



Sustainable by design: An organizational design tool for sustainable business model innovation

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ABSTRACT

When firms want to meet ambitious sustainability targets, they often fail to deliver on more radical innovation at the level of the business model. They often struggle to design and successfully implement new, sustainable business models in practice. While sustainability tools might help bridge the design-implementation gap in business, they often lack a grounding in both theory and practice. In this study, we build on empirical research that recognises the importance of dynamic capabilities to develop sustainable business models, and the barriers and drivers that might exist at the organizational level. We investigate the following research question: How can firms address organizational design issues in order to develop the dynamic capabilities necessary for sustainable business model innovation? The research method consists of four stages derived from the iterative, user-involved method of design science research: 1) identifying the problem and defining objectives for a solution; 2) design and development; 3) demonstration; and 4) evaluation. The work results in the “Sustainable By Design” tool which was used in a workshop setting with two large multinational companies seen as sustainability leaders in their sectors: DSM and IKEA Retail (Ingka Group). The work makes two contributions. First, we contribute the Sustainable By Design tool which practitioners can use to evaluate their current organizational design, identify barriers and drivers for sustainable business model innovation, and develop strategic interventions to engage in organizational transformation. Second, we elucidate the theoretical connections between organizational design, dynamic capabilities, and sustainable business model innovation, and suggest directions for future research.

1. Introduction

While firms increasingly recognize the need to implement sustainability improvements, they often struggle to meet sustainability targets (Geissdoerfer et al., 2018). Radical innovation at the level of the business model — how a firm creates, captures, and delivers value — is often needed to achieve sustainability goals (Rashid et al., 2013). Traditional business model innovation — the act of devising new, innovative business models by altering existing models and/or designing and implementing new ones — can yield higher returns than product or process innovation alone (Chesbrough, 2007). Meanwhile, sustainable business model innovation (SBMI) — the act of designing and implementing new, sustainable business models (SBMs), i.e. those which “create significant positive [impact] and/or significantly reduced negative impacts for the environment and society, through changes in the way the organization and its value-network create, deliver value and capture value ... or change their value propositions” (Bocken et al., 2014, p. 44) — offers

firms a number of tangible firm- and sustainability-focused benefits (Geissdoerfer et al., 2018; Bocken and Geradts, 2020). It can mitigate long-term risk (Choi and Wang, 2009), improve resilience (Buliga et al., 2016), reveal new diversification and value creation opportunities (Nidumolu et al., 2009; Tukker and Tischner, 2006), provide competitive advantage (Porter and Kramer, 2011), reduce costs (Bocken et al., 2014), anticipate future legislation and stakeholder expectations (Schaltegger et al., 2012), boost reputation (Homburg et al., 2013) and attractiveness for top talent (Greening and Turban, 2000), and address long-term sustainability challenges (Bocken and Geradts, 2020; Foss and Saebi, 2017; Laasch, 2019).

However, despite the purported benefits of SBMI and its importance for meeting sustainability targets, there remains a design-implementation gap: companies struggle to successfully design and implement new SBMs (Baldassarre et al., 2020). The process of business model innovation is less clear-cut than product innovation (Chesbrough, 2010) and sustainability adds another layer of complexity by the need to

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satisfy multiple stakeholder demands and create a triple-, rather than a single bottom line impact (Stubbs and Cocklin, 2008). Moreover, there is a lack of tried and tested processes and tools to support the SBMI process (Geissdoerfer et al., 2018; Bocken et al., 2019). While established tools exist for traditional business model innovation (e.g. the Business Model Canvas (Osterwalder and Pigneur, 2010)), tools for SBMI are manifold (Pieroni et al., 2019) but often suffer from design issues, have not been adequately tested and evaluated in practitioner contexts, and/or were designed for specific contexts, thus lacking broader applicability (Bocken et al., 2019).

Recently, it has also been determined that firms often lack the dynamic capabilities to engage in SBMI (Bocken and Geradts, 2020). Dynamic capabilities refer to an organization's ability to "integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997), often understood as the ability to sense and seize new opportunities and transform the organization. Whereas companies already have difficulty innovating their business models in general (Chesbrough, 2010; Teece, 2018), SBMI is even more challenging given the extra demands to fulfill societal and environmental needs on top of a superior customer offering (Bocken and Geradts, 2020; Boons and Lüdeke-Freund, 2013; Stubbs and Cocklin, 2008). Further, recent research has highlighted the importance of organizational design for developing dynamic capabilities in general (Teece, 2018) and for SBMI in particular (Bocken and Geradts, 2020). A tool which can help firms build dynamic capabilities for SBMI by addressing fundamental organizational design considerations could therefore prove useful for organizations attempting to design and implement new SBMs. Such a tool could give firms a concrete process to follow to succeed with SBMI, beginning with tackling organizational design.

This paper therefore investigates the following research question: *How can firms address organizational design issues in order to develop the dynamic capabilities necessary for sustainable business model innovation?*

Here, we address this research question by developing a tool for organizational design to bridge the gap between SBMI theory and practice (Baldassarre et al., 2020). We do so by following a design science research methodology and drawing on recent developments in theory, along with empirical interview data. Section 2 further discusses the relevant concepts operationalized in the development of the tool, including sustainable business model innovation, dynamic capabilities, and organizational design, while also describing the research focus and gap in more detail. Section 3 provides a detailed account of our methodological approach. Section 4 presents the results of the research in the form of the Sustainable By Design tool which emerged from the design science process. Section 5 discusses these results, the tool's relevance for organizational design and sustainable business model innovation, and contributions to theory derived from the tool development process. It also presents the limitations of the study and avenues for further research. Section 6 provides a conclusion.

2. Background

2.1. Sustainable business model innovation

Conceptually, the idea of 'sustainable business model innovation' (SBMI) is comprised of several component concepts: business model; sustainable business model; and business model innovation.

A business model is a representation of the way a firm creates, captures, and delivers value (Osterwalder and Pigneur, 2010). Thinking in terms of business models has become increasingly important for firms and practitioners over the past decade, with differentiation at the business model level emerging as a clear source of competitive advantage for firms as opposed to e.g. a pure focus on technology (Chesbrough, 2007).

Sustainable business models are distinct from 'conventional' business models insofar as they "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" (Geissdoerfer et al., 2018, p. 403–404). As environmental risk grows and places increasing amounts of pressure on companies worldwide — regardless of size or sector — sustainable business models can be a source of competitive advantage (Porter and Kramer, 2011). Geissdoerfer et al. (2018) suggest that continuing environmental trends could lead to the concept of sustainable competitive advantage eventually replacing conventional conceptions of competitive advantage (Grant, 2010).

Business model innovation can be understood in a number of ways, depending on how the notion of a business model is conceptualized ontologically, e.g. whether a business model is primarily seen as a collection of components (Osterwalder and Pigneur, 2010), the "activity system" of the firm (Zott and Amit, 2010), a cognitive representation which allows for the classification of different businesses (Baden-Fuller and Morgan, 2010), or as a "conceptual representation of how a business functions" (Snihur and Bocken, 2022, p. 2; Massa et al., 2017). Given that this research aims to develop research output in the form of a tool which can be utilized by practitioners, and in light of the popularity and practical importance of the component-type definition found in Osterwalder and Pigneur (2010), creators of the business model canvas, we adopt this approach to conceptualizing business models in this paper. With this in mind, business model innovation can then be understood in general as innovation activity aimed at the development and launch of new business models into a market space (Snihur and Zott, 2020) or as the introduction of incremental changes to existing business models (Geissdoerfer et al., 2018), but more specifically as engaging in a process of design. By "specifying a set of business model elements and building blocks, as well as their relationships to one another," one can become a "business model designer" who "can experiment with these blocks and create completely new business models, limited only by imagination and the pieces supplied" (Osterwalder and Pigneur, 2005, p. 24; quoted in Geissdoerfer et al., 2018).

Sustainable business model innovation (SBMI), then, can be understood as business model innovation which aims to "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" (Bocken et al., 2014, p. 44). For incumbent businesses aiming to grow new revenue streams while also achieving their sustainability goals and reducing environmental risk, SBMI is becoming increasingly important (Schaltegger et al., 2012). This is true for large incumbents, SMEs, startups, and scaleups alike (Bocken et al., 2014; Henry et al., 2020; Bashir et al., 2022). Particularly for large incumbent organizations, however, thinking in terms of SBMI can provide grounding for innovation processes. It can help them to systematically develop disruptive innovation capable of generating exponential gains in revenue by crossing boundaries into entirely new industries. At the same time, it can help place sustainability concerns front and center by incorporating them into the fundamental components of a new business model.

2.2. Organization design and dynamic capabilities

Organizational design is closely linked to how successfully a firm can transform its business models. Organizational design can include the "values, beliefs, and assumptions that guide [management's] leadership and decision-making approaches," as well as an organization's "strategy, people, structure, and management processes" (Bocken and Geradts, 2020, p.3; Burton et al., 2006; Galbraith, 1974; Meyer et al., 1993; Miles and Snow, 1978; Miles and Creed, 1995). Tushman et al. (2010) for instance consider four ideal organizational design types — functional, cross-functional, spinout, and ambidextrous — and assess their impact on innovation outcomes. Their findings indicate that ambidextrous organizations, or those with "intra-organizational design

heterogeneity that is consistent with the contrasting strategic requirements of exploration and exploitation,” where “exploitative subunits are organized to be efficient, while exploratory subunits are organized to experiment and improvise” (p. 1336) are more effective in “executing innovation streams” (p. 1331).

Theory on dynamic capabilities has been linked to organization design (Fjeldstad and Snow, 2018; Teece, 2018) as it is also seen as an important theory explaining a firm’s long-term competitiveness. To illustrate, emerging research underscores the connections between organizational design, dynamic capabilities, and SBMI. Teece (2018) considers the impact of organizational design on developing the dynamic capabilities for conventional business model innovation, arguing that dynamic capabilities are underpinned by organizational routines and managerial skills. Fjeldstad and Snow (2018) discuss how new collaborative organizational forms enable open and agile business models. Leih et al. (2015) note that “an organization’s structure, incentives, and culture” may be “more or less well suited to the recognition of new opportunities” (p. 1). Bocken and Geradts (2020) explore how organizational design impacts development of dynamic capabilities for sustainable business model innovation specifically.

