Sustainable business model innovation: A review

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**Abstract**

The capability to rapidly and successfully move into new business models is an important source of sustainable competitive advantage and a key leverage to improve the sustainability performance of organisations. However, research suggests that many business model innovations fail. Despite the importance of the topic, the reasons for failure are relatively unexplored, and there is no comprehensive review of the sustainable business model innovation literature. This research provides a review of the literature, using a systematic database search and cross-reference snowballing. Its key contributions are: (1) a review of the key underlying concepts, discussing their similarities and differences and offer new definitions where there is an identified need; (2) we identify a research gap; and (3) we deduct research questions to address the gap.

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1. Introduction

Sustainability issues, like growing inequality (Piketty and Saez, 2014) and the deterioration of our natural livelihood (Rockström, Steffen, and Noone, 2009) make the transformation to a more sustainable economic system increasingly desirable. To realise this
transition, private business is a pivotal stakeholder commanding the most resources and capabilities (Porter and Kramer, 2011). However, technological advances towards sustainability are increasingly incremental, and many companies find it difficult to meet their sustainability targets. Therefore, innovation on the business model level is required to align incentives and revenue mechanisms to leverage sustainable solutions (Rashid et al., 2013).

Business model innovations are suspected to yield higher returns than product or process innovations (Chesbrough, 2007; Lindgaard et al., 2009), and sustainable business models might have the additional benefit of higher risk mitigation and resilience (Choi and Wang, 2009) and yield additional diversification and value co-creation opportunities (Nidumolu et al., 2009; Porter and Kramer, 2011; Tikker and Tischner, 2006). To realise these advantages organisations become increasingly interested in implementing sustainable solutions (Evans et al., 2009).

However, many business model innovations fail (Patel, 2015). This has serious economic implications for companies (Chesbrough, 2007) and leads to considerable delays in the adoption of sustainable solutions (Geissdoerfer et al., 2017a, b). Despite the importance of these issues, the reasons for failure remain relatively unexplored.

To explore this issue, we conducted a comprehensive review of the sustainable business model innovation literature. We identified various definitions of the key underlying concepts, which we interpreted and synthesised into working definitions. We identified essential research gaps and formulated research questions based on our analysis and thinking. We propose that these and similar questions are addressed by the development of research agendas based on the gap and the proposed working definitions.

The paper is structured as follows. First, the employed method for the literature review is described in section 2, before the key underlying concepts for this research are introduced in section 3. This is followed by a description of the research gap in section 4, based on which, research questions are formulated in section 5. The paper concludes with a short discussion of the findings and some final remarks in section 6.

2. Method

The research was based on a structured literature review, following the recommendations of Creswell (2014), Easterby-Smith et al. (2015), and Tranfield et al. (2003). A systematic database search was conducted, followed by cross-reference snowballing, as illustrated in Fig. 1.

In a first step, a systematic literature search was conducted. As shown in Table 1, the search strings, "business model" in "Title" respectively 'Article title' and "sustainable business model", "business model" for sustainability", "business model innovation" AND sustainab", "business modelling" AND sustainab", and "business model design" AND sustainab in "Topic" respectively 'Article title, Abstract, Keywords' were used to search for reviews or articles in English on the Thomson Reuters Web-of-Science and Elsevier Scopus databases. Subsequently, the abstracts of the identified publications where scanned to define an initial sample of relevant literature.

In a second step, relevant cross-references were identified in this initial sample by first scanning the publications' title in the reference section and their context and cited content in the text. The abstracts of the identified additional publications were scanned to determine whether the paper was relevant. Relevant references were subsequently added to the sample and analogously scanned for relevant cross-references. This process was repeated until no further relevant cross-references could be identified.

In a third step, the final sample was integrated, synthesised, and compiled into the literature review presented in the following. The process was updated on the day of submission.

3. Underlying concepts

This section presents definitions of the concepts of business models, sustainable business models, business model innovation, and sustainable business model innovation, discusses their similarities and differences and synthesises new definitions where there is an identified need. We also introduce the notion of the design-implementation gap of sustainable business model innovation identified during the review. The first four parts of this section are accompanied with a selection of different definitions, while an overview of all considered definitions can be found in Appendix A to D respectively.

3.1. Business models

The business model concept gained popularity during the dotcom boom of the 1990's with a vibrant and diverse research activity more recently (Zott et al., 2011). This activity led to an extensive special issue in the Long Range Planning journal in 2010 and a considerable range of literature reviews, like Beger and Reinhold (2011), George and Bock (2011), Massa et al. (2017), Schallmo (2013), and Zott et al. (2011), which were integrated, updated, and synthesised into this literature review, whose result is illustrated in Table 2.

