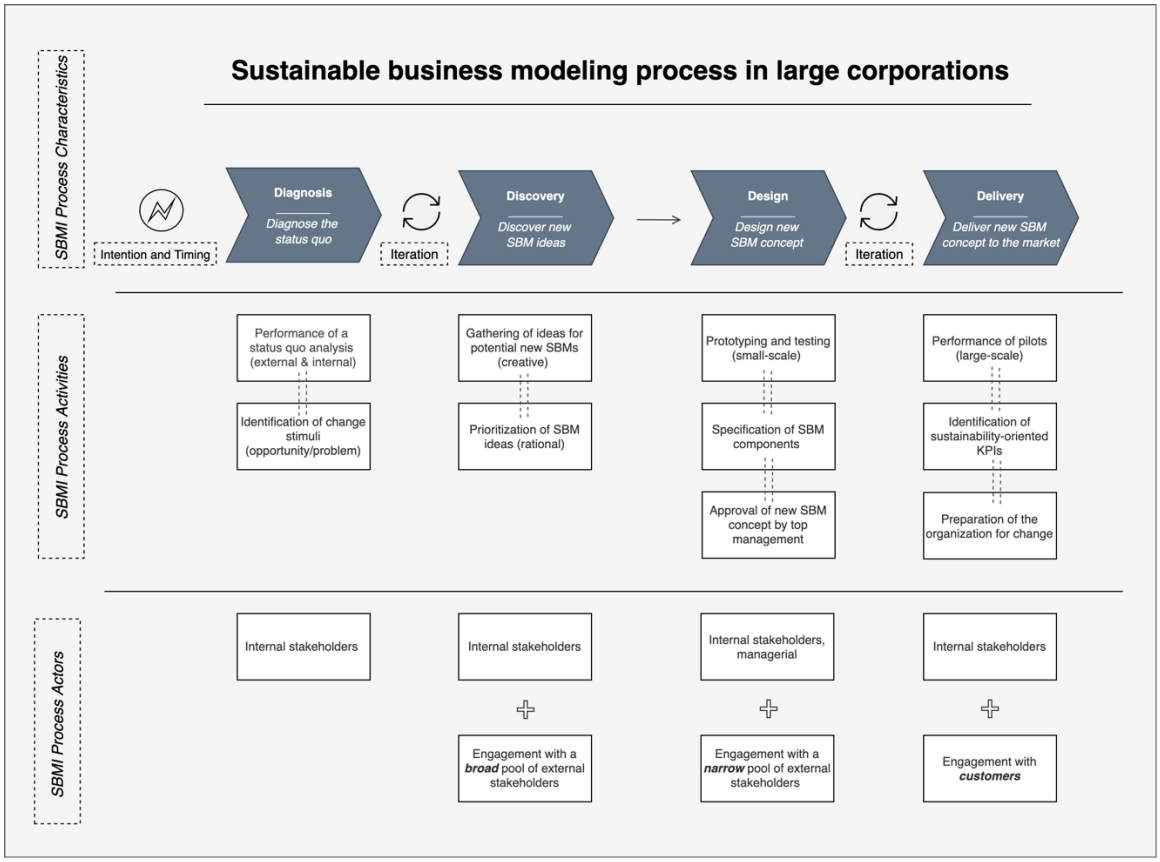

Figure 12. Condensed summary of empirical findings.

[17] Please consult the final process model of this study in Figure 11 for a more detailed delineation of process activities, actors and characteristics.

6.2 Implications for theory and practice

6.2.1 Theoretical contributions

Scholarly attempts to delineate the concepts of SBM and SBMI have produced several definitions in the literature, which have oftentimes emerged along diverging trajectories (Dentchev et al., 2018; Lüdeke-Freund et al., 2018; Schaltegger, Hansen, et al., 2016). At a fundamental level, the comprehensive literature review addresses the existing definitional ambiguity by deriving working definitions for SBM and SBMI. Consequently, this attempt to unite extant definitions and conceptualizations can in itself be regarded as a contribution to establish more conceptual clarity in the scholarly literature. By synthesizing process phases from the neighboring field of conventional BMI, this research further responds to Dentchev et al.'s (2018) call for a more active utilization of knowledge from adjacent, more mature research fields to foster constructive dialogue and synergistic interactions aimed at advancing the field of SBMI, which is still in an early-theory-development stage.

Prior literature has primarily focused on the outcomes of SBMI and only few studies have examined the process that firms undergo to develop and realize more sustainable BMs (Bocken et al., 2014; Brehmer et al., 2018; Geissdörfer et al., 2017; Geissdörfer, Vladimirova, & Evans, 2018; Lüdeke-Freund et al., 2018; Olofsson et al., 2018; Pieroni et al., 2019a; Roome & Louche, 2016). By adopting a dynamic process perspective to SBMI, this study contributes to shifting the predominant focus from static process outcomes to the dynamic business modeling process, attempting to enhance the understanding of how large firms adopt more sustainable BMs and to uncover the "hidden" content of the processual black box.

By proposing a four-phase process model that holistically describes the SBMI process from "idea to launch", this study responds to calls from Pieroni et al. (2019a) and Geissdörfer, Vladimirova, and Evans (2018) that specifically ask for more process-oriented studies, examining the sustainable business modeling process in its entirety. As such, this study also contributes to the process-oriented, holistic perspective on SBMI that slowly emerges as an alternative research stream to the predominant work of BES scholars. By providing an empirically grounded narrative of activities, actors, and overarching characteristics of the SBMI process, this study contributes to SBMI literature in the following ways:

First, while both BES scholars and the few existing holistic process models for SBMI highlight the iterative nature of the sustainable business modeling process, this study contributes to the literature by delineating the exact empirical manifestation of such iterativity, identifying distinct iterative loops that occur between the delivery and design phase as well as the discovery and diagnosis phase of the SBMI process. With the emergence of intention and timing as additional patterns from the examination of the overarching process characteristics, this study further contributes to the stream of literature that examines antecedents of SBMI (e.g., Rauter et al., 2017), identifying changes in customer demand and strategic considerations as two specific internally and externally oriented triggers for large firms to embark on the SBMI process.