Indeed, the concept of dynamic capabilities was first presented in Teece et al. (1997) as an alternative theory of firm competitive advantage. Unlike the resource-based view of the firm (Penrose, 1959), wherein firms are thought to derive competitive advantage from a unique set of internal resources, the notion of dynamic capabilities suggests that it is firms’ ability to “coordinate and redeploy internal and external competencies” — while also being innovative, responsive, and flexible — which affords competitive advantage (Teece et al., 1997, p. 515). The dynamic capabilities concept has become more prominent in a VUCA (volatile, uncertain, complex, and ambiguous) world, (Bocken and Konietzko, 2022; Schoemaker et al., 2018), where companies need to change their business models more rapidly based on faster-paced and unexpected threats and opportunities.

Following Teece (2018), firms have both ordinary and dynamic capabilities. The former are composed of “routine activities” involved in the operationalization of the firm’s existing business model (Teece, 2018, p. 40). Dynamic capabilities, on the other hand, are understood in terms of ‘sensing’, ‘seizing’, and ‘transforming’, namely: “the capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets” (Teece, 2007, p. 1319). Teece (2018) elaborates on this definition by noting that the process of “[devising] new business models to seize new or changed opportunities” is an important component of dynamic capabilities (p. 40–41).

Organization design aspects have been investigated for SBMI (Bocken and Geradts, 2020). Bocken and Geradts (2020) consider the importance of dynamic capabilities for SBMI, suggesting that it is through developing the appropriate dynamic capabilities that firms are able to successfully engage in the activities necessary for SBMI (see also Inigo et al., 2017; Sommer, 2012). Firms must first be able to *sense* both potential threats (e.g. environmental externalities) as well as opportunities (e.g. the ability to capitalize on sustainability-related business opportunities through connecting with customer sentiment) in order to act on SBMI (Bocken and Geradts, 2020; McWilliams and Siegel, 2011; Hart and Dowell, 2011). Once opportunities and risks have been sensed, firms must then have the capabilities needed to *seize* these opportunities, “mobilizing resources to address emerging (sustainability) opportunities and capture value from doing so” (Bocken and Geradts, 2020, p. 3; Teece, 2018). Importantly, firms must finally have the ability to engage in *transformation* via the “deliberate continued renewal of the organization’s capabilities (Teece, 2018) towards becoming a sustainable business” (Bocken and Geradts, 2020, p. 3). The ability to engage in this kind of ongoing organizational renewal is especially important in a sustainability context, as the journey towards sustainability is ongoing. Given the shifting nature of sustainability targets, the wicked nature of

sustainability challenges, and the uncertainty surrounding innovation processes, sustainability is not an end goal but rather an ongoing pursuit, one requiring transformation-type capabilities (Coffay et al., 2022). Teece (2018) sees a firm’s cultural realignment as an important component of transformation-type dynamic capabilities, which we argue underscores the importance of company culture for determining a firm’s ability to succeed with both conventional as well as sustainable business model innovation.

Although much of the literature on organizational design is somewhat opaque, Bocken and Geradts (2020) clarify the concept by considering it in terms of three levels of analysis: institutional, strategic, and operational, echoing earlier work on organizational levels of inaction towards sustainability by Slawinski et al. (2017) (Fig. 1). At the organizational design level, an organization’s institutional factors drive the development of strategy, which is then deployed at the operational level. This institutional-strategic-operational relationship is undergirded by various organizational barriers and drivers, which can either contribute to or hinder the development of the dynamic capabilities needed for SBMI as also depicted in Fig. 1.

2.3. Research focus

Despite the potential for SBMI to contribute to significant positive outcomes for firms, there is a substantial ‘design-implementation gap’: firms struggle with designing and successfully implementing new, sustainable business models in practice (Geissdoerfer et al., 2018; Baldassarre et al., 2020). Geissdoerfer et al. (2018) identify several reasons for the existence of this gap, including a lack of good tools for SBMI. Based on other research we also see the lack of a unified process for business model innovation more generally (Chesbrough, 2010) or SBMI in particular (Bocken et al., 2019; Pieroni et al., 2019). More tools have emerged in recent years (Pieroni et al., 2019), but many of them suffer from design flaws, have not been adequately tested in practitioner contexts, and/or have not been built from theory and practice (Bocken et al., 2019). This confirms earlier research by Baumann et al. (2002) which identified a number of sustainability tools, but each with certain design flaws that inhibit the use of such tools in practice – in particular the lack of testing in practice. The growing number of tools also shows the lack of a unified approach to SBMI and that this research field is still emergent.

Given the theory and literature context outlined above, the research focus of this paper is twofold. First, we aim to better elucidate the theoretical connections between organizational design, dynamic capabilities, and sustainable business model innovation, building on work by researchers such as Inigo et al. (2017), Teece (2018), and Bocken and Geradts (2020). In particular, we develop a clearer understanding of the organizational barriers and drivers which can impact the development of the sensing, seizing, and transforming capabilities needed for SBMI. Second, we approach this task by developing a tool which practitioners can use to evaluate their current organizational design, identify barriers and drivers for SBMI, and subsequently develop strategic interventions to engage in organizational transformation. We suggest that such a tool could help firms approach SBMI with a more structured process, beginning first of all with addressing organizational design through the identification of cultural, strategic, and operational barriers and drivers to SBMI.

In the Method section, we will explain how we develop this tool by leveraging empirical data on organizational barriers and drivers to SBMI as described in Bocken and Geradts (2020). Drawing on previous work in organizational design and dynamic capabilities (Teece, 2018; Fjeldstad and Snow, 2018; Leih et al., 2015), Bocken and Geradts (2020) conducted 56 interviews with top, senior, and mid-level management from 7 multinational corporations engaged in SBMI, including Philips, Unilever, AkzoNobel, Johnson & Johnson, and Pearson. Interviewees were asked to identify organizational factors that supported or inhibited SBMI processes. Analysis of responses revealed common themes across

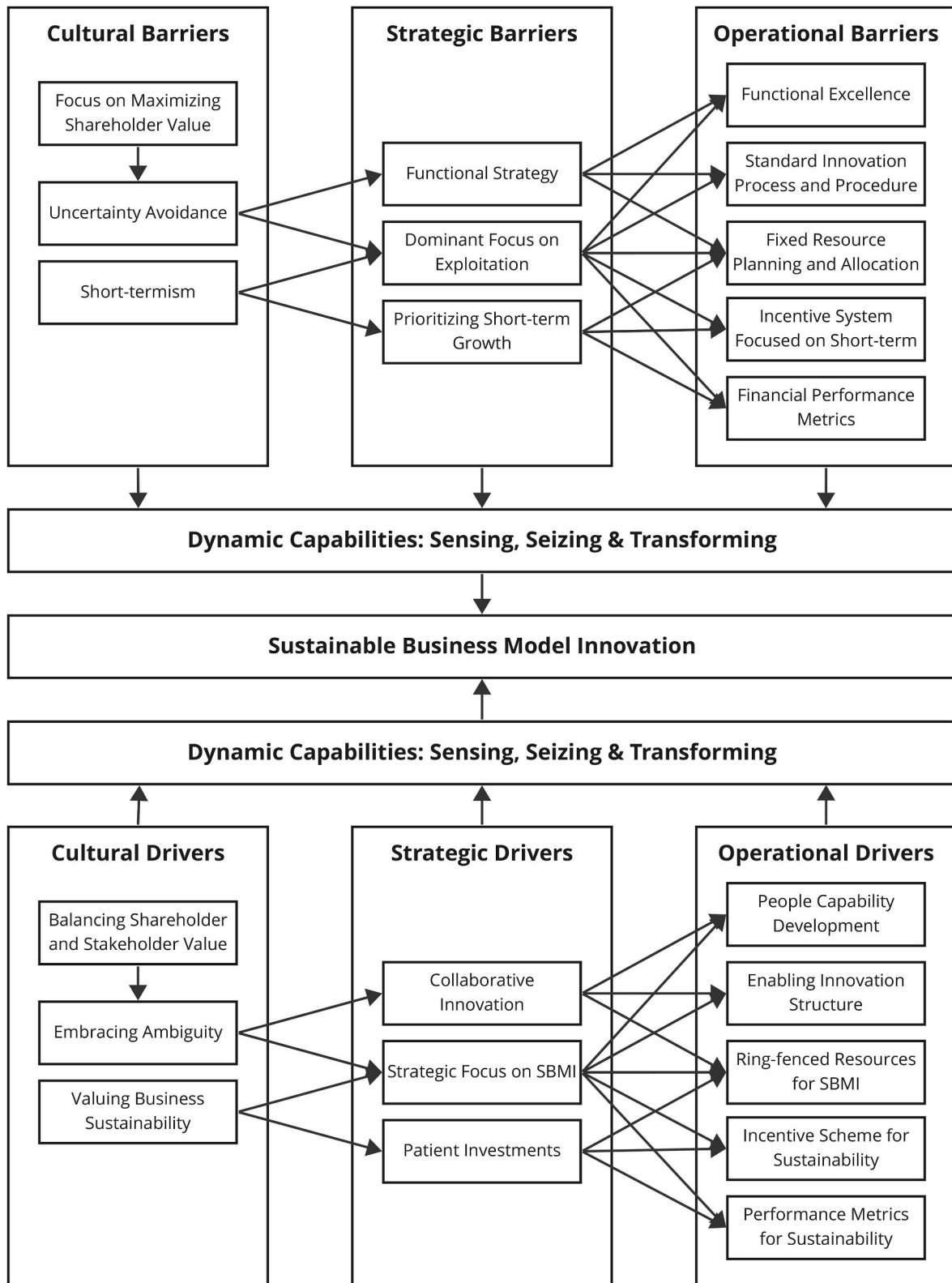


Fig. 1. Identifying barriers and drivers at the organizational level for SBMI. Adapted from Bocken and Geradts (2020).

very different industries and innovation projects, as depicted in Fig. 1. By developing and testing a tool grounded in this empirical data, the present paper aims to build on this earlier work to further illuminate the significance of specific organizational barriers and drivers for dynamic capabilities and SBMI, while also bridging the theory-practice gap by providing practitioners with an actionable tool that can help them

identify organizational barriers and drivers to SBMI present in their organization.

