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Keywords

Circular business model innovation, tactical experimentation, circularity assessment, tool development, design science.

Abstract

The sustainable and circular business model innovation (SBMI and CBMI) literature has been growing rapidly in the past few years. Many scholars pointed at the design-implementation gap (Geissdoerfer, Savaget & Evans, 2017; Baldassarre *et al.*, 2020; Geissdoerfer, Vladimirova & Evans, 2018; Brown, Bocken & Balkenende, 2020) to observe that, while sustainable and circular business models (SBMs and CBMs) have been researched extensively, many business organizations still appear to be unable to design and implement these models in practice. To bridge this gap, an experimentation approach is increasingly advocated (Bocken, Boons & Baldassarre, 2019; Weissbrod & Bocken, 2017; Pieroni, McAloone & Pigosso, 2019).

Experimentation involves conducting experiments, prototyping, and piloting to develop and test new business models (Geissdoerfer *et al.*, 2022). It serves as a means to gain internal and external traction for companies' CBMI (Bocken, Schuit & Kraaijenhagen, 2018). Companies can also use it as a quick and efficient method to validate their assumptions, learn and adapt, and decrease uncertainty and risk in selecting and scaling up their CBM ideas (Santa-Maria, Vermeulen & Baumgartner, 2022; Antikainen & Bocken, 2019; Weissbrod & Bocken, 2017).

Several studies in the last few years addressed the iterative nature of CBM experimentation (Weissbrod & Bocken, 2017; Antikainen & Bocken, 2019; Brown *et al.*, 2021b; Bocken & Konietzko, 2022a) and developed tools to support it on a strategic level (Brown *et al.*, 2021a; Baldassarre *et al.*, 2020; Konietzko, Bocken & Hultink, 2020). However, how the operational implementation of experimentation processes looks, especially in an incumbent firm, is still insufficiently understood (Bocken, Weissbrod & Antikainen, 2021; Evans *et al.*, 2017). We refer to this as the *tactical experimentation* gap. To address this gap, we build on Bocken & Konietzko (2022a; 2022b), who provide a practical guide with management actions to build experimentation capability for CBMI on an operational and granular level. We focus on applying these actions at a tactical level (Reim, Sjödin & Parida, 2021) within the operations of a large corporation. This tactical tool design (de Carvalho Santos, Saraiva & Ruschival, 2021) complements Baldassarre and colleagues' strategic design tool (2020).

Additionally, many SBMI/CBMI scholars have also raised the need to integrate impact assessments in the decision-making processes of CBM experimentation (Breuer *et al.*, 2018; Fichter *et al.*, 2023; Lüdeke-Freund *et al.*, 2017; Bocken, Schuit & Kraaijenhagen, 2018; Pieroni, McAloone & Pigosso, 2019). The strategic tools

developed in recent years lack an in-built impact assessment to assess the potential sustainability and circularity benefits of the CBM experiments.

This paper thus addresses the following question: *How to design and integrate a tactical decision-making artifact that facilitates the circular business model experimentation process with the customer in the B2B context of an incumbent company?*

We adopt a design science approach to answer this research question in a study conducted at Vanderlande, a large corporation providing automated logistics solutions to international B2B clients such as airports, parcel, and consumer goods distribution companies. Design science is a methodology for solving problems and creating new knowledge through the design, development, and evaluation of artifacts (e.g. products, systems, services) (Keskin & Romme, 2020; Romme & Reymen, 2018; Romme & Holmström, 2023). We adopted a year-long iterative tool development and validation approach to design and test the ‘Circular Economy Experimentation Decision Support’ (CEEDS) tool. We drew on theoretical inputs in the form of design principles for CBMI (Bhatnagar *et al.*, 2022; Konietzko *et al.*, 2020; Breuer *et al.*, 2018) and empirical inputs for formulating design requirements, based on interviews with key account managers, sustainability managers, lifecycle planning manager and operation/service managers at Vanderlande. Furthermore, we conducted user validation sessions with experts from academia, and user validation sessions with Vanderlande service managers Vanderlande key account managers. Lastly, several tool development workshops with two sustainability managers, scheduled over a period of eight months, served to iteratively test and adapt the tool. The tool development and validation research was done in the context of a four-year longitudinal and ethnographic study of Vanderlande’s journey in CBMI. Some scholars have pointed at the lack of such studies in the CBMI literature (Hofmann & zu Knyphausen-Aufseß, 2022; Pieroni, McAloone & Pigosso, 2019).

We share our preliminary results here. Vanderlande is a large incumbent firm which focuses on customer-centricity and follows a decentralized structure in its customer management. These characteristics have two consequences. First, this means that key account managers handle each customer account in a highly customized manner, lacking consistent processes and often, reinventing the wheel. Second, the automated logistic systems sold and installed at each customer’s site is unique. A system is composed of sub-systems that are standardized modules. Furthermore, Vanderlande is only beginning to work on CBMs. They implement two circularity strategies of repair and maintenance, and upgrade, both focused on extending existing use-cycle of the installed systems (Hildenbrand *et al.*, 2021).

Despite Vanderlande’s strong strategic commitment to circular economy, it was not clear how it could operationalize this commitment due to a lack of experience and capabilities with CBMs. Therefore, the emphasis for CBM experimentation was to facilitate piloting repair, upgrade, reuse, refurbish, remanufacture, and repurpose strategies, involving six out of nine circularity strategies that emphasize the circulation of products and parts, rather than strategies focusing on circulating materials (Kirchherr, Reike & Hekkert, 2017; Hildenbrand *et al.*, 2021, 2020). In the initial steps of the tool development, the scope, purpose, and user of the tool were unclear. Finally, the tool was designed for service/operations managers collaborating with the customer in conducting pilots on end-of-life modules from installed systems with relevant circularity strategies.

One of the key user requirements for the tool was to make it easy-to-use and self-explanatory. Moreover, we developed the tool assuming the user has no knowledge about circular economy. The tool has three main in-built functions. First, a flowchart with yes/no questions helping the user to identify which circularity strategy is appropriate for a selected module on customer site. Second, the tool helps operationalize each circularity strategy into the activities necessary to implement in the pilot project. Third, the tool helps user to brainstorm and sketch out five pilot ideas and compare these ideas in a quick-scan effort-impact matrix. The effort-impact matrix was already used in Vanderlande for prospective decision-making for a few other processes. We connected the design thinking principles of desirability, viability and circularity to the impact assessment, and feasibility to the Effort assessment (Brown, 2008; Baldassarre *et al.*, 2020; Hildenbrand *et al.*, 2020; Bocken & Konietzko, 2022b). Furthermore, we integrate a prospective circularity impact assessment method by using the Material Efficiency Metric (Brändström & Eriksson, 2022). This method is ideally suited for the early stages of the innovation cycle when the data is unavailable. A balance was needed between simplicity versus complexity as it influences user uptake of the tool and the accuracy of the assessment.

The paper contributes to the literature in two ways. Firstly, it presents one solution for integrating impact assessments in the decision-making processes of CBM experimentation, addressing the lack of impact assessments in business model research. Secondly, the paper builds upon the micro-foundations of dynamic capabilities (Santa-Maria, Vermeulen & Baumgartner, 2022) and operational management actions needed for experimentation capability (Bocken & Konietzko, 2022b) to make the experimentation discourse more tactical.

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