During the e-commerce boom of the 1990's, new innovative revenue mechanisms were introduced. In this context, the business model concept was originally used to communicate complex business ideas to potential investors within a short time frame (Zott et al., 2011). From there, the purpose of the concept developed to be now seen as both a tool for the systemic analysis, planning, and communication of the configuration and implementation of one or more organisational units and relevant parts of their environment in face of organisational complexity (Doleski, 2015; Knyphausen-Aufsess and Meinhards, 2002), as well as a strategic asset for competitive advantage and firm performance (Afuah, 2004; Casadesus-Masanell and Ricart, 2010; Chesbrough, 2007; Hamel, 2000; Magretta, 2002).

For organisational decision-making and academic research in the context of emerging industrial phenomena, like Industry 4.0 (Bundesregierung, 2014) or Re-Distributed Manufacturing (Srai et al., 2016), the business model concept allows to extrapolate from potential customer and value chain benefits to the required configuration and implementation of the other business model elements (Osterwalder et al., 2014; Yang et al., 2016). The resulting potential business models provide the necessary information about the implementation of phenomena's conceptual and technological implications that is required as a basis for further research in these.

As these definitions show, there are three main groups of understanding of the term business model, as illustrated in Fig. 2. The concept is either described as a model of an organisational system (e.g. Baden-Fuller and Morgan, 2010; Knyphausen-Aufsess and Meinhardt, 2002), as an abstract characteristic of an organisational unit, (e.g. Osterwalder and Pigneur, 2010; Teece, 2010), or with a reduced scope that equates the term with individual elements of other authors' definitions or reduce it to achieve certain means (e.g. Doganova and Eyquem-Renault, 2009). There is a central role of value in most definitions, roughly following the categorisation of Richardson (2008), value proposition, value creation and delivery, and value capture elements and the interactions between these elements within an organisational unit.

However, since there can be several representations of the same organisational unit, perceptions of the term must be considered
that assume an underlying abstract concept that is characteristic of the entity — analogue to capabilities, resources, or strategies, which can be documented in different ways without the document becoming the underlying concept. Not fully considered can be definitions with reduced scope that assume identity of the business model with one of its elements, for example, the revenue model.

3.2. Sustainable business models

The academic and practitioner interest in sustainable business models has grown rapidly, culminating in special issues in Journal of Cleaner Production (Vol. 45, April 2013), and Organisation and the Environment (Vol. 29, Is. 1, March 2016), which provide an excellent overview over the topic. There is also a growing range of review articles by Bocken et al. (2014), Boons and Lüdeke-Freund (2013), Evans et al. (2017), and Schaltegger et al. (2016). Following on from this work, an updated and complemented literature review was conducted. An overview of the considered definitions is provided in Table 3.

When the concept was first conceived, its main purpose was to put companies into the service of the transformation to a more sustainable economic system and to provide leverage for integrating sustainability considerations into organisations and helping companies to achieve their sustainability ambitions (Rashid et al., 2013; Stubbs and Cocklin, 2008; Wells, 2013). Today, the notion of sustainable business models is increasingly seen as a source of competitive advantage (Nidumolu et al., 2009; Porter and Kramer, 2011). Thus, it could be argued that the sustainable business model concept model might eventually supersede the business model concept much like sustainable competitive advantage has superseded competitive advantage (Grant, 2010).

The definitions in the literature have in common that they see sustainable business models as a modification of the conventional business model concept, with certain characteristics and goals added to it; and, they either 1) incorporate concepts, principles, or goals that aim at sustainability; or 2) integrate sustainability into their value proposition, value creation and delivery activities, and/or value capture mechanisms.

The literature describes different subcategories, archetypes, or generic strategies for sustainable business models, like product-service systems, base of the pyramid, or circular business models (Bocken et al., 2014). These types have additional characteristics. For example, circular business models are not only creating sustainable value, employing pro-active multi-stakeholder management, and have a long-term perspective, but also close, slow, intensify, dematerialise, and narrow resource loops (Bocken et al., 2016; Geissdoerfer et al., 2017b), as illustrated in Fig. 3.

However, because of potential trade-offs between these additional characteristics and the characteristics that qualify a sustainable business model, there may be cases that represent only the subcategory without being a sustainable business model as illustrated in Fig. 4. This could, for example, be caused by efficiency gains of a new technology that exceed the environmental benefits of closing the loop for an old technology, or negative consequences of going circular for the working conditions of employees (Geissdoerfer et al., 2017b).