Second, while extant studies in the field of SBMI acknowledge the need for collaboration with a variety of stakeholders as a means of coping with the complexity of sustainable innovations (Aagaard & Lodsgård, 2019; Breuer et al., 2018), this study goes one step further. It contributes to the literature by specifically locating responsibilities for SBMI in the different process phases and outlining the different modes of engagement needed (i.e., top-down or bottom-up initiation of the SBMI process with cross-functional support inside the organization and a subsequent phase-dependent integration of external stakeholders).

Third, by identifying distinct process activities in the four different phases of SBMI and the ways how sustainability is embedded in these activities, this study complements the existing scholarly understanding that despite resembling regular BMI, SBMI requires specific extensions and adaptations to account for its higher level of complexity entrenched in a multifaceted value notion, wider inclusion of stakeholders, systems, externalities, and potential negative rebound effects (Breuer et al., 2018; Dembek et al., 2018; Geissdörfer, Vladimirova, & Evans, 2018; Lüdeke-Freund & Dembek, 2017; Rauter et al., 2017).

Lastly, by conducting a multiple case study of three different SBMI process trajectories in the specific context of large corporations from different industries, this study addresses the dearth of empirical studies on SBMI in large firms and enhances the understanding of how they navigate the sustainable business modeling process.

6.2.2 Managerial implications

In addition to the theoretical contributions outlined, this study's process model for SBMI provides cross-functional teams and managers of large corporations, that are interested in transitioning to more sustainable BMs, with much needed guidance in light of the extant scarcity of systematic SBMI process models (Geissdörfer, Vladimirova, & Evans, 2018; Pieroni et al., 2019a).

As such, the familiarization with this process attempts to strengthen practitioners' confidence, inspiring them to initiate the process of SBMI despite its inherent challenging and complex nature (Geissdörfer, Vladimirova, Fossen, et al., 2018; Laukkanen & Patala, 2014; Long et al., 2018; Morioka et al., 2017). As indicated by this study's findings, most of the case companies studied embarked on the process of SBMI using some type of structured scheme. The author of this study encourages the use of the process model proposed for guidance as this study's process model was specifically constructed in the context of SBMI. This may ease the need to adapt extant schemes used for other innovation types, which carries the risk of potentially overlooking the peculiarities of the SBMI process and weaken the sustainability orientation of the activities performed.

The empirical findings further reveal that responsibilities for SBMI in large corporations tend to be anchored in different ways, such as in informal arrangements (e.g., enthusiastic employees in the sustainability department), a BMI unit within an innovation department, or a central unit for sustainability, technology and innovation that directly cooperates with and reports to the CEO. Contrary, other types of innovation, such as product innovations have a clearer organizational anchoring, commonly residing under an R&D department that is responsible for developing new products or technologies (Bucherer, 2010; Bucherer et al., 2012). The author recommends establishing an equally clear organizational set-up for SBMI to ensure that the business modeling process towards sustainability is ongoing rather than a single occasion and hence capable of securing a sustainable competitive advantage for the firm over time.

6.3 Limitations and future research

The first limitation relates to the *use of retrospection.*

In a multiple case study, the process of SBMI was mainly examined retrospectively. This meant that the author constructed a narrative of the business modeling process, which each case company underwent, by studying the respective process backwards (Pettigrew, 1990; Poole et al., 2000). Retrospective processual research can be impeded by difficulties in the ex-post recollection and rationalization of the phenomenon under investigation (Langley, 2009; Leonard-Barton, 1990). As SBMI processes tend to be a lengthy endeavor, lasting from several weeks to years, interview partners could potentially have overlooked or misunderstood critical facts (Eisenhardt & Gräbner, 2007).

To minimize that risk, data triangulation was applied as outlined in the discussion of the research quality in Section 3.3.1. In addition, a pre-interview questionnaire was sent prior to the interviews conducted. It acted as a means to facilitate the interviewees' recollection of particular SBMI processes that were subsequently discussed in greater detail in the interviews.

Nonetheless, the author of this study believes that the examination of the SBMI process would greatly benefit from longitudinal studies in which researchers would follow the business modeling process and collect data in real time over a period of time (Pettigrew, 1990). Alternatively, further studies that combine multiple retrospective case studies, capable of identifying the main patterns in a process, with a single real-time case study, allowing for an in-depth, microscopic investigation of process details, would equally constitute an important contribution to the nascent research field of process-oriented SBMI. The synergistic combination could account for the weaknesses of each approach and increase the validity of the research (Leonard-Barton, 1990).

The second limitation refers to the *selection of interview partners and the risk of social desirability bias.*

All of the research participants interviewed were employees of the case companies selected and were mostly holding managerial positions in the innovation or sustainability department or a specialized unit dedicated to sustainability, technology, and innovation. Since cross-functional support was found to be critical to navigate the process of SBMI, interviews with employees from more functional areas,

such as the R&D, IT, marketing, sales, or strategy department would be of value to obtain a more multifaceted view on the process of SBMI. Additionally, no interviews were held with external actors from the firm's surrounding ecosystem. However, the examination of process actors in this study reveals that both internal stakeholders from different functional areas as well as external stakeholders play a significant role in shaping the SBMI process. Therefore, the author strongly encourages further studies on SBMI processes that attempt to look beyond organizational boundaries and additionally interview external stakeholders that participate in the sustainable business modeling process.

