Does sustainability backfire? Business Model Innovation and value co-destruction dynamics in SEB group's eco-design strategy

Tharwa Najar
Rigueur Laboratory, Gafsa University, Tunisia
tharoua.najjer@isaeg.u-gafsa.tn

Rym Hachana
UCLy (Lyon Catholic University), ESDES, Lyon, France
rhachana@univ-catholyon.fr

Marie-France Vernier
UCLy (Lyon Catholic University), ESDES, Lyon, France
mfvernier@univ-catholyon.fr

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Abstract:

This paper examines the potential of Business Model Innovation (BMI) design as a framework for understanding sustainable initiatives in large corporations, focusing on the failure case of an eco-design (ED) decision within SEB group. Grounded in complexity theory and the adaptation process, the study analyzes the value co-destruction and value generation loops that emerge from sustainability-driven business transformation. Failure-induced research suggests that failure can catalyze individuals and organizations to explore alternative solutions and redefine their strategic approaches. In this context, the case study of SBMI (Sustainable Business Model Innovation) applied to the ED method at Rowenta, a subsidiary of SEB group, provides insights into three key areas: (1) the organizational change dynamics from a complex and adaptive process perspective (2) the interplay of SBMI within organizations and beyond, considering factors such as organizational design, dynamic capabilities, stakeholder engagement, and value cocreation versus value co-destruction and (3) the adaptive strategies

identified through failure-induced learning within the BMI process at SEB group. By analyzing the failure and adaptation mechanisms within a real-world sustainability initiative, this study contributes to the ongoing discourse on SBMI and offers practical implications for organizations navigating the challenges of ED implementation.

Keywords: Business model innovation, sustainable BM, eco-design initiative, failure case, complexity theory, single case study

Introduction

Addressing sustainability challenges and responding to the growing awareness among top managers, Sustainable Business Model Innovation (SBMI) has emerged as a critical topic that continues to drive ongoing discussions and debates (Schaltegger et al., 2016; Geissdoerfer et al., 2018; Freudenreich et al., 2019; Bocken & Geradts, 2020; De Oliveira-Dias et al., 2022; Gennari, 2022; Jorzik et al., 2024; Lee et al., 2024; Coffay et al., 2024; Korayim et al., 2025). Researchers have taken multiple approaches to define and explore SBMI, some of them have sought to delineate the concept, shedding light on its key drivers, characteristics, and barriers (Lüdeke-Freund & Dembek, 2017; Bocken & Geradts, 2020; Lee et al., 2024; Coffay et al., 2024; Korayim et al., 2025), while others have worked toward a unified understanding of SBMI, proposing archetypes that outline the types of business models (BMs) capable of delivering more sustainable value while maintaining economic viability (Bocken et al., 2014; Yang et al., 2017; Alshawaaf & Lee, 2021; Barth et al., 2021; Gennari, 2022; Atkova et al., 2025).

Four key themes characterize the field of SBMI research (1) generalist approaches (2) technology-centered approaches (3) entrepreneurship and innovation-based approaches and (4) behavioral approaches. Focusing on SBMI's organizational aspect, this study falls within the technology-centered approach since the focal firm (SEB group) has implemented an ED strategy based on sustainable new technology. This technological shift substantially altered the BM vision yet unfortunately led to value co-destruction. This case highlights the difficulties

and unintended consequences of integrating ED into BMs, reinforcing the need for more nuanced understanding of SBMI dynamics.

Similarly to Freudenreich et al., (2019), this research defines SBMI as "a business model fulfilling the following criteria: (i) it offers multiple value propositions to customers and all other stakeholders, (ii) it creates and delivers the corresponding forms of value, i.e., a value portfolio, and (iii) it captures economic value for the business while maintaining or regenerating natural, social, and economic capital beyond the boundaries of the focal organization" (p.6). This definition is particularly relevant as it provides a holistic perspective and captures the three key characteristics of SBMIs in relation to the concept of "value". The transition from a traditional BM to a Sustainable Business Model (SBM) occurs through a process of innovation and design, as highlighted by Baldassarre et al., (2020), introducing significant complexity. To develop a comprehensive understanding of the interactions between various elements and actors within and beyond the organization, this study applies complexity theory (Morin, 2008) to explain the dynamics of the co-evolving value destruction and generation during the implementation of a SBMI through an ED strategy in the well-known French company, SEB Group.

Despite significant contributions to the field, empirical evidence linking SBMI to value co-destruction remains very scarce. It is not always clear whether or how companies can effectively co-create financial value through sustainability initiatives (Geissdoerfer et al., 2018; Bocken & Geradts, 2020). Even more critically, in some cases, SBMI fails to deliver the necessary level of transformation across economic, social, and environmental dimensions (Tukker, 2015; Coffay et al., 2024). By adopting a qualitative approach, this study investigates the following research questions: How and why can SBMI lead to value co-destruction in the case of SEB group's ED strategy? We have to make insight to the dynamics and co-generation as well….

This research contributes to the literature on SBMI, ED practices, and value co-destruction in several ways. First, it advances the SBMI field, which remains in an exploratory phase and requires further empirical studies to support its theoretical and practical development (Bocken & Geradts, 2020; Oliveira-Dias et al., 2022). In fact, as Dentchev et al., (2018) noted, "the concept of SBMI has not been sufficiently clarified, and the development of SBM theory is still in its infancy. There is a need for accumulating empirical evidence regarding SBMIs, which could enhance the knowledge of both researchers and practitioners" (p.3). This study seeks to bridge this gap by offering new insights into the unintended consequences of SBMIs, particularly when implementing an ED strategy. Second, unlike previous studies that have relied on transition theory (Bidmon & Knab, 2018) or more traditional frameworks such as the resource-based view and network theory (Rossignoli & Lionzo, 2018), this paper builds its theoretical foundation on complexity theory. This approach is particularly relevant for analyzing SBMIs, which can be understood as complex adaptive systems (Holland, 1975). As Bocken & Geradts (2020) argue, "the significant processes and procedures required to develop and transform BM are expected to be complex […] This is even more challenging in the case of SBMI, which involves the incorporation of heterogeneous metrics (social, environmental, and economic) and the involvement of diverse stakeholders in the innovation process" (p.3). The inherent complexity and multidimensionality of SBMI have resulted in a limited number of known successful cases (Lüdeke-Freund, 2010; Evans et al., 2014; Geissdoerfer et al., 2018; Oliveira-Dias et al., 2022). As a matter of fact, Dentchev et al., (2016) emphasized that studying failure cases is particularly important for the SBM field, as an exclusive focus on successful cases could introduce bias and limit the cumulative development of knowledge. Third, this research focuses on the concept of "value", with particular emphasis on "sustainable value" and "value networks". Previous studies have emphasized that the sustainability impacts of SBMIs are often difficult to predict, and unintended negative rebounds can undermine their

effectiveness (Bocken & Geradts, 2020). However, research has yet to fully explain why SBMI sometimes fails to co-create sustainable value. There remains a critical need for further exploration of the mechanisms underlying value co-destruction in SBMI. By addressing this gap, this study contributes to a better understanding of how firms can more effectively design and implement SBMs, fitting with long-term sustainability objectives.