3. Method

This research investigates how firms can address organizational

design issues to develop the dynamic capabilities necessary for sustainable business model innovation. Design science research (Peffers et al., 2007) was found to be useful to approach this question because of the involvement of the target group in the development of the tool to demonstrate its usage. The iterative, user-involved method of design science research has been applied to develop sustainable business tools before (see e.g. Baldassarre et al., 2020).

The method consisted of four stages building on Peffers et al. (2007): 1) identifying the problem and defining objectives for a solution; 2) design and development; 3) demonstration; and 4) evaluation. While Peffers et al. (2007) also add ‘communication’ as a separate step, we consider communication as manifest in the ongoing interactions we have had with the companies involved regarding deployment and results of the tool, as well as in the publication and dissemination of this article. These steps of the design science process are described next and represented visually in Fig. 2.

3.1. Identifying the problem and defining objectives for a solution

We began by identifying and motivating the problem and defining the objectives for a proposed solution. As described in Sections 1 and 2, the design-implementation gap of SBMI exists in part because of a lack of appropriate tools for firms. At the same time, research has identified the general relationship between organizational design, dynamic capabilities, and SBMI, as well as the existence of common organizational barriers and drivers which can inhibit or assist with the development of the dynamic capabilities needed for effective SBMI. The objective therefore was to develop a tool which could help firms identify these barriers and drivers, therefore assisting firms in bridging the SBMI design-implementation gap. The process of identifying the problem and defining the objectives for a solution was informed not only by a review of the literature as outlined above, but also through conversations with academic experts. Further, we engaged in initial conversations with firms to gauge their interest in the development of such a tool. The level

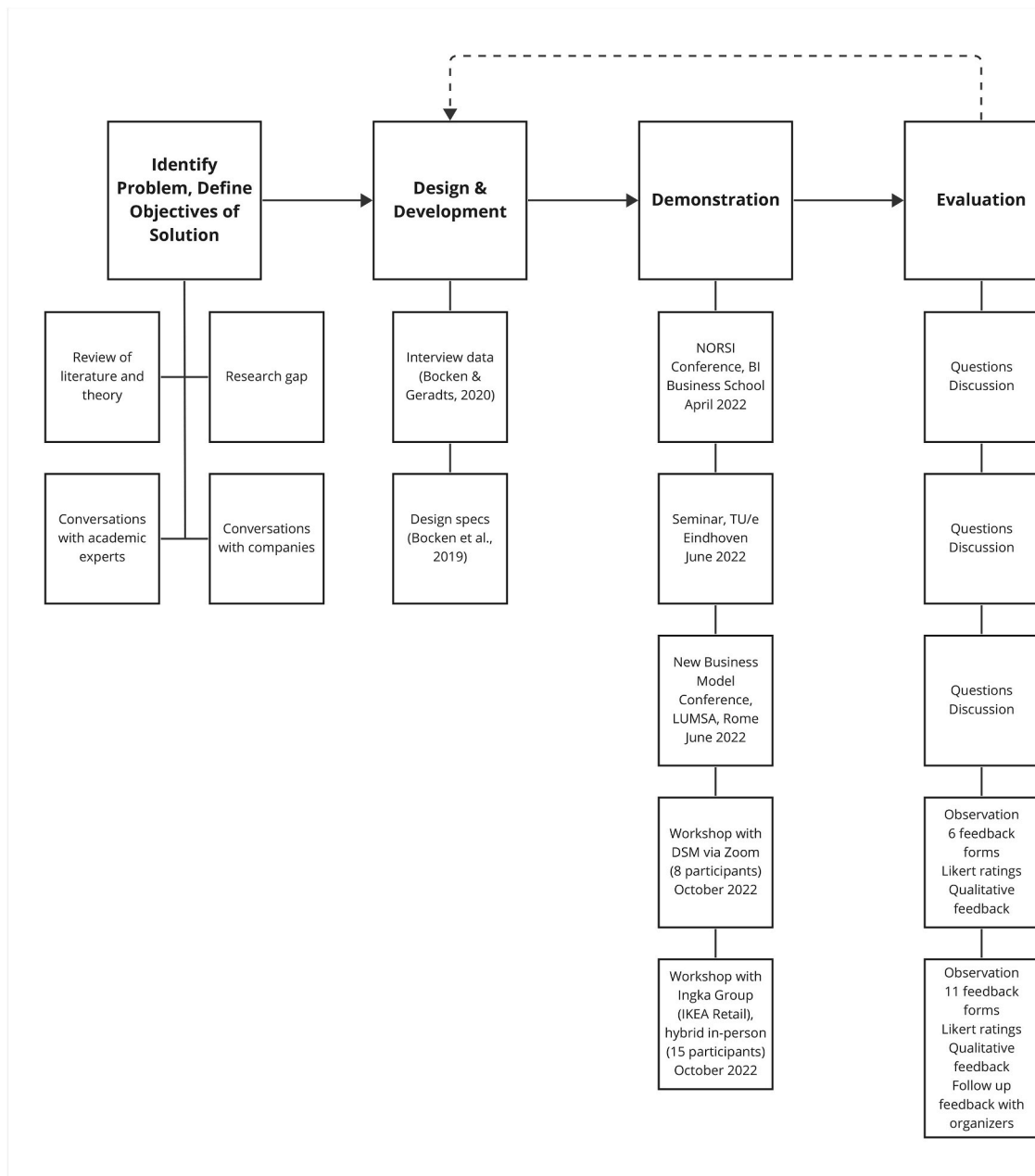


Fig. 2. Overview of the DSR method used in this research (adapted from Peffers et al., 2007; Baldassarre et al., 2020).

of interest from large firms was significant, confirming the presence of the problems identified in the literature and further motivating the development of a tool to address them.

3.2. Design & development

Once the problem had been identified and objectives defined, the first author designed an initial version of the tool which would eventually become the final tool and process, as depicted in Fig. 3. In designing the tool, we adhered to the design principles outlined in Bocken et al. (2019), as described in Table 1. The tool was purpose-made; rigorously developed from literature and practice; iteratively developed and tested with potential users; evaluated by users for effectiveness; provides a transparent procedure and guidance; incorporates broad sustainability objectives; is easy to use; triggers organizational change; and is adaptable to a variety of contexts.

The tool consists of three parts: the Barriers & Drivers Map (Fig. 4); the Culture, Strategy, and Operations Cards (Fig. 5), and the Design Grid (Fig. 6). These parts and the tool process are described in detail in Section 4.1. The tool is grounded in empirical insights from 56 interviews with top, senior, and mid-level management from 7 MNCs engaged in SBMI, including Philips, Unilever, AkzoNobel, Johnson & Johnson, and Pearson (Bocken and Geradts, 2020). Interviewees were asked to identify organizational factors that supported or inhibited SBMI processes. The analysis led to a list of 13 barriers and drivers, each associated with an organizational dimension, as shown in Fig. 1.

The barriers and drivers (Fig. 4) in the tool were derived from those presented in Bocken and Geradts (2020), with two important changes. First, ‘institutional’ barriers and drivers were relabeled as ‘cultural’ ones, to reduce jargon and make the tool more accessible and comprehensible for practitioners. Second, the 13 barriers and drivers were further distilled into nine pairs, following simplicity as a design principle and attempting to reduce overlap of barrier and driver content wherever possible. The content of the Culture, Strategy and Operations cards (Fig. 5) was derived by further distilling and simplifying interview data in Bocken and Geradts (2020), making aggregate responses easy for practitioners to understand and attempting to include tangible examples of how barriers and drivers can present in firm contexts.

While other approaches to thinking about organizational design could have been incorporated into tool development — for example, the hard structural aspects of organizational design related to business

Table 1
Tool design criteria from Bocken et al. (2019).

Tool Design Criteria	Application in Sustainable By Design tool
The tool is purpose-made	Focus on identifying organizational barriers and drivers for SBMI
The tool is rigorously developed—from literature and practice	Incorporating OD/DC/SBMI theory, deep empirical insights from interviews, input from expert audience, and tested in practice
The tool is iteratively developed and tested with potential users	Presented to three expert audiences and tested with two MNCs
The final tool version has then been used multiple times by practitioners, and an evaluation of this process is done to assess tool use and usefulness	Final tool tested by large MNC and received very positive quantitative and qualitative evaluations from participants
The tool provides a transparent procedure and guidance	Tool and workshop process are clear and grounded in robust empirics, as confirmed by user feedback
Circular economy or broader sustainability objectives and impact are firmly integrated	Barriers and drivers to SBMI in tool derived from challenges faced by some of world’s largest companies
Simple and not too time-consuming	Simplicity was key design consideration: barriers and drivers were combined where possible and language simplified for practitioners
Inspires or triggers change	Tool aims to pave the way for fundamental shifts in organizational design in order to drive SBMI
Adaptable to different (business) contexts	Can be used at different levels within large organizations or for scale-ups that want to design for SBMI

areas, functions, and management hierarchy — we opted to limit the tool to a focus on Culture, Strategy and Operations, following the guidance in Bocken et al. (2019) to keep the tool as simple as possible (Table 1).