Given that environmentally responsible behavior can increasingly be considered a social norm, the sustainability-positive nature of this study's research topic might have contributed to the risk of social desirability bias in the interviewees' responses (Newhouse, 1990; Vesely & Klöckner, 2020). As a consequence, the research participants interviewed in this study could have possibly provided an overly optimistic description of the company's business modeling process in terms of its sustainability intention and emphasis. Alternatively, they might also have underemphasized undesirable or problematic environmental or social aspects that occurred during the business modeling process to appear more sustainable (Kuokkanen & Sun, 2020; Paulhus, 2002). This may also have rendered the partial member checking conducted less useful as its aim to correct any factual or interpretive errors could have been overshadowed by the interviewee's desire to present the SBMI process in a more favorable light. In addition, contextual factors could have aggravated the risk of social desirability bias as the virtual and personal presence of the interviewer might have triggered socially desirable answers by the interviewees (Kühne, 2018). To address the latter, the researcher granted and repeatedly communicated the confidential treatment of the interview answers and personal data to the interviewees and attempted to phrase questions in a careful manner.

Nonetheless, further studies could make use of more anonymous modes of engagement, such as online surveys. Although the risk of social desirability bias still represents a critical issue in survey research, the anonymity may to some extent ease the interviewees' apprehension of potential social sanctioning (Joinson, 1999; Vesely & Klöckner, 2020). In addition, the inclusion of social desirability measures to reveal a person's tendency to reply in a socially desirable manner as a control variable in surveys may further mitigate this risk and assist in adjusting the results for individual bias (Vesely & Klöckner, 2020).

The third limitation relates to this study's *nature and sample size.*

While analytical generalization from the similarities identified in process activities, actors, and overarching characteristics in the cross-case analysis can be assumed, the qualitative nature of the case study design selected for this study paired with the small sample size of SBMI processes in three case companies do not make it possible to claim statistical generalization (Yin, 2003). Initially, more cases were taken into consideration for the multiple case study. However, some of them were ultimately excluded from the sample given that they did not fulfil the sampling criteria established or working definition of SBMI derived, or faced substantial confidentiality constraints. Therefore, the findings of this study should not be understood as universally binding but given the nascency of the research subject and this study's qualitative nature rather as suggestive evidence, which requires further research.

Besides additional qualitative research, quantitative studies with larger sample sizes, in particular, are recommended to statistically generalize this study's findings. As already suggested in the discussion of the social desirability bias risk, this may, for example, occur in a survey. More specifically, a large-scale, standardized survey that tests the findings of this explorative study related to the activities, actors, and overarching characteristics could enhance the robustness of the study results.

The fourth limitation is linked to *sample selection and context specificity.*

To select appropriate cases, criterion sampling was applied as outlined in Section 3.2.2. By applying the first criteria that demanded a clear sustainability orientation of the business modeling endeavor, the author might have missed relevant cases of processes in which the sustainability orientation was not explicitly evident to research participants, for example due to multiple overlapping process objectives or a lack of awareness.

Additionally, the use of sustainable archetypes proposed by Bocken et al. (2014) and Ritala et al. (2018) and SBMI types by Geissdörfer, Vladimirova, and Evans (2018) in the pre-interview questionnaire for the determination of relevant cases might have excluded potentially interesting cases of SBMI processes that are not captured by scholarly classifications given that these classifications do not claim completeness and may be amended or extended over time as new sustainable strategies and SBMI types arise.

The application of the second criteria, which required the process of SBMI to be nearly or fully accomplished could have excluded interesting cases of unsuccessful SBMI attempts that did not reach the later stages of the process. Nonetheless, the "lessons learned" from these cases could have provided valuable knowledge with regard to process activities, actors, or characteristics that might have provoked the early failure.

Lastly, by restricting the size and geographical location of the case companies selected, the author missed out on cases of SBMI processes outside Germany in other cultural settings and any potential case companies that did not fulfil the enterprise size requirement specified in Section 1.3.

As such, the resulting findings of this study are based on a multiple case study of three large German firms that operate in the cosmetics, HVAC, and confectionary industries and attempt to either diversify or change their existing BM towards sustainability. All the three SBMI processes studied were fully or partially marketplace-centered and interested in increasing value for customers through the SBMI process. It is important to stress that the findings shall mainly be considered in the aforementioned contexts. For example, processes initiated solely for the sake of complying with regulatory requirements or optimizing production efficiency, might have resulted in different activities and actors in the business modeling process. This illustrates that the applicability of the findings and process model proposed may be impeded in other contexts.

Consequently, further research on the process of SBMI, which tests the boundary conditions of the process model proposed relating to different firm sizes, industries, geographic locations, other SBMI types and drivers, or any other kind, would be appreciated. This could assist in evaluating whether the same activities and actors would be relevant in other conditions and whether the nature of the SBMI process would remain alike.

The fifth and final limitation relates to the *researcher's dilemma between examining a research subject in greater depth or breadth* (Reinhold, 2014).

Given the current embryonic state of research on the process of SBMI, the phenomenon was investigated in breadth. As such, the author of this study focused on jointly examining three sub-questions of the overarching research question related to the activities, actors, and characteristics of the SBMI process. This approach, however, comes at the expense of studying the sustainable business modeling process in greater depth.

While this thesis provides a good starting point indicating how a holistic, process-oriented perspective on SBMI can be adopted by researchers, the author believes that the aforementioned three sub-questions would benefit from isolated investigations, preferably in the form of independent empirical studies attributed to each of them. This would allow for a more fine-grained exploration of each sub-question.

While this thesis identified the main activities and actors in the sustainable business modeling process, further studies may attempt to investigate them in greater depth and potentially explore these process elements from an individual rather than organizational perspective. Alternatively, additional studies might exclusively focus on the characteristics of the SBMI process, zooming into the iterative patterns identified between the delivery and design phase as well as the discovery and diagnosis phase, but also the role of intention and timing in the process of SBMI that emerged as additional patterns from the data. Finally, researchers could also focus on other process elements than the ones examined in this study. As such, they may extend the process model proposed with a “toolbox” for SBMI in large corporations or delineate artefacts and potential success factors for each of the four process phases.