This paper is structured as follows: The first section unpacks the SBMI concept by distinguishing it from ED while emphasizing its connection to the concept of value. Additionally, we introduce complexity theory as a relevant theoretical framework, positioning SBMIs as complex adaptive systems. The second section outlines the qualitative methodology, detailing the case study, sample selection, and research method. The third section presents the analysis of our results, followed by Section 4, which discusses these findings in depth. Finally, the paper concludes by summarizing key insights and outlining implications for future research.

Literature review

Geissdoerfer et al., (2018) emphasize the importance of SBMIs in promoting sustainability, they clarify the concept by distinguishing it from BMs, SBMs, and BMIs. SBMIs integrate sustainability into business strategies to ensure long-term value creation for multiple stakeholders, including businesses, customers, society, and the environment. The literature underscores the importance of integrating user-driven innovation, leveraging dynamic capabilities (DC), and adopting structured frameworks to overcome barriers. In fact, the dynamic capabilities perspective provides a lens to understanding how firms adapt and transform their BMs in response to sustainability challenges. As noted by Oliveira-Dias et al., (2022), sensing, seizing, and transforming capabilities enable firms to innovate their BMs dynamically.

Recent research has introduced the concept of sustainable DC, which refers to a company's ability to identify corporate social responsibility (CSR) opportunities (Li et al., 2024). This

perspective underscores the need for firms to apply CSR competencies to transform traditional business activities into sustainable practices.

An essential aspect of SBMI is the involvement of multiple stakeholders, including users, in the innovation process. Baldassarre et al., (2017) emphasize that successful SBMI requires a user-centered approach, where businesses co-create value with customers, suppliers, and other actors. The table below provides an updated overview of the most frequently cited definitions of SBMI in the literature. Despite the diversity of definitions, they consistently highlight three key aspects:

1. Adopting a triple-bottom-line approach to facilitate the co-creation of social, environmental, and economic benefits.
2. Considering a broad spectrum of stakeholder interests while ensuring a balanced and inclusive approach to sustainability.
3. Integrating value creation as a core principle for long-term sustainability, ensuring that value is proposed, created, delivered, and captured effectively.

Table 1: SBMI definitions

Authors	Definitions
Lüdeke-Freund (2010, p.23)	A SBMI is "a business model that creates competitive advantage through superior customer value and contributes to a sustainable development of the company and society".
Bocken et al., (2014, p. 44)	"Business model innovations for sustainability are defined as 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".
Schaltegger et al., (2016)	SBMI comprises a value proposition to customers, delivered by a wide value creation and delivery network, and a value capture mechanism that captures

	economic value for the business while simultaneously regenerating natural, social and economic value beyond organizational boundaries.
Baldassarre et al., (2017, p.177)	"SBMI aims at benefitting society and/or the environment by also generating economic value (Schaltegger et al., 2016). The core of a sustainable business model is a sustainable value proposition; namely, a value proposition that allows multiple-stakeholder value creation by considering the needs of customers, shareholders, suppliers and partners as well as the environment and society".
Geissdoerfer et al., (2018, p409)	SBMI are "business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders and hold a long-term perspective".
Freudenreich et al., (2019, p.6)	"A business model for sustainability is defined as a business model fulfilling these three criteria: (i) it offers multiple value propositions to customers and all other stakeholders, (ii) it creates and delivers the corresponding forms of value, i.e., a value portfolio, (iii) and it captures economic value for the business while it maintains or regenerate natural, social and economic capital beyond the boundaries of the focal organization".
Foss and Saebi, 2017	"SBM is about changing the way business is done, by incorporating societal and environmental concerns into core business practices". p2
Utaminingsih et al., (2024, p.95)	"SBMI seeks to strengthen the ability of businesses to pursue sustainable development by integrating sustainability goals into the business model".

There appears to be a consensus that SBMIs are difficult to implement and pose significant challenges. Geissdoerfer et al., (2018) highlight that a substantial number of SBMIs fail, underscoring the lack of research on the challenges associated with their implementation and the factors contributing to their low success rate. They introduce the concept of the "design-implementation gap" (p. 407), which they define as "the set of challenges that prevent

organizations from successfully innovating their business model due to insufficient follow-up on ideas, lack of implementation of concepts, and failure of businesses in the market" (p. 408). In an effort to identify the challenges faced by SBMIs, Utaminingsih et al., (2024) highlight both external and internal barriers. External factors include regulatory uncertainty, market dynamics, and social influence, while internal constraints encompass organizational resistance and limited financial resources.

ED as a foundation for SBMI

Sustainability is an answer to the negative effects of the currently dominant production models. Six out of nine planetary boundaries are already crossed (Richardson et al., 2023). The transition to sustainability depends therefore on the capacity of both production and consumption systems to reduce pollution and to minimize the use of resources. ED methodology and circular economy practices are key elements in that direction (Mendoza et al., 2017)..

On one side, the objective of ED methodology is to reduce pollution. First writings date from 2001 in a report making a review of ED initiatives in various companies (Johansson et al., 2001). This methodology aims at reducing negative environmental impact of product during all its life cycle while conserving identical technical performance. Today, most common approach is based on life cycle analysis where the impact of the environnement for a product is studied for the different phases of its life cycle : selection of raw materials, manufacturing process, storage and transportation phase, usage, and final disposal (Andriankaja et al., 2013; ISO, 2002).

On the other side, circular economy practices focus on minimizing the use of resources. For Kirchherr et al. (2017, p. 224-225) they constitute an economic system " based on business models which replace the 'end-of-life' concept by reducing, alternatively reusing, [and]

recycling [...] materials in the production/distribution and consumption processes, [...], with the aim to accomplish sustainable development".

Indeed, circular economy models can be implemented based on ED methodology (O'Brien et al., 2014; Vence & Pereira, 2019). ED methodology can lead to circular economy practices in increasing reparability, duration of products and recyclability of resources. This is the objective of the new Ecodesign Sustainable Products Regulation in European Union that strengthen the range of ED requirements with durability and circularity since July 2024 . Innovation driven by ED methods will foster the development of new BM, which are essential for the transition. Den Hollander et al., (2017, p. 524) argue "A business built around long-life products and recovered resources cannot operate without products that support that strategy, preferably by intention and design. For product designers, changes in business model could result in product design briefs that contrast starkly to those for the linear economy throw-away products".