3.3. Demonstration

The tool was first presented at two academic conferences and an academic seminar, attended by experts in sustainable business models, circular economy, innovation, and design (Table 2). Feedback was elicited to further confirm the theoretical grounding of the tool and attempt to refine its presentation for practitioners. We then utilized the

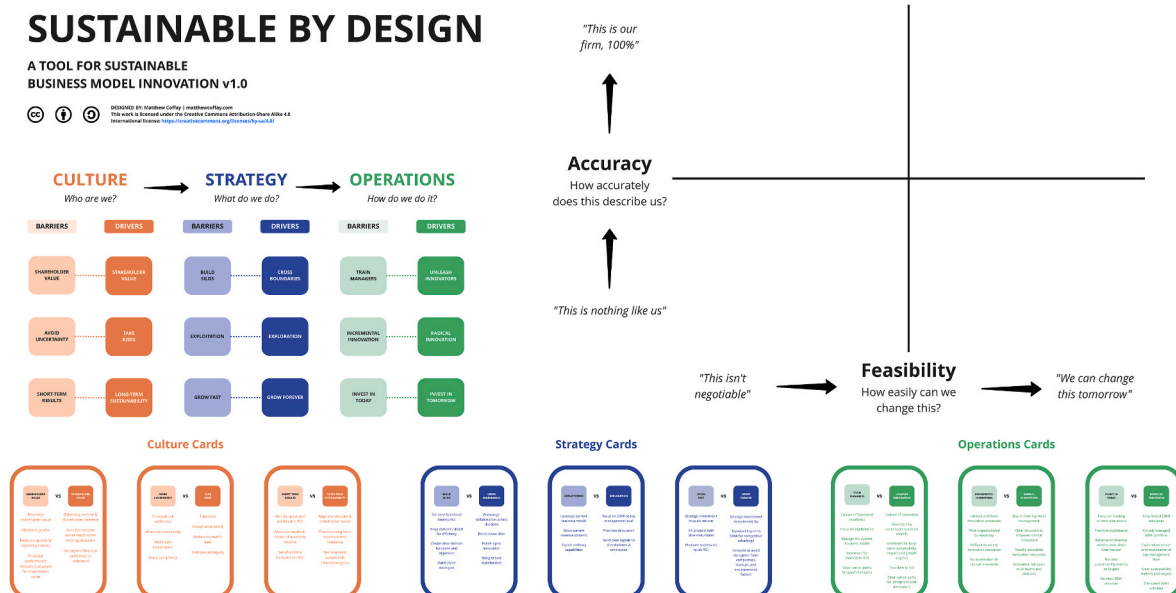


Fig. 3. The Sustainable By Design tool. The text is clearly visible on the Miro board where the tool is hosted: https://miro.com/app/board/uXjVOu7qLgQ=

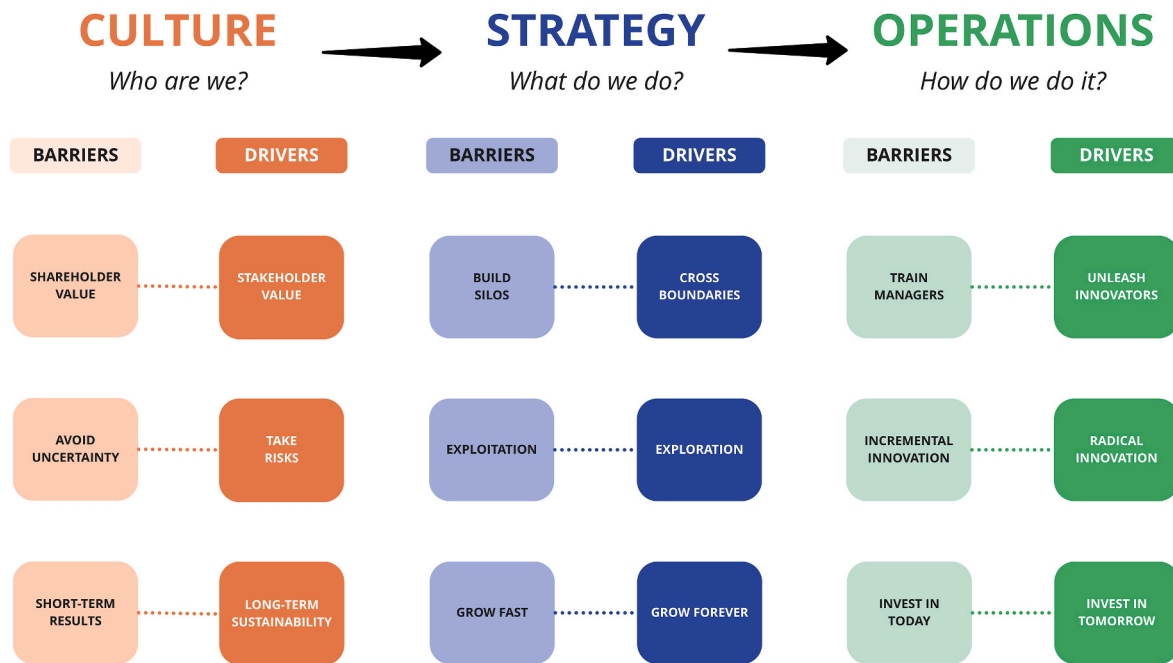


Fig. 4. Barriers & drivers map.

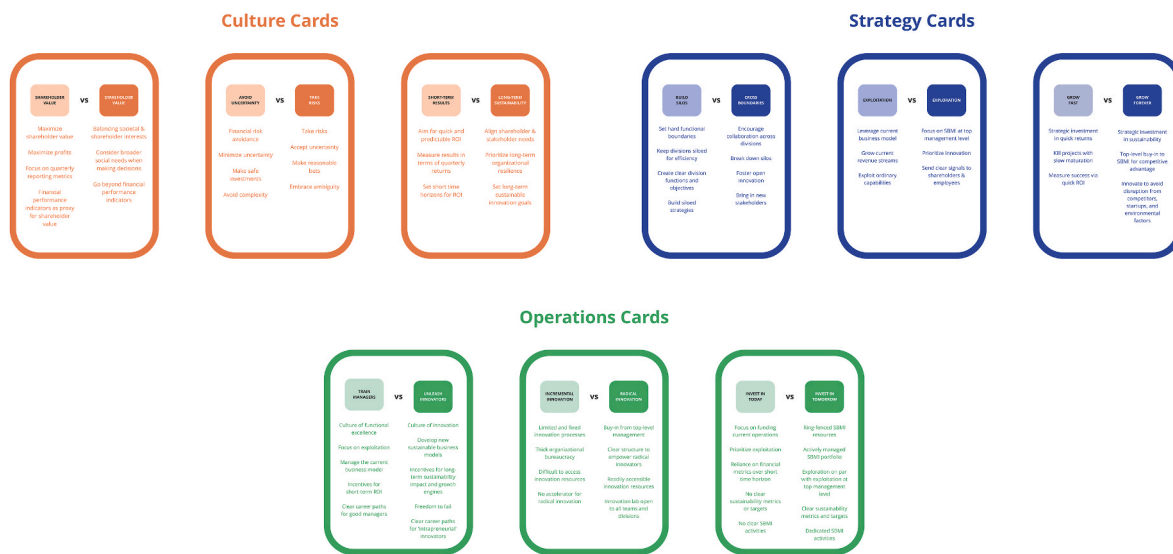


Fig. 5. Culture, Strategy, and Organization cards. The text is clearly visible on the Miro board where the tool is hosted: <https://miro.com/app/board/uXjVou7qLgQ=/>

tool as part of two workshops with two firms seen as sustainability leaders in their respective sectors (DSGC, 2018; Globescan and Sustainability, 2020) (Table 2). The first workshop was with DSM, a Dutch multinational company which describes itself as “a global, purpose-led leader in health and nutrition, applying bioscience to improve the health of people, animals, and the planet” (DSM, 2022), and the second was with Ingka Group, the largest IKEA franchisee with 39.8 billion EUR revenue in 2021 (Ingka, 2021). DSM’s strategy includes a focus on leveraging the company’s “resources and capabilities to address the urgent societal and environmental challenges linked to the way the world produces and consumes food” (DSM, 2021, p. 4) and is “based on the global megatrends and the SDGs” (SDGs) (DSM, 2021, p. 7). IKEA aims “to inspire and enable the many people to live a better everyday life within the boundaries of the planet,” with its business strategy based on the ambition to become more affordable, accessible and sustainable,

including to become circular and climate positive by 2030 (IKEA, 2022). The DSM workshop was conducted via Zoom with 8 participants in addition to two facilitators (the authors). The IKEA Retail (Ingka Group) workshop was conducted hybrid, with 11 in-person participants on location in Malmö, 4 online participants, and one facilitator (the first author). The workshop process is described in detail in Section 4.1.

3.4. Evaluation

To evaluate the effectiveness of the tool, feedback was first elicited from academic experts in three different presentation sessions. This feedback was incorporated into the development of the workshop process, as detailed in Table 2. Further structured feedback was obtained from participants in the DSM and IKEA Retail (Ingka Group) workshops using online feedback forms which incorporated both quantitative and

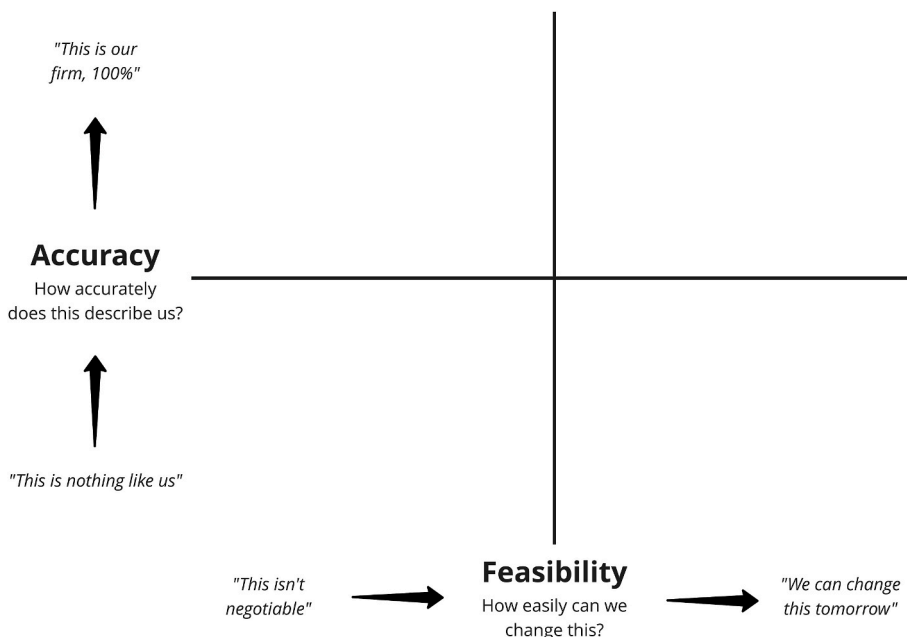


Fig. 6. Design grid.