Sustainable business model working definition

Based on this analysis, we define sustainable business models as business models that incorporate pro-active multi-stakeholder...
The business model is “an architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues” (p. 4).

The business model is “the heuristic logic that connects technical potential with the realization of economic value” (p. 529). “The business model provides a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs” (p. 532).

A business model is a simplified representation of a profit aimed venture, consisting of its essential elements and their interconnections.

"[Business models] are, at heart, stories—stories that explain how enterprises work [and answer the following questions:] Who is the customer? And what does the customer value? It also answers the fundamental question every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to the customers at an appropriate cost?" (p. 87)

A business model is “a conceptual framework that helps to link the firm’s strategy, or theory of how to compete, to its activities, or execution of the strategy. The business model framework can help to think strategically about the details of the way the firm does business.” (p. 135) “The three major components of the framework — the value proposition, the value creation and delivery system, and value capture — reflect the logic of strategic thinking about value. The essence of strategy is to create superior value for customers and capture a greater amount of that value than competitors.” (p. 138)

The business model is a narrative and calculative device that allows entrepreneurs to explore a market and plays a performative role by contributing to the construction of the techno-economic network of an innovation.” (p. 1559)

"Business models have a multivalent character as models. They can be found as exemplar role models that might be copied or presented as nutshell descriptions of a business organisation: simplified, short-hand descriptions equivalent to scale models. We can think of them not only as capturing the characteristics of observed kinds in the world (within a taxonomy), but also as abstract ideal types (in a typology)” (p. 167)

"A business model is […] a reflection of the firm’s realized strategy” (p. 195).

"A business model describes the rationale of how an organisation creates, delivers, and captures value.” (p. 14)

"A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value” (p. 179).

"We conceptualize a firm’s business model as a system of interdependent activities that transcends the focal firm and spans its boundaries. The activity system enables the firm, in concert with its partners, to create value and also to appropriate a share of that value [and is defined by] design elements - content, structure and governance - that describe the architecture of an activity system; and design themes - novelty, lock-in, complementarities and efficiency – that describe the sources of the activity system’s value creation.” (p. 216).

"We describe business models as simplified representations of the elements e and interactions between these elements e that an organisational unit chooses in order to create, deliver, capture, and exchange value.” (p. 1218)

"A business model is a simplified and aggregated representation of the relevant activities of a company. It describes how marketable information, products and/or services are generated by means of a company’s value-added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the superordinate goal of generating, or rather, securing the competitive advantage. To fulfill this latter purpose, a current business model should always be critically regarded from a dynamic perspective, thus within the consciousness that there may be the need for business model evolution or business model innovation, due to internal or external changes over time.” (p.41)

"a business model is a description of an organisation and how that organisation functions in achieving its goals (e.g., profitability, growth, social impact, ...)” (p. 73)

Fig. 2. Three types of business model definitions.

management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective.

The most prevalent framework underlying the different conceptualisation is the value proposition, value creation and delivery, and value capture structure of Richardson (2008), which we included in our working definition. In different modifications, it is used by most authors in our sample. While some of these modifications have accounted for the multi-stakeholder nature of sustainable business models in two of the elements, the focus on customer and monetary value of the value capture element endured. Since sustainable business model innovation focuses on stakeholder benefit and shareholder value rather than solely on customer benefit or shareholder value the existing definition seems inadequate. We therefore propose the following definition: value capture describes how part of the value generated for a stakeholder can be transformed into value useful for the company. The value is useful for the company if it helps the company to achieve its purpose. Examples of useful value thus could be profit, strategic fit, and employee motivation.

3.3. Business model innovation

Business model innovation is a stream in the work on business models, and some authors of the latter assume it to be an implicit part of their conceptualisation. Schallmo (2013) and Foss and Saebi (2017) provided an extensive literature review on the topic, which was updated and complemented for this research. A resulting overview of different business model innovation definitions is provided in Table 4.

The concept is investigated to understand and facilitate the analysis and planning of transformations from one business model to another (Schaalmo, 2013). The capability for frequent and successful business model innovation can increase an organisation’s resilience to changes in its environment and constitute a sustainable competitive advantage (Mitchell and Coles, 2003).
These definitions refer to business model innovation as a change in the configuration of either the entire business model or individual elements of it, either as a reaction to opportunities or challenges in the organisation’s environment or as a vehicle for diversification and innovation. Consequently, the concept’s main fields of application have been in corporate diversification (Ansoff, 1957) and business venturing and start-up contexts. Based on the described business model innovation examples, four generic configurations of business model innovation can be distinguished. These comprise start-ups, business model transformation, business model diversification, and business model acquisition (Fig. 5).