Despite the limitations described, the avenues for future research are plenteous. The author hopes that this thesis was able to spark interest in the holistic, process-oriented perspective on SBMI and stimulate further research to extend the understanding of the process of SBMI but also motivate practitioners to embark on the process of SBMI to create competitive advantage for their businesses as well as contribute to a more sustainable future for society and the environment.

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Appendices

Appendix A: Overview of holistic process models in BMI and SBMI literature

AUTHORS	*DISCIPLINE*	*METHOD*	*DESCRIPTION*
Bucherer, 2010	BMI	Conceptual	Four-phase process model for BMI based on process models from innovation management literature and life-cycle analysis
Bucherer et al., 2012	BMI	Empirical	Process of BMI divided into four phases based on a multiple case study (11 cases)
Eurich et al., 2014	BMI	Conceptual	Six-step approach to design a BM based on principles of network thinking and Drucker's (1994) 'theory of the business'
Fallahi, 2018	BMI	Empirical	Purposeful BMI process inductively derived from a multiple case study (7 cases)
Frankenberger et al., 2013	BMI	Empirical	4I-framework related to BMI structure and challenges based on phases from general innovation process models and a multiple case study (14 cases)
Gassmann et al., 2014	BMI	Empirical	Four-phase process framework "St. Gallen BM Navigator" for BMI (extension of 4I-framework)
Geissdörfer et al., 2017	SBMI	Empirical	Eight-phase Cambridge SBMI process based on process models from BM/BMI literature and expert interviews, tested in a single, short case study
Laudien & Daxböck, 2017	BMI	Empirical	Four-phase BMI process inductively derived from a multiple case study of average market players (10 cases)
Mitchell & Bruckner Coles, 2004b	BMI	Conceptual	Four dimensions for a continuous BMI process
Osterwalder & Pigneur, 2010	BMI	Empirical	Proposition of five phases for the process of BM design
Roome & Louche, 2016	SBMI	Empirical	Four-phase process model of BM change for sustainability inductively derived from a comparative case study
Schallmo, 2013	BMI	Conceptual	Procedural model for BMI based on extant process models in BM/BMI literature
Stampfl, 2016	BMI	Empirical	Analytical model of BMI processes in incumbent firms based on change management and identity theory and a comparative case study
Tesch, 2019	BMI	Conceptual	Framework for BMI as transformational processes based on extant process models in BM/BMI literature
Wirtz & Daiser, 2018	BMI	Conceptual	Proposition of a generic BMI process based on an extensive literature review of process-oriented BMI literature
Zott & Amit, 2015	BMI	Conceptual	Five-phase normative model of the BMI process based on design research

Appendix B: Process phases of holistic process models in BMI and SBMI literature

AUTHORS	*PROCESS PHASES*				
	Four Process Phases				
Bucherer, 2010	Analysis	Design (Idea generation, design, selection and test of BM scenarios)	Implementation	Control	
Bucherer et al., 2012	Analysis	Design (Development and feasibility study of solution alternatives)	Implementation	Control	
Frankenberger et al., 2013	Initiation	Ideation (Idea generation)	Integration	Implementation	
Gassmann et al., 2014	Initiation	Ideation (Pattern adaptation)	Integration	Implementation	
Laudien & Daxböck, 2017	Monitoring of BM fit beyond the industry-level	BM development	Opening-up the BM	Deliberate BMI	
Mitchell & Bruckner Coles, 2004b	Understanding and optimal application of the current BM	Establishment, understanding, and following of appropriate BMI vision	Ongoing design and testing of potential BM improvements, replacements, and innovations	Understanding and installation of next BM improvement or replacement	
Roome & Louche, 2016	Identifying	Translating	Embedding	Sharing	
Stampfl, 2016	Sensebreaking (Recognition of BM limitations)	Sensegiving (BM prototype development)	Freezing (BM design and implementation)	Refinement (Continuous BM adaptation)	
	Five Process Phases				
Osterwalder & Pigneur, 2010	Mobilize	Understand	Design	Implement	Manage
Zott & Amit, 2015	Observe	Synthesize	Generate	Refine	Implement

	Six Process Phases						
Eurich et al., 2014	Determination of the mission and assumptions about the business environment	Analysis of interdependen-cies	Determination and analysis of design alternatives	Creation of BM design alternatives	Selection of one BMI	Testing and realization of the BM	
Schallmo, 2013	Generation of BM ideas	Development of BM vision	BM prototyping	BM development	BM implemen-tation	BM extension	
Tesch, 2019	Initiation	Ideation	Prototyping	Validation	Implemen-tation	Scaling	