Table 2
Workshops conducted for development of the tool.

#	Description	Date & Location	Participants	New elements added post-workshop	Steps in Fig. 2
1	Presentation at academic conference	Apr 22, 2022 BI Business School, NORSI conference Oslo, Norway	Academic: PhD students, academic researchers	No changes; validation of concept	Demonstration & Evaluation
2	Presentation at seminar	Jun 9, 2022 TU/e Eindhoven, Netherlands	Academic: PhD students, academic researchers	No changes	Demonstration & Evaluation
3	Presentation at academic conference	Jun 24, 2022 LUMSA University New Business Models Conference Rome, Italy	Academic: PhD students, academic researchers	Facilitation changes: Clear communication of sustainability elements in cards	Demonstration & Evaluation
4	Workshop with managers from different business areas of DSM (8 participants)	Oct 17, 2022 Online (Zoom)	Sustainability ambassador, portfolio managers, innovation directors	Facilitation changes: Guidance on next steps post-workshop, Clearer guidance on focus in breakout groups to eliminate confusion around overlapping content (Culture vs. Strategy vs. Operations), Longer and more frequent breaks in workshop process	Demonstration & Evaluation
5	Workshop with managers from sustainability, circularity, risk, compliance, strategy, and investment business areas of Ingka Group (15 participants)	Oct 25, 2022 IKEA Retail (Ingka Group) Malmö, Sweden	Circular strategy, sustainability managers/specialists/process leaders, ERM specialist, global ESG, circular leader	No changes	Demonstration & Evaluation

qualitative elements. The results of this feedback are detailed in Section 4.2 and presented in Table 3 (quantitative) and Table 4 (qualitative).

Table 3
Results from evaluation.

	Workshop 1 (DSM)	Workshop 2 (IKEA Retail (Ingka Group))	Overall assessment
How easy was the workshop to follow? (mean & standard deviation)	4.00 (0.89)	4.55 (0.69)	4.35
How useful was the workshop for you? (mean & standard deviation)	3.67 (0.52)	4.18 (0.60)	4.00
Number of respondents and participants	6 (8 participants)	11 (15 participants)	

Feedback from academic researchers and PhD students indicated that the tool was “clearly needed.” However, some expert seminar and conference participants suggested that the sustainability elements could be better clarified as part of facilitation (e.g., while sustainability elements are evident when reading the Cards, they are less clear when reading the abbreviated Barrier and Driver titles), and that next steps following the workshop should be discussed during the introductory session of the workshop. Some experts also indicated the importance of the tool’s modularity, meaning its ability to fit into a variety of strategic sustainability processes across different firms.

4. Results

Below, we present the tool and workshop process which emerged following the design science research method, as well as a summary of quantitative and qualitative evaluation of the tool and workshop provided by workshop participants.

Table 4
Qualitative assessment.

Key takeaways	Suggestions for improvement	Actions
<p>Robust methodology helpful for organizational design “Key to follow a robust methodology and process to surface real issues”</p>	<p>Explain next steps and follow up procedure</p>	<p>Discuss potential tools and workshops to follow up and take action on barriers and drivers (e.g. roadmapping)</p>
<p>The culture gap “Gap between what [we] say and what [we] actually want ... how might we close that gap?” “The concept of actualized culture, to put a sticker on the main things that keep us away from what we aim to do” “We struggle to assess feasibility to change because there is a gap between what we say/our ambition vs reality”</p>	<p>Some content overlap between barriers and drivers across Culture, Strategy and Operations</p>	<p>During facilitation, remind participants to focus on Barriers and Drivers in each breakout session in terms of either Culture, Strategy, or Operations, depending on session</p>
<p>Risk aversion “How can we develop the risk appetite?” “the organization seems to be quite risk avert (sic) (in some areas)” “How can we collaborate more, allow more risks?”</p>	<p>More pre-read and prep material would help align participants beforehand</p>	<p>Consider sending out a survey pre-workshop to assess participant knowledge base and assign pre-reads as necessary</p>
<p>Differing views across business areas and silos “We have different perceptions on our ... reality, depending on where we are working” “there is some heterogeneity across business groups and different ways to see the actual status” “bringing together of the different perspectives from the 3 breakout groups was hard”</p>	<p>More time for discussion in plenary sessions</p>	<p>Where possible, consider extending workshop from half day to three-quarters or full day to allow for more discussion in plenary</p>

4.1. Final tool and workshop process

The Sustainable By Design tool (Fig. 3) was built in Miro, an online collaboration platform. We opted to design the tool in Miro for two reasons. First, the tool was designed during the COVID-19 pandemic, and we anticipated the need to conduct online workshops. Ultimately, one of the test workshops was conducted entirely via Zoom, while the other was held in a hybrid format. Additionally, we opted to build the tool in Miro to make it easy for practitioners to use the tool in the future by simply copying the tool to their own Miro board. The tool approaches SBMI at the level of organizational design, with the aim of aiding firms in developing the dynamic capabilities needed for SBMI. By identifying and mapping barriers and drivers to SBMI at the level of organizational culture, strategy, and operations, firms can take action to improve organizational design, boosting drivers for SBMI and breaking down barriers.

The complete tool is depicted in Fig. 3, with the component parts represented in Figs. 4, Figure 5, and Fig. 6. The tool can be accessed in Miro at the following URL: https://miro.com/app/board/uXjVOu7qLgQ=. In a workshop setting, participants map out barriers and drivers for SBMI. Beginning with the Culture column, participants consider each Barrier-Driver pair, referring to the corresponding Card descriptions. For each pair, participants ask themselves: 1) Accuracy: how accurately does

this describe our organization today? and 2) Feasibility: how easily could we change this? Next, participants map the Barrier-Driver pair on the Design Grid. Those barriers and drivers which are highly descriptive of the organization are placed higher on the Y (Accuracy) axis, while those which could most feasibly be changed are placed further to the right on the X (Feasibility) axis. This process is repeated for each Barrier-Driver pair, until all have been mapped onto the grid. At the end of the session, participants consider the Barriers in the upper-right quadrant (highly descriptive of the organization, feasible to change) and the Drivers in the bottom-right quadrant (not descriptive of the organization, feasible to change) (Fig. 7). These are the Culture, Strategy, and Operations components which should be addressed first for maximum impact on SBMI. Senior management can proceed to develop strategic interventions to address these barriers and drivers.

4.2. Evaluation of final tool and workshop process

Both workshops were evaluated with an anonymous online feedback form which included two Likert scale questions (“How easy was the workshop to follow?” and “How useful was the workshop for you?”), where participants could rate their experience from 1 to 5. Participants were also asked to elaborate on these responses. Evaluation of the final tool and workshop process was very positive, with participants scoring “How easy was the workshop to follow?” as 4.55/5, and “How useful was the workshop for you?” as 4.18/5 (Table 3). We noted a marked improvement in both Likert scale scores for these questions as well as qualitative response form feedback from the first workshop to the second workshop. In terms of usefulness, participants remarked in an open field for qualitative feedback that it was “really great to see that we can guide cross functional teams to insights and realizations in a democratic and co-creative way,” and that the workshop process “gave a very good base for discussing the critical soft factors in a structured way.” The tool was seen as enabling a “structure and common language for discussing barriers and drivers”: one participant remarked that without the tool, “we could spend a lot of time discussing but not really moving or turning the ‘complaints’ into anything actionable.” In terms of ease of following the workshop process, participants remarked that they “weren’t confused even once,” and that “the flow was very clear, and collaborative” with a “clear, simple structure.”

In addition to the Likert scale questions above, workshop participants were asked to provide their key takeaways from the workshop along with any suggestions for improvement of the tool and/or workshop process. These key takeaways and suggestions are presented in a consolidated form in Table 4. The suggestions for improvement regarding content overlap were taken into consideration following Workshop 1 and incorporated into the facilitation procedure for Workshop 2. We noted that participants in Workshop 2 did not identify any issues or confusion regarding content overlap, and therefore consider our changes to have succeeded in addressing the issue raised by participants in Workshop 1. The increase in quantitative scores from Workshop 1 to Workshop 2 (comprehensibility, 4.0 to 4.55; usefulness, 3.67 to 4.18) strengthens this observation. While the other suggestions for improvement in Table 4 regarding follow up sessions, pre-reads, and additional discussion time were derived from Workshop 2 feedback, we consider the accompanying actions to be optional and ‘nice to have’ but not essential for successful workshop facilitation, based on the overall high scores and positive nature of the feedback from Workshop 2.