It is crucial to consider how ED method can actively facilitate implementation, ensuring that BMs move beyond the design phase and are effectively put into practice. To achieve this, the ED approach provides a strategic pathway for companies, enabling them to develop and implement SBM more effectively. The ED methodology can be divided into six main steps ((Mendoza et al., 2017) :

1. Initially, a set of objectives is established, considering the drivers and constraints involved in implementing ED.
2. A product category (or service) is chosen to align with the established objectives. The attributes of the product(s) undergoing ED must be clearly specified, and their environmental performance across the life cycle should be assessed using both qualitative and quantitative tools.
3. An eco-brief (Smith & Wyatt, 2006) is developed to steer the ED process by addressing the critical issues identified in the previous step and enhancing environmental performance.

This approach enables the formulation of ED strategies while assessing their technical and socio-economic feasibility for potential implementation.

4. The most promising and innovative solutions are identified and selected for further exploration. This phase focuses on conceptual development, ensuring that the chosen ideas align with ED principles.

5. The selected eco-product undergoes environmental validation, where its sustainability performance is assessed to confirm its effectiveness in reducing environmental impact. LCA tools are necessary to assess the environmental impact.

6. In the final step, production and marketing plans are formulated to facilitate the commercialization of the eco-product(s). The product team selects the final product according to the marketing strategy and the results of the LCA on the product. It is necessary to consider the consequences of reducing the environmental impact on various criteria such as costs, materials to be used, energy required, weight of the final product (Vernier, 2024).

The ED approach emphasizes collaboration between stakeholders (design, research and development, marketing, sales) to enhance the product design life cycle, ultimately strengthening the entire product life cycle to achieve long-term sustainability.

SBMI and value co-creation and co-destruction

SBMIs are argued to unlock the potential value of advanced technologies and transform them into market outcomes in a sustainable way (Lüdeke-Freund, 2010). While they are considered a valuable means of creating business opportunities, their implementation is challenging due to high costs, risks, and ease of imitation (Bocken & Geradts, 2020; Schaltegger et al., 2016, 2022). As a **"**regenerative business model" (Bocken et al., 2014), SBMIs are comprehensive processes that require a broader network perspective. They necessitate that companies engage with a diverse set of stakeholders, including customers, suppliers, partners, NGOs, government actors, and local communities (Velter et al., 2021). Building on this perspective, Yang et al.,

(2016, p.3) emphasize that "to develop new business models for sustainability, it is essential to consider the integration of social and environmental goals into a more holistic meaning of value in business models". Freudenreich et al. (2019) highlight that SBMI shifts the focus from merely creating value for customers, suppliers, and business partners to co-creating value with and for a broader network of stakeholders. This aligns with Baldassarre et al., (2017, p.177), who emphasize that "the core of a SBM is a sustainable value proposition; namely, a value proposition that allows simultaneous value creation for multiple stakeholders, including customers, shareholders, suppliers, and partners, as well as the environment and society".

Most research on SBMIs primarily focuses on value proposition, value capture, value creation, and delivery (Amit & Zott, 2012). However, recent studies have introduced new concepts, such as value destruction, through the development of BM tools like the Value Mapping Tool (Bocken et al., 2014) and the Sustainable Value Analysis Tool (Yang et al., 2014). Rana et al., (2013) demonstrate that companies can uncover new business opportunities by mapping value proposed, value destroyed, and value missed across multiple stakeholders. This approach has proven useful in analyzing value exchange among stakeholders and stimulating the development of new BMs (Bocken et al., 2014). Building on these concepts, Yang et al., (2014) further refined the framework by introducing the concept of "value uncaptured" which refers to potential value that exists but remains unutilized.

Complexity theory: A new look at SBMI

Simon (1962, p. 468) defines complexity as arising when multiple components "interact in a non-simple way". This complexity often manifests in systems composed of interdependent, complementary subsystems. The defining characteristics of complex systems are their structure and the degree of interaction between their components. This complexity arises from the diverse rules governing each part, resulting in intricate patterns of behavior. Complexity theory provides a framework for contextualizing and understanding how new attributes emerge within

a system through the dynamic interactions between its components. These interactions cannot be fully perceived when analyzing individual parts in isolation. By adopting complexity theory, we can decode the processes of coevolution and self-organization, which drive the development of new system properties over time. A key aspect of this approach is the system's nonlinear nature, meaning that outputs are not necessarily proportional to inputs, highlighting the intricate and often unpredictable relationships within the system (Tekic & Tekic, 2024).

In this research, the metaphor of a "complex adaptive system" is particularly relevant for understanding the transformative potential of SBMIs in reshaping organizations within a dynamic network of individuals, units, and stakeholders. Hence, SBMI is regarded as a dynamic, complex adaptive design grounded in sustainable design theory (Baldassarre et al., 2020). The concept of a "complex adaptive system" was introduced by Holland (1975) to describe nonlinear systems in which behavior emerges from the interactions of adaptive components. The properties of complex adaptive systems are adaptation and learning which allow continuous improvement in internal units and processes.

Building on the recent work of Vatankhah et al., (2023), the intersection of complexity theory and BM literature highlights key elements such as components, hierarchies, interdependencies, nonlinear relationships, and boundaries. Applying these principles to BMs underscores the activity system perspective, wherein a BM is viewed as an architecture composed of interdependent value subsystems (Teece, 2010). Hence, fostering SBMIs involves focusing on the interdependencies between elements and the dynamic nature of the value subsystems, enabling the development of novel and adaptive business models.

In relation to dynamics of value mentioned in former sections, the destruction of value in SBM through the innovation process is presumed as a failure. On the basis of complexity theory, a crucial concept in this context is the positive feedback loop to understanding the unpredictable outcomes of the SBMI (value destrcution). It refers to a systemic mechanism that can either

reinforce or undermine transformation efforts. This framework helps explain the self-reinforcing nature of system failures and the challenges of overcoming structural inertia. The adaptation process can lead to either stability (no change) or a new equilibrium, depending on whether the transformation results in the creation or destruction of initial value.

A positive feedback loop amplifies initial stresses within a system, such as those introduced by ED methods, hindering its ability to absorb shocks and return to its original equilibrium. Instead, the system undergoes a transition to a new equilibrium state with distinct characteristics. Moreover, positive feedback loops reinforce past events, causing their effects to persist even after the initial stimulus has subsided. This self-reinforcing mechanism makes it difficult for the system to alter its trajectory (Eppel et al., 2011). In some cases, the continuous amplification of inputs can lead to system-wide disruption or collapse. Conversely, a negative feedback loop serves as a stabilizing force, counteracting the effects of positive feedback by restoring balance and maintaining system resilience. At a higher level of analysis, integrating complexity theory into SBM design could provide deeper insights into how these dynamic interactions shape sustainable business transformations.