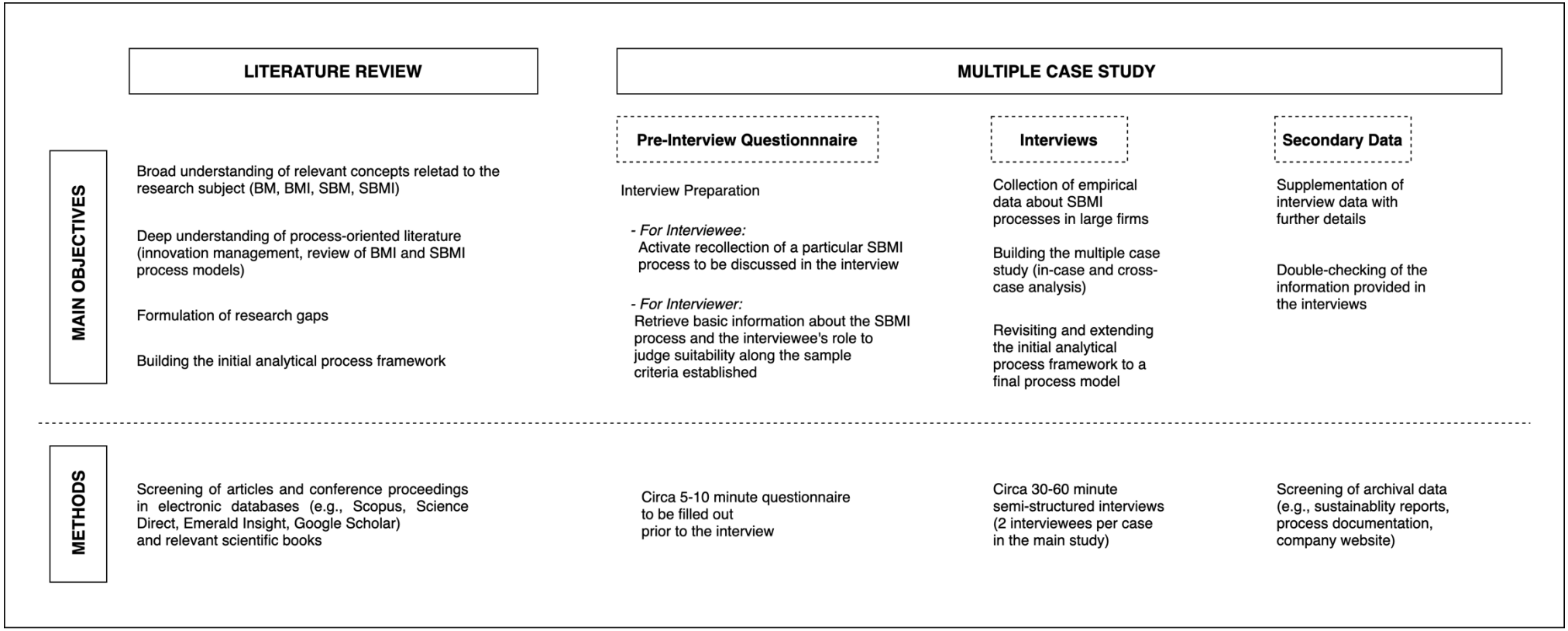
	Seven Process Phases							
Fallahi, 2018	Market study	Conceptualization of BM	Concept creation	Test	Adaptation	Imple-men-tation	Growth	
Wirtz & Daiser, 2018	Analysis	Ideation	Feasibility	Proto-typing	Decision-Making	Imple-men-tation	Sustain-ability	
	Eight Process Phases							
Geissdörfer et al., 2017	Ideation	Concept Design	Virtual Proto-typing	Experi-menting	Detail Design	Pilot-ing	Launch	Adjustment/ Diversi-fication

Appendix C: Mapping of the derived process phases to phases in BMI and SBMI literature

Phases Derived / *Authors*	***DIAGNOSIS***		***DISCOVERY***		***DESIGN***			***DELIVERY***		
Bucherer, 2010	Analysis		Design (Idea generation, design, selection and test of BM scenarios)					Implementation	Control	
Bucherer et al., 2012	Analysis		Design (Development and feasibility study of solution alternatives)					Implementation	Control	
Eurich et al., 2014	Determination of the mission and assumptions about the business environment	Analysis of interdependen-cies	Determination and analysis of design alternatives		Creation of BM design alternatives	Selection of one BMI		Testing and realization of the BM		
Fallahi, 2018	Market study		Conceptualization of BM		Concept creation	Test	Adaptation	Implementation	Growth	
Frankenberger et al., 2013	Initiation		Ideation (Idea generation)		Integration			Implementation		
Gassmann et al., 2014	Initiation		Ideation (Pattern adaptation)		Integration			Implementation		
Geissdörfer et al., 2017	-		Ideation	Concept Design	Virtual Prototyping	Experimen-ting	Detail Design	Piloting	Launch	Adjustment/ Diversification
Laudien & Daxböck, 2017	Monitoring of BM fit beyond the industry-level		BM development			Opening-up the BM		Deliberate BMI		
Mitchell & Bruckner Coles, 2004b	Understanding and optimal application of the current BM		Establishment, understanding, and following of appropriate BMI vision		Ongoing design and testing of potential BM improvements, replacements, and innovations			Understanding and installation of next BM improvement or replacement		
Osterwalder & Pigneur, 2010	Mobilize	Understand	Design					Implement	Manage	
Roome & Louche, 2016	Identifying		Translating		Embedding			Sharing		
Schallmo, 2013	-		Generation of BM ideas	Develop-ment of BM vision	BM prototyping	BM development		BM implementation	BM extension	
Stampfl, 2016	Sensebreaking (Recognition of limitations of the existing BM)		Sensegiving (BM prototype development)			Freezing (BM design and implementation)			Refinement (BM adaptation)	
Tesch, 2019	Initiation		Ideation		Prototyping	Validation		Implementation	Scaling	
Wirtz & Daiser, 2018	Analysis		Ideation		Feasibility	Prototyping	Decision-making	Implementation	Sustainability	
Zott & Amit, 2015	Observe		Synthesize		Generate	Refine		Implement		

Appendix D: Overview of the research design and data collection sources and methods

In the following, an overview of the methodology applied in this study is presented, illustrating the research design adopted with the respective objectives and data collection sources and methods used.



Appendix E: Recruitment message, information letter, and consent

To recruit interview partners, the author contacted interviewees via telephone (if phone number was indicated on the firm website), LinkedIn, or email. For the latter two approaches, the author of this study prepared a message to establish a first contact with potential interview partners, which is shown in E.1. In addition to this message, an attachment with a detailed information letter and consent form, which was created based on the template provided by the Norwegian Centre for Research Data, was included to the message sent (see E.2). To increase the response rate, the message, information letter, and consent presented below were translated from English into German, which represented the mother tongue of most potential interview candidates contacted and facilitated communication.

E.1 LinkedIn message/email to recruit interview partners

Title: Interested to learn about [redacted]-business model innovation journey!