5. Discussion

This study investigated how firms can address organizational design issues in order to develop the dynamic capabilities necessary for sustainable business model innovation. We investigated the following question: How can firms address organizational design issues in order to develop the dynamic capabilities necessary for sustainable business model innovation? First, we reflect on the Sustainable by Design tool

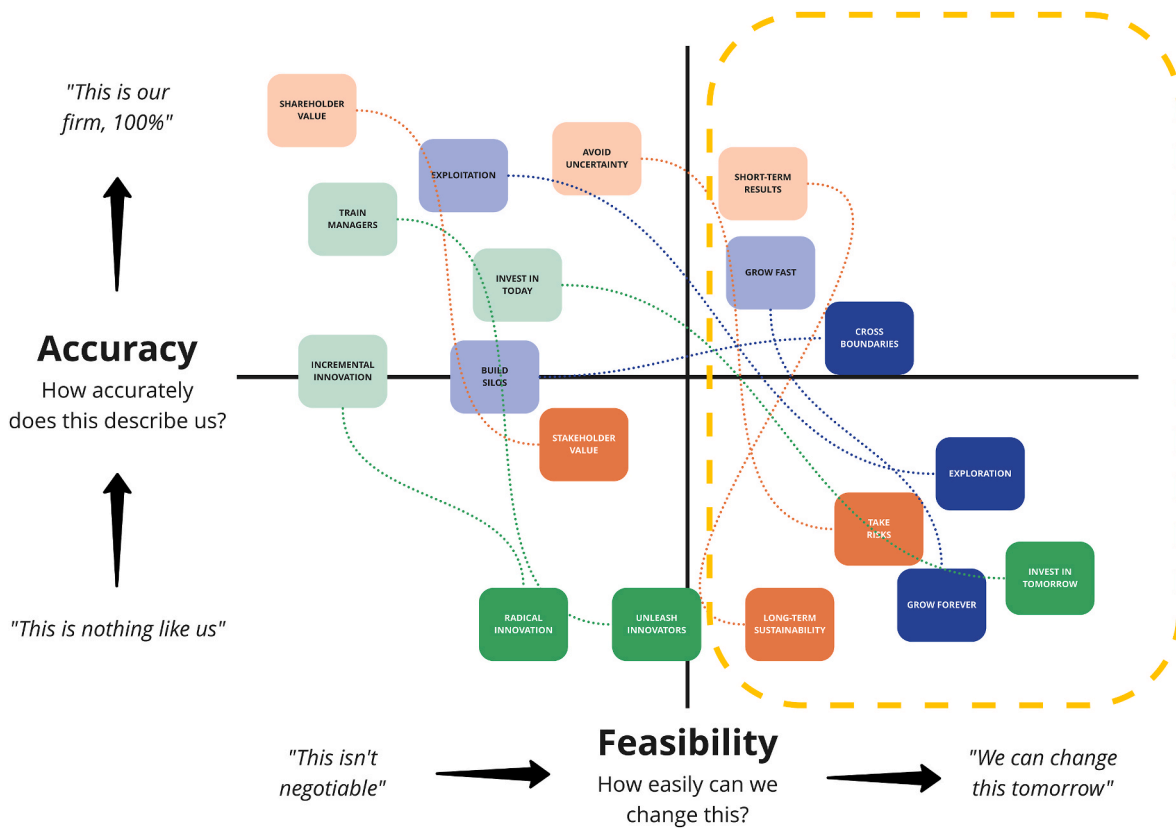


Fig. 7. Barriers and drivers mapped onto the Design Grid. High impact barriers and drivers inside dotted yellow line. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

developed in this study. This is followed by a discussion on the organizational design issues to develop the dynamic capabilities necessary for sustainable business model innovation, and future research.

5.1. Sustainable by design tool

Based on our experience and participant feedback, the Sustainable By Design tool appears to be useful for helping firms identify organizational barriers and drivers to develop the dynamic capabilities necessary for engaging in sustainable business model innovation. Below, we develop several lessons learned, which add to the emergent theory around how organizational design impacts dynamic capabilities for SBMI, drawing on participant feedback from the workshops as well as our observations during the workshop facilitation process.

First, we noted that there are often widely divergent views about which barriers and drivers are present depending on a participant’s business unit, position within the organization, and background. While previous studies identified several (Bocken and Geradts, 2020; Hina et al., 2022), the action-based workshop approach illuminated real and contrasting opportunities and barriers at the organizational level. Participants noted that “we have different perceptions on our ... reality, depending on where we are working,” and that “there is some heterogeneity across business groups and different ways to see the actual status.” This lack of consensus could lead to challenges with sensing and seizing opportunities for SBMI. Indeed, clarifying organizational vision is essential for sensing these kinds of opportunities. This was especially evident in the plenary sessions, in which breakout groups would attempt to reconcile their results with those of the other participants and achieve some consensus around where to place organizational barriers and drivers on the Map in plenum. We therefore suggest the following:

Lesson 1: Mapping organizational barriers and drivers to SBMI jointly with a tool and workshop process can help firms identify differing

understandings, views, and visions across different organizational areas.

We further noted what we term a ‘culture gap.’ Many workshop participants observed that their organization’s culture as communicated by top management was not always enacted at the level of operations. Hence, while research has highlighted design-implementation gaps at the level of developing and piloting circular and sustainable business models (e.g. Geissdoerfer et al., 2016, 2018; Baldassarre et al., 2020), this study identifies the need to address this issue already at the higher cultural level of the organization echoing earlier work by Geradts and Bocken (2019) on creating a culture for sustainable innovation. The ability to build this kind of organizational culture can itself be understood as a transformation-type dynamic capability, with Teece (2018) noting “realigning of culture” as an example of transforming (p. 44). Participants noted a “gap between what [we] say and what [we] actually want” and pointed to the “concept of actualized culture, to put a sticker on the main things that keep us away from what we aim to do.” They further explained that the workshop helped them to see that they “struggle to assess feasibility to change because there is a gap between what we say/our ambition vs reality.” Previous research has found that organizational subcultures can persist within a larger organization, with different subcultures maintaining different approaches to and understandings of sustainability (Linnenluecke et al., 2007). While Linnenluecke and Griffiths (2010) suggest that there could be a ‘trickle down effect’ from e.g. top management’s emphasis on sustainability to lower levels of the organization, empirical studies have shown that this ‘trickle down’ rarely happens in practice (Harris and Crane, 2002; Howard-Grenville, 2006; Welford, 1995; Hoffman, 1993; Dodge, 1997). This leads us to the following:

Lesson 2: Organizations can suffer from a ‘culture gap,’ where top management’s idealized views of company culture fail to trickle down to the operational level. Engaging in a structured assessment process with a tool like Sustainable By Design can help firms identify this gap and pave

the way for overcoming it.

Finally, we noted the value of approaching organizational design by leveraging an empirically grounded tool and workshop process. This is especially true in large organizations, where questions of organizational design can quickly devolve into vague, ungrounded, circular discussions without actionable outcomes. That these types of discussions might tend toward vagueness without the grounding of a tool and workshop process is unsurprising given the sweeping nature of organizational design and the wide range of definitions outlined in Section 2.2, in addition to the fact that it is still an emergent concept in the literature when connected with dynamic capabilities and SBMI (e.g. Inigo et al., 2017). Workshop participants noted that the tool provided them with “a structure and common language for discussing barriers and drivers to make discussion more concrete and to create a common base for developing our approach. Without this, we could spend a lot of time discussing but not really moving or turning the ‘complaints’ into anything actionable.” They also commented that it is “key to follow a robust methodology and process to surface real issues,” as was achieved with the workshop. Leveraging a tool like Sustainable By Design can itself therefore assist firms in developing transformation-type capabilities, e.g. for identifying internal incongruencies and realigning organizational culture (Tece, 2018). It can also provide firms with a process to follow in order to address organizational issues which can impede SBMI. This is important, as there is currently a lack of clear and testable processes for succeeding with SBMI. We therefore suggest one additional lesson:

Lesson 3: Organizational design is complex. For firms to effectively assess and take action on the Culture, Strategy, and Operations components of their organizational design, a structured process is important. This may be facilitated by a tool and workshop. Without such a structured approach, firms run the risk of dedicating time and resources to discussions which fail to materialize into actionable outcomes.

5.2. Organizational design to develop dynamic capabilities for sustainable business model innovation

Through the development of the Sustainable by Design tool based on literature, this study also gives new insight into the connections of organizational design to develop dynamic capabilities for sustainable business model innovation.

First, pressured by the increasing evidence on climate change, changing customer demands, and emerging legislation, sustainable business model innovation becomes a corporate solution to tackle societal and environmental issues by transforming the way business is done (Bocken and Konietzko, 2022; Schaltegger et al., 2012; Stubbs and Cocklin, 2008). Through the workshops we conducted as part of the tool development process, it emerged that companies with bold sustainability visions realize that more radical sustainable business model innovation is needed, e.g. offering second hand products or product as a service models. To successfully implement and embed new business models in the organization, organizational design needs to be adapted (Tece, 2018). Despite the bold sustainability visions and sustainable business model experiments, organizational design lags behind. This results in tension, as the existing organizational design is primarily fit for the current ‘unsustainable model’ and may not be suited to encourage sustainability throughout the organization. For example, in the move from a linear to a circular business model, companies may not have the logistics capabilities, physical space in stores, or incentives to implement circular business models at scale. While the Sustainable By Design tool highlights key challenges and ways to overcome them for organizations, deeper organizational work is needed to address business model and organizational design challenges in parallel.

Second, echoing earlier work (Slawinski et al., 2017), organizational (in)action manifests at the cultural, strategic and operational layers. For a sustainable business model innovation to be successful, the organizational design needs to be supportive at all levels. For example, top-level commitment needs to be matched with KPIs and incentive schemes at

the operational level, while teams must be given room to experiment (Bocken and Geradts, 2020). To illustrate, a circular economy vision without secondhand or remanufactured sales targets will hardly be successful. The Sustainable By Design tool applied collaboratively in cross-functional teams revealed that these challenges are real and urgent, and suggest there could be a role for ‘sustainable organizational designers’ to orchestrate the changes to make the business ready for sustainability challenges. Hence, while corporate sustainability and innovation teams are working on product and sustainable business model innovations, there may be a new role for ‘organizational redesigners’ for sustainability who start to realign the organization design elements to gradually shift to a more sustainable business model. While such a role is now often conducted by external consultants, this study showed the importance of organizational design for sustainability and a potential core role of internal organizational designers for sustainability.