Research design: A single-case study protocol

Two primary methodological approaches are commonly used to study complexity in management sciences. The traditional approach relies on operational research and computer simulations, which adopt a positivist paradigm. However, an alternative stream of scholars explores non-positivist methods, emphasizing qualitative approaches to understanding complexity. Drawing on Stacey's (1995) insights, methodologies such as ethnographies, longitudinal studies, and metaphorical analysis can be used to identify patterns and meaning, helping to decipher system behaviors and their responses to change. Similarly, Levy (2000, p. 84) suggests that "one approach is to employ complexity theory in a more qualitative or metaphorical way." This perspective supports the rationale for adopting a qualitative

methodology in the present research as a means of verification. The primary goal of a qualitative study is to explain and interpret configurations derived from the theoretical framework. One of the most widely used qualitative methodologies in social science and innovation research is the case study approach. Yin (2003) notices "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p.13). This methodology is particularly valuable for researchers seeking to understand complex social issues, as it provides a holistic perspective on dynamic and context-specific interactions.

In this study, we examine the interactions and dynamics of a complex adaptive system, specifically SBMI. An inductive approach using a single-case study of the SEB Group, was adopted enabling an in-depth and comprehensive investigation. This unique case-study provides valuable insights into the complexities of SBMI and ED implementation.

Yin (2003) identifies five key reasons for conducting a single-case study, two of which guided our selection of the SEB Group. First, SEB Group qualifies as a revelatory case, offering unique insights into the circumstances and challenges of implementing SBMI. Second, it serves as a representative case, illustrating the inherent difficulties in generating value from an ED strategy. The lessons learned from this case are expected to provide valuable insights applicable to similar contexts, contributing to a deeper understanding of SBMI implementation hurdles.

Data collection: Two sources of evidence

Yin (2013, p.106) notices that "the date collection process for case studies is more complex than those used in other research strategies". To ensure a comprehensive and reliable dataset, we collected information from multiple sources, allowing us to cross-check consistency and enhance the robustness of our findings (Yin, 2009). The data collection process included interviews and documentary evidence (Yin, 2013), issued by SEB group, each providing distinct yet complementary perspectives. Documentary analysis was conducted to examine how

industrial actors perceived and responded to changes in SEB group's activities. Complementing this, the interviews provided deeper insights into stakeholders' understanding of organizational transformations, particularly focusing on SEB's historical approach to ED. The questions addressed key aspects such as the efforts to reduce environmental impact, the commercial implications of ED, and the challenges encountered in implementing this strategy.

The data collection process involved interviews with individuals both within and outside SEB Group. In total, we conducted eleven semi-structured interviews between April 2008 and February 2025 (Appendix A), each lasting between 40 and 90 minutes. Of these interviews, seven were conducted with representatives from SEB Group, four were conducted with external stakeholders, including a design agency, a public agency (ADEME), and two professional associations: CDRA (Centre du Design Rhône-Alpes) and Pôle National Éco-conception et Management du Cycle de Vie. Each interview was recorded and transcribed, and we conducted a systematic analysis of all interview transcripts, press articles, and reports. This allowed us to identify key themes derived from the literature review and assess their relevance in practice. To enhance data reliability, we applied triangulation by comparing insights from internal and external stakeholders and cross-checking them with documentary, ensuring a more comprehensive understanding of the findings.

To ensure the internal validity, we maintain a chain of evidence, as recommended by Yin (2013, p.105). The protocol involves systematically linking data to the research questions to ensure clarity and coherence. It establishes a structured approach for tracing how findings are derived, allowing for transparency and reliability in the research process. By maintaining a clear chain of evidence, the protocol enables researchers to demonstrate the logical progression from data collection to conclusions, ensuring that interpretations are well-supported and verifiable.

Site selection

Rowenta, originally founded in 1884, has been a subsidiary of SEB group, a global leader in the small electrical household appliance sector, since 1988. A decade ago, SEB group launched an ED vacuum cleaner, but due to several factors, it turned out to be a commercial failure. At the time when SEB group decided to implement ED strategy, Rowenta was one of the leading suppliers in the vacuum cleaner market. This study explores the factors behind the product's failure within the context of the company's sustainability-driven approach.

We selected SEB group for two key reasons:

- the commitment to environmental innovation: All SEB group sites are ISO 14001-certified, ensuring adherence to international environmental management standards. The company has pursued an eco-friendly logistics policy, optimizing transportation costs to minimize its environmental footprint. While ED strategy was introduced later, it was accompanied by a strong commitment to reducing CO_2 emissions through improved product lifecycle management, particularly focusing on end-of-life product handling.

- SEB group is a unique case of silent ED adoption: In 2006, the company launched the Shock Absorber, an ED vacuum cleaner that won first prize for sustainable development from the French Ministry of Economy. In France, Rowenta market share in value for all vacuum cleaner types was 9.4%, ranking after Miele, Dyson, Electrolux, and Tornado. The vacuum cleaner industry was highly competitive, with new models emphasizing compactness, ergonomics, suction power, noise reduction, and innovative features such as bagless and cordless designs. Rowenta also demonstrated a strong commitment to Research & Development, investing approximately 3% of its turnover in innovation. In 2007, SEB group ranked 22nd globally for patent filings, launching nearly 100 innovations per year. The Rowenta brand was widely recognized for its high-quality products, associated with ruggedness, reliability, and aesthetics.

Results

SEB group and SBMI: Integrating ED into business strategy

SEB group's BM integrates a diverse network of partners, including a design agency, distributors, consumers, SEB itself, and ADEME, an engineering school that played a crucial role in product development and provided financial subsidies. The BM's structure is shaped by the interplay of these relationships, reflecting the collaborative nature of its innovation and sustainability efforts. The novelty in SEB group's BM stems from the integration of an ED strategy. Designers developed a new vacuum cleaner with a primary focus on reducing environmental impact, leading to a BM centered around clean technologies and innovative processes. Compared to previous SEB group vacuum cleaners, the efforts to minimize environmental impact were significantly more ambitious. Until then, sustainability efforts had been primarily limited to the manufacturing process. This vacuum cleaner represented both process and product innovation aimed at reducing environmental impacts. However, the changes were largely incremental (Tushman & Anderson, 2004), meaning that technological innovations modified existing subsystems and linking mechanisms rather than introducing a radical transformation.

SEB group adopted the Life Cycle Analysis (LCA) methodology to reduce environmental impact. As part of its ED strategy, the company developed the Shock Absorber vacuum cleaner, integrating 11 key environmental criteria into its design. The ED approach resulted in a 10% to 50% reduction in environmental impact compared to a standard vacuum cleaner. The most significant improvements were observed in two key lifecycle stages: manufacturing and usage (Table 2).