Hi [redacted]

my name is Kristina Rehm and I am a master student at the Norwegian School of Economics. Sustainability and business model innovation are two fields I am very passionate about. Looking at your LinkedIn profile I believe that you are a very knowledgeable person in this field, and I would highly appreciate the opportunity to talk to you.

Currently, I am writing my master thesis with the objective to gain a better understanding about the process of sustainable business model innovation in large firms. My desired outcome is to generate insights and develop a process model that can guide companies to achieve a more effective business modeling process. I hope that the results will also be valuable for your future projects. I will happily share my thesis and also prepare an executive summary for you.

To learn about the activities and actors involved in such a process and understand how you navigated through the entire business modeling process, I am doing a multiple case study and would highly appreciate the opportunity to interview knowledgeable people that are familiar with this topic. I have attached a detailed information letter that will provide you with all the relevant specifics about my research and what your participation involves. Please do not hesitate to reach out to me if you have more questions.

I thank you for taking the time to read this message. I look forward to hearing from you back.

Kind regards,

Kristina Rehm

E.2 Information letter and consent form attached to LinkedIn message/email

Written information letter and consent form

NHH

Are you interested in taking part in the master thesis project: *'Navigating the process of sustainable business model innovation'?*

This is an inquiry about participation in a master thesis project where the main purpose is to deepen the understanding about sustainable business model innovation processes in large firms. In this letter, I will provide you with information about the purpose of the project, what your participation will involve, and how your data will be processed.

Purpose of the master thesis project:

The purpose of this master thesis is to gain a better insight into the process that large corporations undergo to arrive at more sustainable business models, by examining the following overarching research question:

How do large firms navigate the process of sustainable business model innovation?

Research motivation and object:

My research is motivated by increasing sustainability challenges that the world is facing, evidenced by climate change, intensified resource scarcity and rising social inequality. As powerful economic actors, companies play an important role in the sustainability discourse, and have been heralded as potential catalysts to devise necessary solutions that contribute to sustainable development.

The process of sustainable business model innovation in large firms is the focus of my research. It can be defined as *a process of change guided by sustainability-oriented strategies that firms undergo to transition to a more sustainable business through the creation, acquisition of new business models or the modification of value-creation, delivery and capture mechanisms in establishes ones.*

This process is driven by a firm's motivation to become *sustainable and economically viable,* implying that sustainability is intended to be deeply embedded into the business rather than being solely considered as an "add-on". The latter is often associated with traditional business approaches to sustainability such as philanthropic and corporate social responsibility (CSR) practices, which will not be investigated in this master thesis.

Who is responsible for the master thesis project?

Norwegian School of Economics (NHH) is the institution responsible for the project. Kristina Rehm, student at NHH, is conducting the master thesis project that is supervised by Professor Lars Jacob Tynes Pedersen.

Why are you being asked to participate?

For the purpose of this master thesis project circa two informants per case company will be asked to participate in the interviews. The informants' knowledge is intended to provide deeper insights into the process that their company has undergone when pursuing a sustainable business model innovation. Before the interview, a short questionnaire will be sent to the participants to trigger their memory about the sustainable business model innovation process that will be further discussed in the following interview.

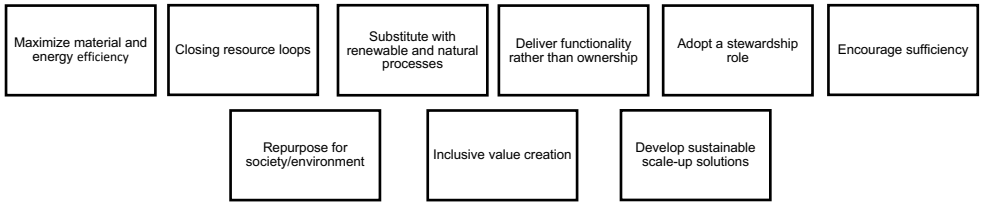
For a meaningful contribution to the research project, the following criteria have been established for the selection of the interviewees and case projects.

The interviewee

- should be familiar with the overall sustainable business model innovation process (i.e., phase-specific activities and actors and characteristics of the overall process) that the firm is/ has been involved in and
- should have preferably participated in the majority of the process phases.

Sustainable business model innovation processes that will be discussed

- should either be completed by the time of the interview or currently be in the final implementation phase
- should take place in a large company *(> 250 employees and > 40-million-euro annual turnover and/or balance sheet total exceeding 20 million euros according to § 267 of the German Commercial Code)*
- should encompass a clear sustainability orientation that aims to incorporate one or a combination of the following principles:



Sustainable Business Model Archetypes. Adapted from Bocken et al. (2014) and Ritala et al. (2018).

What does participation involve for you?

If you decide to take part in the master thesis project, this will involve that you participate in an interview lasting approx. 45-60 minutes and a short questionnaire prior to the interview. The interview includes questions about activities and actors involved in the different process phases and characteristics of the sustainable business model innovation process that your firm has been/is involved. Your answers will be sound recorded for transcription purposes, and notes will be taken during the interview.

Participation is voluntary.

Participation in the master thesis project is voluntary. If you decide to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you, if you choose not to participate or later decide to withdraw.

Your personal privacy – how I will store and use your personal data

I will only use your personal data for the purpose(s) specified in this information letter. I will process your personal data confidentially in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

The types of personal data I will use, and their purposes are specified below:

- Signature of the interviewee will be utilized for the written consent.
- Email address will be used to contact the interviewee (e.g., to schedule an interview appointment or answer/ask questions).
- Background information (information about the company and the interviewee's role) are necessary as the research subject relates to the process that a company undergoes to arrive at a more sustainable business model.
- Sound recordings are necessary for transcription purposes.