Third, significant work in research and practice has gone into making organizations agile to respond to a VUCA world resulting from growth in digital innovation and global challenges (Schoemaker et al., 2018; Worley and Jules, 2020). Echoing Worley and Jules (2020), we see that sustainability challenges require a new form of agility to address quickly changing environmental pressures, climate change and resource pressures, geopolitical changes, and shifting customer demands and legislation (e.g. the EU Circular Economy Action Plan). As Worley and Jules (2020) argue: “there is no sustainability without agility” (p. 279). The Sustainable By Design tool developed in this study could serve as a starting point to judge organizational readiness for sustainability challenges, and in particular embedding sustainable business model innovations. However, future work can identify synergies between organizational design for sustainability and dominant research and practice in areas like organizational agility and lean organizing (e.g., Benkarim and Imbeau, 2021; de Freitas et al., 2017).

5.3. Limitations and future work

The study’s main limitation is the sample of two corporations. While these corporations are seen as leading in sustainability in their fields, a greater number of workshop sessions would have revealed more patterns of how organizational design might hinder or drive sustainable business model innovation.

Future work might further explore the connections between organizational design, dynamic capabilities, and SBMI. It could delve deeper into the organizational design needs and challenges at different levels in large organizations, including the cultural, strategic and operational levels (Slawinski et al., 2017; Bocken and Geradts, 2020). Further research could also explore the role of a ‘sustainable organizational designer’ as an internal change agent within an organization, tasked with connecting sustainable business model innovation with the organizational changes needed to succeed with new business model implementation and organizational transformation. Additionally, future research could explore various synergies between work on agile and lean organizational design on the one hand (e.g. Benkarim and Imbeau, 2021; de Freitas et al., 2017; Worley and Jules, 2020) and, on the other, organizational design to develop the dynamic capabilities needed for SBMI — that is, how companies might become ‘sustainable by design’.

Action research case studies and design science research can be fruitful approaches to both further developing the body of theory in this area while also making positive contributions to the transition toward more sustainable forms of production and consumption. In particular, researchers could further investigate cultural misalignment around sustainability within an organization, and how internal subcultures can realign to drive sustainability outcomes specifically related to SBMI. Another fruitful avenue for research involves the *process* needed to succeed with SBMI. We have suggested that not only a lack of good tools, but also a lack of a clear process can lead to a failure to bridge the design-implementation gap of SBMI. Starting by addressing organizational design considerations first — particularly the barriers and drivers which

exist at the cultural, strategic, and operational levels in an organization — can serve as the first step in a process to achieve better SBMI outcomes. Future research could investigate this process further.

6. Conclusion

Companies across different industries need to transform their largely unsustainable business models to sustainable business models. This requires a radical reorganization of businesses and how they operate. In this paper, we investigated how firms can address organizational design issues to develop the dynamic capabilities necessary for sustainable business model innovation. Leveraging a design science research methodology, we developed the ‘Sustainable By Design’ tool which was used in a workshop setting with two large multinational companies seen as sustainability leaders in their sectors: DSM and IKEA Retail (Ingka Group).

This study made two contributions to the literature. First, we developed the Sustainable by Design tool which practitioners can use to evaluate their current organizational design, identify barriers and drivers for SBMI, and subsequently develop strategic interventions to engage in organizational transformation. This tool is grounded in theory and empirical research, and has been validated in practitioner contexts. Additionally, we made a contribution to the body of theory around the connections between organizational design, dynamic capabilities, and sustainable business model innovation. Our research further confirms the importance of these connections. We observed that when leveraging a tool and workshop process to address organizational design for SBMI, visions and understandings of organizational barriers and drivers often differ across business areas. Further, organizations can suffer from a ‘culture gap’, where top management’s idealized views of company culture fail to trickle down to the operational level (Linnenluecke and Griffiths, 2010). A tool like Sustainable By Design can help teams identify and reconcile internal incongruencies between organizational subcultures, providing them the opportunity to realign and prioritize sustainability outcomes. Additionally, organizational design is complex, and addressing organizational barriers and drivers for SBMI may be best achieved with a structured and empirically robust approach (e.g. leveraging a tool such as Sustainable By Design) to keep discussions focused and actionable. Taking action to mitigate barriers and boost drivers must then be a priority of leaders with an organization. We further found that organizations may need to engage in deep organizational design work in order to succeed with implementing new, sustainable business models at scale. Such work may entail the need for new company roles focused on organizational design for sustainability. Mounting sustainability challenges presented by a VUCA world may demand new agile organizational forms better suited to adaptation and sustainable innovation.

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CRedit authorship contribution statement

Matthew Coffay: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition. **Nancy Bocken:** Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial

interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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References

- Baden-Fuller, C., Morgan, M.S., 2010. Business models as models. *Long. Range Plan.* 43 (2–3), 156–171. <https://doi.org/10.1016/j.lrp.2010.02.005>.
- Baldassarre, B., Konietzko, J., Brown, P., Calabretta, G., Bocken, N., Karpen, I.O., Hultink, E.J., 2020. Addressing the design-implementation gap of sustainable business models by prototyping: a tool for planning and executing small-scale pilots. *J. Clean. Prod.* 255, 120295 <https://doi.org/10.1016/j.jclepro.2020.120295>.
- Bashir, M., Alfalih, A., Pradhan, S., 2022. Sustainable business model innovation: scale development, validation and proof of performance. *J. Innov. Knowl.* 7 (4), 100243.
- Baumann, H., Boons, F., Bragd, A., 2002. Mapping the green product development field: engineering, policy and business perspectives. *J. Clean. Prod.* 10 (5), 409–425. [https://doi.org/10.1016/S0959-6526\(02\)00015-X](https://doi.org/10.1016/S0959-6526(02)00015-X).
- Benkarim, A., Imbeau, D., 2021. Organizational commitment and lean sustainability: literature review and directions for future research. *Sustainability* 13 (6), 3357.
- Bocken, N., Konietzko, J., 2022. Circular business model innovation in consumer-facing corporations. *Technol. Forecast. Soc. Change* 185, 122076.
- Bocken, N.M.P., Short, S.W., Rana, P., Evans, S., 2014. A literature and practice review to develop sustainable business model archetypes. *J. Clean. Prod.* 65, 42–56. <https://doi.org/10.1016/j.jclepro.2013.11.039>.
- Bocken, N.M.P., Strupeit, L., Whalen, K., Nußholz, J., 2019. A review and evaluation of circular business model innovation tools. *Sustainability* 11 (8), 2210. <https://doi.org/10.3390/su11082210>.
- Bocken, N.M.P., Gerads, T.H.J., 2020. Barriers and drivers to sustainable business model innovation: organization design and dynamic capabilities. *Long. Range Plan.* 53 (4), 101950 <https://doi.org/10.1016/j.lrp.2019.101950>.
- Boons, F., Lüdeke-Freund, F., 2013. Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *J. Clean. Prod.* 45, 9–19. <https://doi.org/10.1016/j.jclepro.2012.07.007>.
- Buliga, O., Scheiner, C.W., Voigt, K.I., 2016. Business model innovation and organizational resilience: towards an integrated conceptual framework. *J. Bus. Econ.* 86 (6), 647–670. <https://doi.org/10.1007/s11573-015-0796-y>.
- Burton, R.M., Eriksen, B., Håkonsson, D.D., Snow, C.C., 2006. *Organization Design: the Evolving State-Of-The-Art*. Springer Science & Business Media, New York.
- Chesbrough, H., 2007. Business model innovation: it’s not just about technology anymore. *Strat. Leadersh.* 35 (6), 12–17. <https://doi.org/10.1108/10878570710833714>.
- Chesbrough, H., 2010. Business model innovation: opportunities and barriers. *Long. Range Plan.* 43 (2–3), 354–363.
- Choi, J., Wang, H., 2009. Stakeholder relations and the persistence of corporate financial performance. *Strat. Manag. J.* 30 (8), 895–907. <https://doi.org/10.1002/smj.759>.
- Coffay, M., Coenen, L., Tveterås, R., 2022. Effectuated sustainability: responsible Innovation Labs for impact forecasting and assessment. *J. Clean. Prod.* 376, 134324 <https://doi.org/10.1016/j.jclepro.2022.134324>.
- de Freitas, J.G., Costa, H.G., Ferraz, F.T., 2017. Impacts of Lean Six Sigma over organizational sustainability: a survey study. *J. Clean. Prod.* 156, 262–275.
- Dodge, J., 1997. Reassessing culture and strategy: environmental improvement, structure, leadership and control. In: Welford, R. (Ed.), *Corporate Environmental Management 2. Culture and Organizations*, pp. 104–126. Earthscan.
- DSGC, 2018. Five DSGC Companies in Dow Jones Sustainability Index. <https://www.dsgc.nl/nl/nieuws/2018/5-dsgc-companies-in-dow-jones-sustainability-index>. (Accessed 12 December 2022).
- DSM, 2021. Royal DSM Integrated Annual Report 2021. <https://annualreport.dsm.com/ar2021/>. (Accessed 16 January 2023).
- DSM, 2022. Royal DSM N.V. <https://www.dsm.com/corporate/home.html>. (Accessed 16 January 2023).
- Fjeldstad, Ø.D., Snow, C.C., 2018. Business models and organization design. *Long. Range Plan.* 51 (1), 32–39. <https://doi.org/10.1016/j.lrp.2017.07.008>.
- Foss, N.J., Saebi, T., 2017. Fifteen years of research on business model innovation: how far have we come, and where should we go? *J. Manag.* 43 (1), 200–227. <https://doi.org/10.1177/0149206316675927>.
- Galbraith, J.R., 1974. Organization design: an information processing view. *Interfaces* 4 (3), 28–36.
- Geissdoerfer, M., Bocken, N.M., Hultink, E.J., 2016. Design thinking to enhance the sustainable business modelling process—A workshop based on a value mapping process. *J. Clean. Prod.* 135, 1218–1232. <https://doi.org/10.1016/j.jclepro.2016.07.020>.