Table 2: Novelty in SEB group Shock Absorber

Area of changes	Technical aspects	Advantages
Manufacturing stage	Shell made of expanded polypropylene instead of standard polypropylene	- Lighter (half the weight of the vacuum cleaner compared to a classic one) - Flexible - Better resistance to shocks
	One material for the shell expanded polypropylene	Easier to disassemble and to recycle

usage stage	High-powered motor	20% reduction in energy consumption for the same cleaning performance
	Smaller size of the appliance	- Less packaging materials needed - Lower environmental impact in terms of transport and distribution
	Sturdier Shock Absorber	- No marks when it collided with a wall or a piece of furniture - Can even survive a fall down the stairs
	Easier to repair	

The marketing strategy was implemented in two phases: The launch strategy initially emphasized SEB group's environmental efforts, highlighting its commitment to sustainability. This approach was quickly replaced by a campaign focusing on two key messages: (1) the vacuum cleaner's shock resistance, and (2) its ability to protect furniture from damage.

To promote the Shock Absorber, SEB group launched a television advertising campaign that emphasized the product's key strengths. The advertisement highlighted its extreme sturdiness, ensuring long-lasting durability, as well as its shock absorption through deformation, demonstrating resilience. It also showcased the vacuum cleaner's high-level furniture protection, preventing damage, and its lightweight design, making it easy to handle. This campaign aimed to position the Shock Absorber as a robust, innovative, and user-friendly vacuum cleaner in the competitive market.

Analyzing the role of stakeholders in SBMI implementation

To develop long-term solutions to complex challenges, companies cannot operate in isolation, particularly when communities face overlapping and interconnected issues that often involve shared decision-making. Addressing sustainability and innovation requires collaboration with external stakeholders, as seen in the case of SEB group. Indeed, our company is engaged with a diverse network of external stakeholders, including public agencies, an engineering school, the Ministry of Economy, retailers, and consumers. The project, initiated in 2004, received partial funding from the French Public Agency ADEME (Environment and Energy

Management Agency). Additionally, ENSAM (École Nationale Supérieure d'Arts et Métiers), a French engineering school, played a crucial role in the project by assessing its environmental impact and conducting a Life Cycle Analysis (LCA).

In November 2006, the vacuum cleaner was recognized for its sustainability impact, winning first prize for sustainable development from the French Ministry of Economy at the POLLUTEC exhibition. Furthermore, SEB group's commitment to eco-innovation was reinforced by the filing of five patents related to this product. During this period, there was a growing interest in ED-based innovations, with standards agencies actively supporting ED through ecolabel certifications. Since the mid-2000s, the number of products and services carrying ecolabels has seen a significant increase. For instance, the number of NF labels rose from 65 in 2005 to 116 in 2010, while European ecolabels increased from 47 to 235 during the same timeframe (AFNOR). Additionally, this period witnessed the emergence of new associations dedicated to advancing ED initiatives. Notable examples include:

- Pôle National Éco-conception et Management du Cycle de Vie (PNEC) (*National Centre for ED and Life Cycle Management*), founded in 2005.
- CREER Cluster (Cluster Research: Excellence in ED & Recycling), established in 2007 to foster research and innovation in ED and recycling.
- Club DEMETER, a collaborative network comprising retailers, logistics service providers, manufacturers, and public agencies, dedicated to promoting sustainable logistics and supply chain solutions that reduce environmental impact.

Concerning the consumers, they were nearly not informed about the ED strategy used to make the vacuum cleaner. "*Consumer communication was not focused on ED but on the benefits according to expectations of the vacuum cleaner market*" (Interview 2). The company used point-of-sale advertising and trade marketing to a lesser degree. Trade marketing was

instrumental in improving distribution because the company formed a direct relationship with appliance stores.

Value creation/destruction loops

The new BM failed and led to value destruction. The economic results were insufficient, as sales remained low: fewer than 20,000 units were sold. SEB group carried out a new survey of consumers that showed that the vacuum shell looked different from others and that it was associated with negative perceptions about its sturdiness: "*It was perceived as a fragile vacuum cleaner, which limited its commercial success. Vacuums had to be robust and even with its exceptional characteristics concerning robustness, the material was associated with polystyrene, and therefore it was perceived as fragile*" (Interview 1).

Consumers did not recognize the environmental value embedded in the vacuum cleaner. The ED efforts made by designers and top managers were not effectively communicated or highlighted by the marketing and communication departments. This pattern suggests a broader hesitation among companies to use ED as a marketing differentiator, possibly due to concerns about consumer perception, message clarity, or market readiness for sustainability-driven branding.