The following actions will be taken to ensure confidential handling of the data:

- Only persons part of the research project will have access to the recordings and resulting transcriptions until the end of the master thesis project.
- Additionally, I will take measures to ensure that no unauthorized persons are able to access the personal data, by replacing names of the informants and their firms with pseudonyms and numerical IDs, keeping the list of names and respective codes separately from the rest of the collected data, and storing the data on an encrypted university server.
- Participants of the study will not be recognizable in publications (names of the informants and their firms as well as contact details will not be published).

What happens to your personal data at the end of the research project?

The project is scheduled to end approximately 20th October 2020. The collected data will be anonymized at the end of the master thesis project and deleted after the submission of the master thesis report.

What gives me the right to process your personal data?

I will process your personal data based on your consent. Based on an agreement with the Norwegian School of Economics, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have questions about the project, or want to get general information about data processing, contact:

NHH – Norwegian School of Economics via

- Kristina Rehm (student), by email or telephone: [redacted]
- Lars Jacob Tynes Pedersen (supervisor), by email: [redacted]
- Our Data Protection Officer, by email: [redacted]
- NSD – The Norwegian Centre for Research Data AS, by email: [redacted]

Thank you for taking the time to read the information letter and I am looking forward to an interview with you.

Yours sincerely,

Lars Jacob Tynes Pedersen
(Supervisor)

Kristina Rehm
(Student)

Consent Form Participant

I have received and understood the information about the master thesis project *'Navigating the process of sustainable business model innovation'* and have been given the opportunity to ask questions. I give consent:

- o to participate in an interview
- o to fill out the short questionnaire prior to the interview

I give consent for my personal data to be processed until the end date of the master thesis project, approximately 20th October 2020.

_____

(Signed by participant, date)

Appendix F: Interview protocol

PART 1: Short introduction

Aim: Establish a friendly atmosphere and rapport with the interviewee before beginning the interview.

Begin the interview by greeting the interviewee and briefly presenting the interview agenda (this includes informing the interviewee about the sound-recording of the conversation and his or her rights based on the written consent provided).

- *"Good morning! Thank you for taking the time to talk to me today. The purpose of my research is to learn more about the process of sustainable business model innovation (SBMI) in large companies. For our interview, please note that there are no right or wrong answers to my questions, so feel free to share your thoughts and experiences openly. Everything you say will remain confidential. You have signed the written consent. Therefore, I will sound-record our conversation. Please let me know if at any point you want me to turn off the recorder or wish to not answer a particular question. Before we start with the interview, are there any questions you want to ask? If you experience any difficulties in understanding some aspects of my questions in the course of the interview, please do not hesitate to interrupt and ask at any time."*

Refer to the questionnaire that the interviewee filled out prior to the interview.

- *"Let's have a closer look at the process of the sustainable business model innovation endeavor you described in the questionnaire."*

PART 2: Navigating the process of SBMI from "idea to launch"

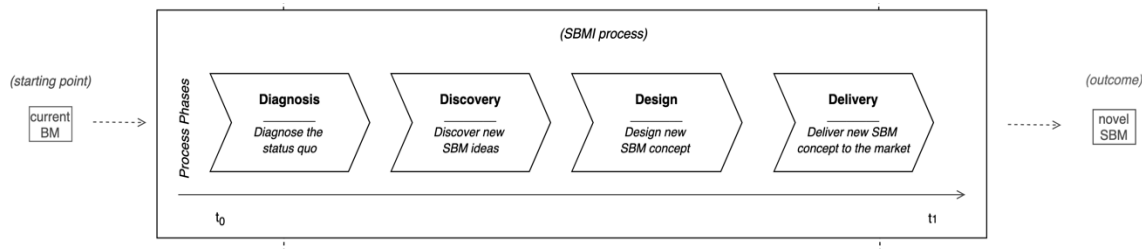
Aim: Get a deeper understanding of the SBMI process in large corporations.

Navigation of the SBMI process

Research question-driven: Determine key activities that have occurred and the actors performing these activities in the different phases of the SBMI process as well as understand the characteristics of the overall process.

Option A: If the interviewee responds in the pre-interview questionnaire that the broad *process phases of the conceptual process framework (see figure below) generally reflect their business modeling process on a higher level,* then following questions will be asked.

Process phases of this study's initial conceptual process framework



Diagnosis

A.1 How did you start the SBMI process?

- What were the main activities that occurred in the beginning of the process?

A.2 How important was sustainability in the start of the SBMI process? *[ecological/social considerations]*

A.3 Who was responsible for initiating the SBMI project?

Discovery
A.4 How did you discover ideas for the new SBM?
A.5 What role did sustainability play in the development of new ideas? *[ecological/social considerations]*
A.6 Who was involved when ideas for the new SBM were generated?

Design
A.7 How did you translate the newly developed ideas into an SBM concept?
- What were the key activities you performed when designing the new SBM?

A.8 What role did sustainability play in the SBM design? *[ecological/social considerations in value creation, delivery and capture]*
A.9 Who was involved in the development of the new SBM?

Delivery
A.10 How did you implement the newly developed BM?
A.11 How did you ensure that initial sustainability ambitions have actually been realized in a meaningful way?
A.12 Who was involved in the implementation of the new SBM?
A.13 (If the implementation is not yet completed), what is the current status of your implementation?
A.14 (If the implementation is fully completed), how do you keep track of the new SBM?

Process Characteristics
A.15 How would you describe the overall nature of the business modeling process that you have undergone?
A.16 In your SBMI process, how did you move through the different phases?

(A.17 If an interviewee mentions in the pre-interview questionnaire (see Q6) that the phases illustrated need adjustments, I will ask what is missing or can be improved.

Option B: If the interviewee responds in the pre-interview questionnaire that the *phases of the conceptual framework do not reflect their business modeling process,* then the questions asked will not follow the phases of the conceptual process framework developed. Instead, interviewees will be asked more broadly to describe the business modeling process they navigated, using the questions below:

B.1 How did the SBMI project start and who initiated it?
B.2 Can you guide me through the major milestones and activities that occurred throughout your SBMI project?
B.3 Who was involved in the activities?
B.4 What role did sustainability play in the process of SBMI? *[ecological/social considerations]*
B.5 How would you describe the overall nature of the SBMI process that you followed?