- Geissdoerfer, M., Vladimirova, D., Evans, S., 2018. Sustainable business model innovation: a review. *J. Clean. Prod.* 198, 401–416. <https://doi.org/10.1016/j.jclepro.2018.06.240>.
- Geradts, T., Bocken, N.M.P., 2019. Driving sustainability-oriented innovation: a sustainable corporate entrepreneurship approach. *MIT Sloan Manag. Rev.* 60 (2), 78–83.
- GlobeScan & Sustainability, 2020. The 2020 Sustainability Leaders. <https://www.sustainability.com/contentassets/b298c9248bd14c03951e8801a6880436/gss-leaders-report-2020.pdf>. (Accessed 12 December 2022).
- Grant, R.M., 2010. *Contemporary Strategy Analysis*, seventh ed. John Wiley & Sons, Chichester.
- Greening, D.W., Turban, D.B., 2000. Corporate social performance as a competitive advantage in attracting a quality workforce. *Bus. Soc.* 39 (3), 254–280. <https://doi.org/10.1177/000765030003900302>.
- Harris, L.C., Crane, A., 2002. The greening of organizational culture: management views on the depths, degree and diffusion of change. *J. Organ. Change Manag.* 15 (3), 214–234. <https://doi.org/10.1108/09534810210429273>.
- Hart, S.L., Dowell, G., 2011. A natural-resource-based view of the firm: fifteen years after. *J. Manag.* 37 (5), 1464–1479.
- Henry, M., Bauwens, T., Hekkert, M., Kirchherr, J., 2020. A typology of circular start-ups: an Analysis of 128 circular business models. *J. Clean. Prod.* 245, 118528.
- Hina, M., Chauhan, C., Kaur, P., Kraus, S., Dhir, A., 2022. Drivers and barriers of circular economy business models: where we are now, and where we are heading. *J. Clean. Prod.* 333, 130049. <https://doi.org/10.1016/j.jclepro.2021.130049>.
- Hoffman, A.J., 1993. The importance of fit between individual values and organizational culture in the greening of industry. *Bus. Strat. Environ.* 20 (4), 1015–1052. <https://doi.org/10.1002/bse.3280020402>.
- Homburg, C., Stierl, M., Bornemann, T., 2013. Corporate social responsibility in business-to-business markets: how organizational customers account for supplier corporate social responsibility engagement. *J. Mark.* 77 (6), 54–72. <https://doi.org/10.1509/jm.12.0089>.
- Howard-Grenville, A., 2006. Inside the 'black box': how organizational culture and subcultures inform interpretations and actions on environmental issues. *Organ. Environ.* 19 (1), 46–73. <https://doi.org/10.1177/1086026605285739>.
- IKEA, 2022. Transforming into a Circular Business. <https://about.ikea.com/en/sustainability/a-world-without-waste>. (Accessed 12 December 2022).
- Ingka, 2021. Annual Summary FY21. <https://www.ingka.com/static/annual-summary-fy-21.pdf>. (Accessed 12 December 2022).
- Inigo, E.A., Albareda, L., Ritala, P., 2017. Business model innovation for sustainability: exploring evolutionary and radical approaches through dynamic capabilities. *Ind. Innovat.* 24 (5), 515–542. <https://doi.org/10.1080/13662716.2017.1310034>.
- Laasch, O., 2019. An actor-network perspective on business models: how 'being responsible' led to incremental but pervasive change. *Long. Range Plan.* 52 (3), 406–426. <https://doi.org/10.1016/j.lrp.2018.04.002>.
- Leih, S., Linden, G., Teece, D.J., 2015. Business model innovation and organizational design: a dynamic capabilities perspective. In: Foss, N.J., Saebi, T. (Eds.), *Business Model Innovation: The Organizational Dimension*. Oxford University Press, Oxford, pp. 24–42.
- Linnenluecke, M.K., Griffiths, A., 2010. Corporate sustainability and organizational culture. *J. World Bus.* 45 (4), 357–366. <https://doi.org/10.1016/j.jwb.2009.08.006>.
- Linnenluecke, M.K., Russel, S.V., Griffiths, A., 2007. Subcultures and sustainability practices: the impact on understanding corporate sustainability. *Bus. Strat. Environ.* 18 (7), 432–452. <https://doi.org/10.1002/bse.609>.
- Massa, L., Tucci, C.L., Afuah, A., 2017. A critical assessment of business model research. *Acad. Manag. Ann.* 11 (1), 73–104. <https://doi.org/10.5465/annals.2014.0072>.
- McWilliams, A., Siegel, D.S., 2011. Creating and capturing value: strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage. *J. Manag.* 37 (5), 1480–1495. <https://doi.org/10.1177/0149206310385696>.
- Meyer, A.D., Tsui, A.S., Hinings, C.R., 1993. Configurational approaches to organizational analysis. *Acad. Manag. J.* 36 (6), 1175–1195. <https://doi.org/10.2307/256809>.
- Miles, R.E., Creed, D., 1995. Organizational forms and managerial philosophies. A descriptive and analytical review. In: Staw, B., Cummings, L. (Eds.), *Research in Organizational Behavior*. JAI Press, Greenwich, CT, pp. 333–372.
- Miles, R.E., Snow, C.C., 1978. *Organizational Strategy, Structure, and Processes*. McGraw-Hill, New York.
- Nidumolu, R., Prahalad, C.K., Rangeswami, M.R., 2009. Why sustainability is now the key driver of innovation. *Harv. Bus. Rev.* 87, 56–64.
- Osterwalder, A., Pigneur, Y., 2005. Clarifying business models: origins, present, and future of the concept. *Commun. Assoc. Inf. Syst.* 16, 1–40. <https://doi.org/10.17705/1CAIS.01601>.
- Osterwalder, A., Pigneur, Y., 2010. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. Wiley, Hoboken.
- Peffer, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S., 2007. A design science research methodology for information systems research. *J. Manag. Inf. Syst.* 24 (3), 45–77. <https://doi.org/10.2753/MIS0742-1222240302>.
- Penrose, E., 1959. *The Theory of the Growth of the Firm*. Basil Blackwell, London.
- Pieroni, M.P., McAlloone, T.C., Pigosso, D.C., 2019. Business model innovation for circular economy and sustainability: a review of approaches. *J. Clean. Prod.* 215, 198–216. <https://doi.org/10.1016/j.jclepro.2019.01.036>.
- Porter, M., Kramer, M., 2011. Creating shared value. *Harv. Bus. Rev.* 89, 62–77.
- Rashid, A., Asif, F.M.A., Krajnik, P., Nicolescu, C.M., 2013. Resource conservative manufacturing: an essential change in business and technology paradigm for sustainable manufacturing. *J. Clean. Prod.* 57, 166–177. <https://doi.org/10.1016/j.jclepro.2013.06.012>.
- Schaltegger, S., Lüdeke-Freund, F., Hansen, E.G., 2012. Business cases for sustainability: the role of business model innovation for corporate sustainability. *Int. J. Innovat. Sustain. Dev.* 6 (2), 95–119. <https://doi.org/10.1504/IJISD.2012.046944>.
- Schoemaker, P.J., Heaton, S., Teece, D., 2018. Innovation, dynamic capabilities, and leadership. *Calif. Manag. Rev.* 61 (1), 15–42. <https://doi.org/10.1177/0008125618790246>.
- Slawinski, N., Pinkse, J., Busch, T., Banerjee, S.B., 2017. The role of short-termism and uncertainty avoidance in organizational inaction on climate change: a multi-level framework. *Bus. Soc.* 56 (2), 253–282. <https://doi.org/10.1177/0007650315576136>.
- Sommer, A., 2012. *Managing Green Business Model Transformations*. Springer-Verlag, Berlin.
- Snihur, Y., Bocken, N., 2022. A call for action: the impact of business model innovation on business ecosystems, society and planet. *Long. Range Plan.* 55 (6), 102182. <https://doi.org/10.1016/j.lrp.2022.102182>.
- Snihur, Y., Zott, C., 2020. The genesis and metamorphosis of novelty imprints: how business model innovation emerges in young ventures. *Acad. Manag. J.* 63 (2), 1–30. <https://doi.org/10.5465/amj.2017.0706>.
- Stubbs, W., Cocklin, C., 2008. Conceptualizing a "sustainability business model". *Organ. Environ.* 21 (2), 103–127. <https://doi.org/10.1177/1086026608318042>.
- Teece, D.J., Pisano, G., Shuen, A., 1997. Dynamic capabilities and strategic management. *Strat. Manag. J.* 18 (7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z).
- Teece, D.J., 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strat. Manag. J.* 28 (13), 1319–1350. <https://doi.org/10.1002/smj.640>.
- Teece, D.J., 2018. Business models and dynamic capabilities. *Long. Range Plan.* 51 (1), 40–49. <https://doi.org/10.1016/j.lrp.2017.06.007>.
- Tukker, A., Tischner, U., 2006. *New Business for Old Europe*. Greenleaf, Sheffield.
- Tushman, M., Smith, W.K., Woody, R.C., Westerman, G., O'Reilly, C., 2010. Organizational designs and innovation streams. *Ind. Corp. Change* 19 (5), 1331–1366. <https://doi.org/10.1093/icc/dtq040>.
- Welford, R., 1995. *Environmental Strategy and Sustainable Development*. Routledge.
- Worley, C.G., Jules, C., 2020. COVID-19's uncomfortable revelations about agile and sustainable organizations in a VUCA world. *J. Appl. Behav. Sci.* 56 (3), 279–283. <https://doi.org/10.1177/0021886320936263>.
- Zott, C., Amit, R., 2010. Business model design: an activity system perspective. *Long. Range Plan.* 43 (2), 216–226. <https://doi.org/10.1016/j.lrp.2009.07.004>.