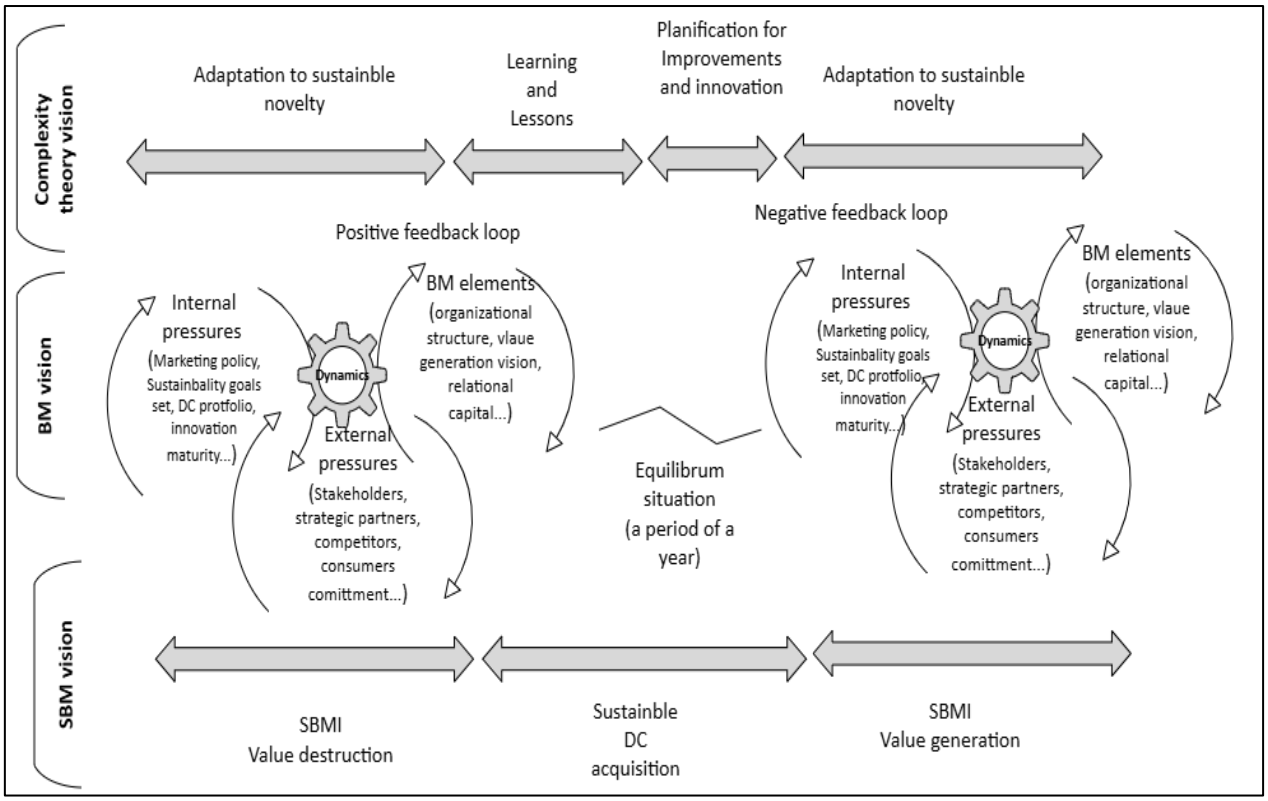

Figure 1: SEB group SBMI design

Discussion: Adapting SBMI in SEB group: Challenges and feedback loops

The difficulty of adaptation (See Figure 1) can, in some cases, be attributed to the fact that changes may diminish the value of existing assets. Adapting to new BM structures requires nontrivial modifications in the BM architecture and its core elements. In the case of SEB group, this adaptation process necessitated adjustments in product life cycle management and development strategies. Furthermore, consumer relationships, particularly through marketing investments, play a crucial role in shaping the BM for sustainability innovation dynamics.

Complexity theory and positive feedback loops in ED

From a complexity theory perspective, the introduction of ED within the BM has triggered a positive feedback loop. At this analytical level, BMI is understood as a nonlinear process, where changes in sustainability management create self-reinforcing feedback mechanisms. As Bocken et al., (2014) explain, different sustainability-driven BM strategies vary in their economic

viability at different points in time. For instance, when the first hybrid car was introduced, its economic feasibility was initially uncertain but later improved due to regulatory shifts and market acceptance.

Adaptive systems and learning from failure

According to the adaptive systems framework, two key characteristics drive successful adaptation, the organizational learning and the strategic adaptation. For SEB group, the failure of the Shock Absorber vacuum cleaner serves as a learning opportunity. The company must engage in an adaptation process through BMI.

From a complexity theory standpoint, adaptation is also governed by negative feedback loops, which counteract positive feedback loops to stabilize the system. This is precisely what SEB group did with the Shock Absorber project, while preserving the core SBM design, they introduced novel elements after a period of equilibrium adjustment.

Continuous improvement and external linkages

The evolution of SEB group's BM exemplifies continuous improvement in business structure and design. Based on previous learning experiences, the company has refined its sustainability approach, focusing on stronger linkages with external stakeholders and a deeper integration of environmental objectives into its business strategy.

This case highlights how businesses navigating sustainability transitions must adopt a flexible, learning-oriented approach, leveraging both positive and negative feedback loops to balance innovation, risk, and long-term impact.

Relationships between stakeholders are complex. On one hand, there were external patterns (stakeholders and partners, consumers…) in favor of ED coming from the French state, the European Union, standards agencies, consulting firms, some engineering schools, and a minority of consumers. On the other hand, in 2007 most customers seemed to be reluctant regarding ED products. Most vacuum cleaner manufacturers were not committed to ED but

rather to bagless vacuum cleaners, which were driving the market. So, there were no market opportunities for a product with environmental characteristics such as the Shock Absorber.

Leveraging dynamic capabilities for SBMI

As discussed in previous sections, Coffay et al., (2024) argue that BMI can help simplify the management of sustainability complexity. Their research highlights the interrelationship between BMI, DC, and organizational design. In the literature, DC have been widely recognized for their impact on driving sustainable change (Abdelfattah et al., 2025; Bocken & Geradts, 2020a, 2020b; Guo et al., 2022; Pan et al., 2023). These studies reinforce the notion that organizations leveraging DC are better positioned to adapt, innovate, and integrate sustainability into their BMs.

Drawing on the DC dimensions (sensing, seizing, and transforming), in relation to SBMI, SEB group demonstrates a structured approach to sustainability-driven transformation. First, the company actively identifies and evaluates emerging sustainability challenges, recognizing them as potential business opportunities. It not only assesses these opportunities but also integrates them into its strategic vision. Second, SEB group mobilizes resources to address these sustainability opportunities, effectively capturing value by translating them into SBMI initiatives. This process involves aligning technological, operational, and market-driven capabilities to foster sustainable innovation. Finally, the transformation phase is aimed at deliberately renewing the organization's capabilities (Teece, 2018). This ongoing process ensures the implementation, adaptation, and reinforcement of new SBMs, concepts, and methods, positioning SEB group as a forward-thinking leader in sustainability-driven innovation.

DC, by their very nature, are fundamental to managing change, enabling corporations to develop, refine, and transform their BMs (Teece, 2007; Bocken & Geradts, 2020). They are not only integral to BMI (Teece, 2018), but also play a crucial role in SBMI. However, our findings

indicate that developing DC is not enough for SBMI to generate the expected value. Bocken & Geradts (2020a) argue that establishing DC in large corporations is particularly challenging due to their complex structures, rigid processes, and resource-intensive nature. In the case of SEB group, the acquisition of DC emerges as a key determinant in enhancing the effectiveness of the innovation process. At a higher strategic level, our results reveal that acquiring sustainable DC significantly supports the design and execution of SBMI.

The concept of sustainable or green capabilities is gaining increasing attention in environmental discourse (Abdelfattah et al., 2025; Hernani-Merino et al., 2025a; Li et al., 2024). For companies undergoing a sustainability transition, it is essential to focus on developing sustainable DC to continuously refine and transform their BMs. This strategic shift not only enhances long-term competitiveness but also aligns with the increasing regulatory and consumer-driven demand for sustainability.

Conclusion

The primary theoretical contribution lies in bridging the literature on SBMI with complexity theory. From a strategic and managerial standpoint, the study extends SBMI literature by providing insights into environment-centered transitions, particularly through ED product initiatives.

The previous literature review identifies key characteristics for analyzing the process of value creation/destruction in SBMI. Firstly, novelty can relate to various aspects such as technology, processes, operational procedures, practices, business models, systems, and conceptual approaches. Secondly, the role of stakeholders plays a crucial part in this analysis (Bocken et al., 2016). Thirdly, according to complexity theory, understanding a system's structure and its interdependence is crucial for determining organizational design. Lastly, SBMI can be viewed as a dynamic and adaptive system, capable of evolving with changing transformation dynamics

and driving elements. The present research attempts to validate these concepts and statements in a specific ED method implementation case study.