PART 3: Closing Questions

Aim: End the interview by giving the interviewee a chance to mention any aspects that were not covered in the previous questions. Thank the interviewee for their time and ask for permission to contact them after the interview for clarification purposes.

C.1 Are there any other comments or concerns you would like to share with me?
C.2 Do you have any written supplementary material about the topic discussed that you can share with me?
C.3 Is it okay if I contact you via email for explanatory questions after the interview has been transcribed?

Appendix G: Pre-Interview questionnaire

Pre-Interview Questionnaire: Process of Sustainable Business Model Innovation in Large Corporations

Start of Block: Default Question Block

Dear Interviewee,

thank you for taking part in my research project about the process of sustainable business model innovation in large firms. For our upcoming interview, I kindly ask you to think of one particular business model innovation project that your firm is/has been involved in that

- encompass a clear sustainability orientation
- and should either be completed by the time of the interview or currently be in the implementation phase.

To begin, I would like to learn more about the sustainable business model innovation project your company has been/ is involved in.

Q1 **Please describe briefly your role in the project and the purpose of the sustainable business model innovation project you will be discussing.**

○ Your role in the project (1) _____

○ Main objective of the project (2) _____

Q2 **Which of the following sustainability principles reflect the main objectives of your project best?** *(You can select multiple answers)*

[Note: Answer choices based on sustainable business model archetypes by Bocken et al., 2014 & Ritala et al., 2018]

- ○ Maximize material and energy efficiency
  (e.g., low carbon solutions, dematerialization of products/packaging, increased functionality) (1)
- ○ Closing resource loops
  (e.g., recycling/reuse/remanufacturing, take-back schemes, circular solutions, cradle-2-cradle, industrial symbiosis) (2)
- ○ Substitute with renewable and natural processes
  (e.g., use of renewable energy, biomimicry, slow manufacturing, green chemistry) (3)
- ○ Deliver functionality rather than ownership
  (e.g., extended producer responsibility, rental/lease/pay-per-use solutions) (4)
- ○ Adopt a stewardship role
  (e.g., ethical trade, resource stewardship, radical transparency about ecological/societal impacts) (5)
- ○ Encourage sufficiency
  (e.g., consumer communication, demand management, product longevity, responsible product distribution/promotion) (6)
- ○ Repurpose for society/environment
  (e.g., alternative ownership: cooperative/mutual collectives, localization, hybrid businesses) (7)
- ○ Inclusive value creation
  (e.g., collaborative approaches to sourcing, production and lobbying, peer-to-peer and sharing models; base-of-the-pyramid solutions) (8)
- ○ Develop sustainable scale-up solutions
  (e.g., open innovation (platforms), slow capital, impact investing, crowdfunding) (9)
- ○ Other (please indicate below) (12) _____

Q3 **Which type of sustainable business model innovation does your project belong to?**

[Note: Answer choices based on classification by Geissdörfer et al., 2018]

- ○ Sustainable business model transformation
  (change of an existing business model towards a more sustainable version) (1)
- ○ Sustainable business model diversification
  (creation of a new sustainable business model next to existing unchanged business model) (2)
- ○ Sustainable business model acquisition
  (acquisition of a sustainable business model integrated into the organization) (3)
- ○ Sustainable start-up *(creation of a new organization with a sustainable business model)* (4)

Q4 **Which components of the business model have been changed in the process of your project?** *(You can select multiple answers)*

[Note: Answer choices based on business model components proposed by Osterwalder & Pigneur, 2010]

- ○ Value Proposition (product and/or service offerings) (1)
- ○ Target customer (2)
- ○ Relationship with customer (3)
- ○ Distribution channels (4)
- ○ Partner networks (5)
- ○ Core resources and activities (6)
- ○ Revenue model (7)
- ○ Cost structure (8)
- ○ All components (it is a new additional business model) (9)

Now let's have a closer look at the process of the sustainable business model innovation you just described.

Q5 **Which of the following options describe your sustainable business model innovation process best?**

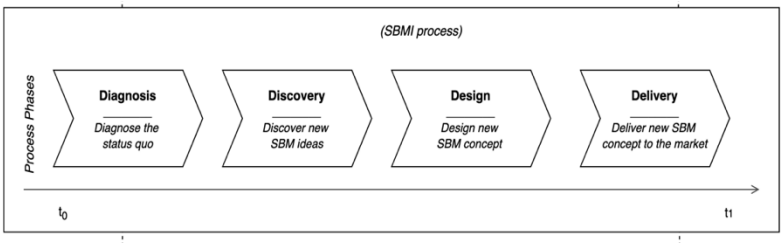
- ○ The process is rigidly structured into sequential linear phases. (1)
- ○ The process follows a structured scheme yet is still flexible, allowing to move between the phases. (2)
- ○ The process is chaotic and does not follow any scheme. (3)

Q6 only displayed if respondents selected answer (1) or (2) in Q5

You have answered previously that your project has used a systematic approach to sustainable business model innovation. Please take a look at the following four generic process phases.

Q6 **Would you say that these generic phases in the picture below reflect the overall process of your sustainable business model innovation project?**

- ○ yes (1)
- ○ no (2)



Finally, let's focus on the final phase of your sustainable business model innovation process.

Q7 **What is the status of the implementation of your project?**

- ○ Implementation is on-going. (1)
- ○ Implementation is completed. (2)

In the upcoming interview, we will first discuss the activities and events occurred in the sustainable business model innovation process that you just described. I will also be interested in learning about the actors that performed these activities and participated in the process. Following that, we will talk about how you navigated through the business modeling process to learn more about the characteristics of the overall process.

Thank you for taking the time to complete this survey! I look forward to the interview!