Innovation in SEB group's business model: Advancing a sustainable initiative

Academic and business interest in SBMI has grown significantly over the past decade as a potential solution to pressing global sustainability issues (Bocken and Short, 2021). An abundant literature relates environmental, and societal issues to value creation within a BMI perspective (Bocken & Geradts, 2020b). The most prominent contribution of the present study highlights a failure case of Group SEB SBMI causing value destruction. It attempts to understand SBM elements dynamics through complexity theory insights. While research on SBMI is prolific (Dentchev et al., 2018), its field is still in the exploration phase. A holistic view is presented focusing on the organization's broader boundaries. In this fashion, we claim that successful SBMI requires a broad network or societal-level focus (Cramer, 2020; Jaeger-Erben, 2022). Hence, firms need to not only conduct changes in their organization but also depend on (re-)alignment with stakeholders (Velter et al., 2021). Any change to the business model of a firm requires changes in the business model of other actors, otherwise, it will not work (Hellström et al., 2015).

The lack of case studies makes it challenging for firms to understand how to innovate their business models, identify and design alternatives, and then assess and select the most adequate one. When considering business model innovation for sustainability, this leads to a higher complexity related to how to preliminarily assess the impact of sustainability innovations and how to understand their effects on the whole business network.

This study constitutes an in-depth analysis of a particular SBMI that couldn’t deliver economic value to the focal firm. It focuses on sustainable and social manufacturing, providing a more circular business model that would reduce waste management. It provides practical examples

and tools that could be useful to practitioners developing SBMIs, including circular models, in various industries.

This research can also serve as an example for initiatives in other industries or for policymakers trying to foster SBMI development in relation, namely to new technologies. As future perspectives of research, the study opens up new avenues for topics that are currently lacking in both qualitative and quantitative sustainability-oriented business model research.

REFERENCES

Andriankaja, H., Bertoluci, G., & Millet, D. (2013). Development and integration of a simplified environmental assessment tool based on an environmental categorisation per range of products. Journal of Engineering Design, 24(1), 1-24. https://doi.org/10.1080/09544828.2012.665226

Amit, R., & Zott, C. (2012). Creating value through business model innovation. *MIT Sloan management review*.Bidmon, C. M., & Knab, S. F. (2018). The three roles of business models in societal transitions: New linkages between business model and transition research. *Journal of Cleaner Production, 178*, 903-916. https://doi.org/10.1016/j.jclepro.2017.12.198

Bocken, N. M. P., & Geradts, T. H. J. (2020). Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities. *Long Range Planning, 53*(4), Article 101950. https://doi.org/10.1016/j.lrp.2019.101950

Bocken, N. M. P., & Short, S. W. (2021). Unsustainable business models—Recognising and resolving institutionalised social and environmental harm. *Journal of Cleaner Production, 312*, Article 127828. https://doi.org/10.1016/j.jclepro.2021.127828

Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production, 65*, 42-56. https://doi.org/10.1016/j.jclepro.2013.11.039

Coffay, M., Tveterås, R., Bocken, N., & Bogers, M. (2024). Sustainable business model innovation, dynamic capabilities, and organizational design: Insights from Norwegian aquaculture. *Business Strategy and the Environment*.

den Hollander, M. C., Bakker, C. A., & Hultink, E. J. (2017). Product Design in a Circular Economy : Development of a Typology of Key Concepts and Terms: Key Concepts and Terms for Circular Product Design. Journal of Industrial Ecology, 21(3), 517-525. https://doi.org/10.1111/jiec.12610

Dentchev, N. A., Baumgartner, R. J., Dieleman, H., Johannsdottir, L., Jonker, J., Nyberg, T., ... & van Hoof, B. (2016). Embracing the variety of sustainable business models: A prolific field of research and a future research agenda. *Journal of Cleaner Production, 113*, 1-12. https://doi.org/10.1016/j.jclepro.2015.12.130

Dentchev, N. A., Baumgartner, R. J., Dieleman, H., Johannsdottir, L., Jonker, J., Nyberg, T., ... & van Hoof, B. (2018). Embracing the variety of sustainable business models: A prolific field of research and a future research agenda. *Journal of Cleaner Production, 172*, 2373-2385. https://doi.org/10.1016/j.jclepro.2017.10.111

Evans, S., Rana, P., & Short, S. (2014). Final set of tools and methods that enable analysis of future oriented, novel, sustainable, value adding business-models and value-networks. *Deliverable D2, 6*.

Evans, S., Vladimirova, D., Holgado, M., Van Fossen, K., Yang, M., Silva, E. A., & Barlow, C. Y. (2017). Business model innovation for sustainability: Towards a unified perspective for creation of sustainable business models. *Business Strategy and the Environment, 26*(5), 597-608. https://doi.org/10.1002/bse.1939

Foss, N. J., & Saebi, T. (2017). Fifteen years of research on business model innovation: How far have we come, and where should we go? *Journal of Management, 43*(1), 200-227. https://doi.org/10.1177/0149206316675927

Freudenreich, B., Lüdeke-Freund, F., & Schaltegger, S. (2019). A stakeholder theory perspective on business models: Value creation for sustainability. *Journal of Business Ethics, 166*(1), 3-18. https://doi.org/10.1007/s10551-019-04112-z

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production, 198*, 401-416. https://doi.org/10.1016/j.jclepro.2018.06.240

Holland, J. (1996). *Hidden order: How adaptability creates complexity*.

Holland, J. H. (1975). *Adaptation in natural and artificial systems: An introductory analysis with applications to biology, control, and artificial intelligence*. University of Michigan Press.

Holland, J. H. (1992). Complex adaptive systems. *Daedalus, 121*(1), 17-30.

ISO. (2002). Environmental Management-Integrating Environmental Aspects into Product Design and Development.

Johansson, G., & Magnusson, T. (2001). Eco-design methods and their applicability. *Journal of Cleaner Production*, 9(5), 387-394. https://doi.org/10.1016/S0959-6526(01)00013-3

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy : An analysis of 114 definitions. Resources, Conservation and Recycling, 127, 221-232. https://doi.org/10.1016/j.resconrec.2017.09.005

Lee, M.-J., Choi, H., & Roh, T. (2024). Is institutional pressure the driver for green business model innovation of SMEs? Mediating and moderating roles of regional innovation

intermediaries. *Technological Forecasting and Social Change*, *209*, 123814. https://doi.org/10.1016/j.techfore.2024.123814

Levy, D. L. (2000). Applications and limitations of complexity theory in organization theory and strategy. *Public Administration and Public Policy, 79*, 67-88.

Lüdeke-Freund, F. (2010). Towards a conceptual framework of business models for sustainability. In R. Wüstenhagen, J. Hamschmidt, S. Sharma, & M. Starik (Eds.), *Sustainable innovation and entrepreneurship* (pp. 75-96). Edward Elgar Publishing.

Lüdeke-Freund, F., & Dembek, K. (2017). Sustainable business model research and practice: Emerging field or passing fancy? *Journal of Cleaner Production, 168*, 1668-1678. https://doi.org/10.1016/j.jclepro.2017.08.093

Mendoza, J. M. F., Sharmina, M., Gallego-Schmid, A., Heyes, G., & Azapagic, A. (2017). Integrating backcasting and eco-design for the circular economy : The BECE framework. Journal of Industrial Ecology, 21(3), 526-544.

Morin, E. (2008), La Méthode I : 1. La Nature de la Nature, 2. La Vie de la Vie, 3. La Connaissance de la Connaissance, Les Éditions du Seuil, Paris

O'Brien, M., Miedzinski, M., Giljum, S., Doranova, A., European Commission, Wuppertal Institute for Climate, Environment and Energy, Technopolis Group Belgium, & Vienna University of Economics and Business (Éds.). (2014). Eco-innovation and competitiveness : Enabling the transition to a resource-efficient circular economy: annual report 2013 (Wuppertal Institute). Publications Office. https://doi.org/10.2779/58269

Richardson, K., Steffen, W., Lucht, W., Bendtsen, J., Cornell, S. E., Donges, J. F., Drüke, M., Fetzer, I., Bala, G., von Bloh, W., Feulner, G., Fiedler, S., Gerten, D., Gleeson, T., Hofmann, M., Huiskamp, W., Kummu, M., Mohan, C., Nogués-Bravo, D., … Rockström,

J. (2023). Earth beyond six of nine planetary boundaries. Science Advances, 9(37), eadh2458. https://doi.org/10.1126/sciadv.adh2458

Rossignoli, F., & Lionzo, A. (2018). Network impact on business models for sustainability: Case study in the energy sector. *Journal of Cleaner Production, 182*, 694-704. https://doi.org/10.1016/j.jclepro.2018.02.015

Schaltegger, S., Hansen, E. G., & Lüdeke-Freund, F. (2016). Business models for sustainability: Origins, present research, and future avenues. *Organization & Environment, 29*(3), 264-289. https://doi.org/10.1177/1086026615599806

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development, 6*(2), 95-119. https://doi.org/10.1504/IJISD.2012.046944

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment, 20*(4), 222-237. https://doi.org/10.1002/bse.682

Stacey, R. D. (1995). The science of complexity: An alternative perspective for strategic change processes. *Strategic Management Journal, 16*(6), 477-495.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning, 43*(2-3), 172-194.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Vatankhah, S., Bamshad, V., Altinay, L., & De Vita, G. (2023). Understanding business model development through the lens of complexity theory : Enablers and barriers. *Journal of Business Research*, *155*, 113350.

Vence, X., & Pereira, Á. (2019). Eco-innovation and Circular Business Models as drivers for a circular economy. Contaduría y Administración, 64(1), 64. https://doi.org/10.22201/fca.24488410e.2019.1806

Vernier, M.-F. (2024). Eco-Design and Ecological Transition. Questioning the Economic Model. ISTE Ltd.

Yin, R. K. (2003). Designing case studies. *Qualitative research methods*, *5*(14), 359-386.

Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). sage.

Yin, R. K. (2013). Validity and generalization in future case study evaluations. *Evaluation*, *19*(3), 321-332.

Zott, C., Amit, R., & Massa, L. (2011). The business model : Recent developments and future research. *Journal of management*, *37*(4), 1019-1042.

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Vernier M.-F., 2019, « Innovation and ecodesign: lessons from the failed launch of a vacuum cleaner », 10th International Research Meeting in Business and Management, 8-10 juillet, IPAG Business School, Nice, France

Colloque Vernier M.-F., 2014, « Pratiques d'éco-conception en France, une approche néo institutionnelle. Étude du cas Rowenta » 9ème congrès du Réseau International de recherche

sur les Organisations et le Développement Durable (RIODD) : « Environnement et travail quelles relations ? », 1-3 octobre, Pôle Juridique et Judiciaire de l'Université de Bordeaux, Bordeaux, France.

chapitre d'ouvrage : Vernier M.-F., 2023, De l'éco-conception à l'innovation environnementale. Chronique d'un échec, in : Imaginer le futur à partir du passé, Forest J. et Bocquet B. (coordonné par), Série : « Business and Innovation, Volume 30 », Ed. Peter Lang, Bruxelles.

Appendixes:

Table A. List of interviews

Position	**Organization**	**Date**	
General manager for Rowenta brand	SEB Group	April 16th, 2008, April 7th, 2011 December 19th, 2018	Interview 1 Interview 2 Interview 3
Project manager	Pole National Ecoconception et Management du Cycle de Vie (National Centre for Ecodesign and Lifecycle Management). Public association	September 16th , 2014	Interview 4
Co-director	Faltazi (Design agency)	February 1st, 2019,	Interview 5
Mission officer	Centre du design Rhône Alpes (CDRA) (Design Center for Rhône Alpes)	March 15th, 2019	Interview 6
ED Engineer	Agence de l'Environnement et de la Maitrise de l'Énergie (Agency for the Environment and Energy Management), ED and sustainable development Department.	January 17th, 2020	Interview 7
Marketing Manager	SEB Group (at the time of the Shock Absorber launching)	September, 15th, 2021	Interview 8
Designer	SEB Group (at the time of the Shock Absorber launching)	November, 3rd, 2021	Interview 9
Product Manager	SEB Group (at the time of the Shock Absorber launching)	November, 3rd, 2021	Interview 10

Design Director SEB Group	SEB Group (at the time of the Shock Absorber launching)	February 4th 2022	Interview 11

Table B. Sources of data collected

Source Name	Date	Type of publication
Rowenta Press Release	September 12th, 2006	Press Release
Design Plus Magazine (published by Centre du Design Rhône Alpes)	2006, n°26	Specialized Press
[dizajn]	Autumn 2006	Specialized Press
L'Usine Nouvelle	December 1st, 2006	Business Press
Press Release Orée – Crédit Cooperatif	2007	Press Release
Ciao.fr (consumers blog)	January 2007 – May 2008	General Press
L'Usine Nouvelle	February 1st, 2007	Business Press
Le Figaro Economie.	February 21st, 2007	Business Press
Journal des finances	February 23rd, 2007	Business Press
La Tribune,	March 29th, 2007	Business Press
La Tribune	April 3rd, 2007	Business Press
Le Figaro	May 16th, 2007	General Press
La Croix	1August 3th 2007	General Press
Les Echos	October 23rd, 2007	Business Press
Stratégies	April 10th, 2008	Business Press
Environnement Magazine	June 1st, 2008	Specialized Press
Les Echos	July 1st, 2008	Business Press
Les Echos	February 23rd, 2010	Business Press
Paris Normandie	October 5th,2010	General Press
Nest	June 10th, 2011	General Press
L'Express	January 11th, 2012	General Press
L'Usine Nouvelle	December 2nd, 2012	Business Press
Retour Économique. Fiche Entreprise	December 2008	Report