The differentiation between other forms of innovation and diversification is not clearly defined by the reviewed publications. For example, Lindgardt et al., 2009 define that at least two business model elements have to change for an innovation to qualify as a business model innovation. However, the thresholds for changes in a company’s activities to qualify as a change in a business model element remain unclear, for instance, when a product innovation constitutes a new value proposition. Thus, it remains conceptually underexplored under what circumstances, for example, product innovation, service innovation, or changes in the supply chain qualify as a business mode innovation.1

Business model innovation working definition

Based on this analysis, we define business model innovation as the conceptualisation and implementation of new business models.

1 We have discussed this in more detail in Geissdoerfer et al., (2018b).
This can comprise the development of entirely new business models, the diversification into additional business models, the acquisition of new business models, or the transformation from one business model to another. The transformation can affect the entire business model or individual or a combination of its value proposition, value creation and deliver, and value capture elements, the interrelations between the elements, and the value network.

3.4. Sustainable business model innovation

As a subset in the sustainable business model field, research in sustainable business model innovation has started relatively recently, and there seems to be no comprehensive review of the literature yet. Therefore, this review was conducted, and an overview of different definitions is presented in Table 5.

These definitions combine a business model innovation element with sustainability considerations. Similar to the understanding of conventional business model innovation scholars, business model innovation is seen as a process of business model exploration, adjustment, improvement, redesign, revision, creation, development, adoption, and transformation. The process qualifies as a sustainable business model innovation or a business model innovation for sustainability, when it aims at: 1) sustainable development or positive, respectively reduced, negative impacts for the environment, society, and the long-term prosperity of the organisation and its stakeholders or 2) adopting solutions or characteristics that foster sustainability in its value proposition, creation, and capture elements or its value-network.

Analogous to the discussion of conventional business model innovation in section 3.3, there are four types of sustainable business model innovation: (1) sustainable start-ups: a new organisation with a sustainable business model is created; (2) sustainable business model transformation: the current business model is changed, resulting in a sustainable business model; (3) sustainable business model diversification: without major changes in the existing business models of the organisation, and additional, sustainable business model is identified, acquired, and integrated into the organisation.

Based on the discussion in section 3.2, these four innovations are expected to aim at implementing certain sustainable business model types and strategies. The types include circular business model innovation (Bocken et al., 2016), social enterprises (Defourny and Nyssens, 2010), bottom-of the pyramid businesses (Prahalad, 2009), and product-service systems (Tukker, 2004). The strategies were reviewed by Bocken et al. (2014) and recently updated by Ritala et al. (2018). They have synthesised nine generic sustainable business model strategies, they call “archetypes”. The strategies comprise: (1) maximise material and energy efficiency; (2) closing resource loops; (3) substitute with renewables and natural processes; (4) deliver functionality rather than ownership; (5) adopt a stewardship role; (6) encourage sufficiency; (7) repurpose for society or the environment; (8) inclusive value creation; and (9) develop sustainable scale up solutions.

Sustainable business model innovation therefore aims at (1)

Table 4

| Source | Definition |
|--------|------------|
| Mitchell and Coles, 2004 | “By business model innovation, we mean business model replacements that provide product or service offerings to customers and end users that were not previously available. We also refer to the process of developing these novel replacements as business model innovation.” (p. 17) |
| Labbé and Mazet, 2005 | A business model innovation changes one or more dimensions of a business model [which are perceived by the authors as product-market combination, the architecture of the value creation, and the revenue model] so that a novel configuration of the elements is created and implemented. (pp. 897 f.) |
| Osterwalder and Pigneur, 2005 | “Specifying a set of business model elements and building blocks, as well as their relationships to one another […] a business model designer […] can experiment with these blocks and create completely new business models, limited only by imagination and the pieces supplied.” (p. 24) |
| Chesbrough, 2007 | Business model innovation is to “advance [the] business model […] from very basic (and not very valuable) models to far more advanced (and more valuable) models.” (p.15) |
| Lindgardt et al., 2009 | “Innovation becomes BMI [business model innovation] when two or more elements of a business model are reinvented to deliver value in a new way. […] BMI can provide companies a way to break out of intense competition, under which product or process innovations are easily imitated.” (p. 2) |
| Romero and Molina, 2009 | “Business models as definers of the value creation priorities in an organisation should be continuously reviewed in response to actual and possible changes in the perceived market conditions and evolve the enterprise strategy as the business environment and customers’ needs change.” (p. 3) |
| Chesbrough, 2010 | Business model innovation “[1] Articulates the value proposition (i.e., the value created for users by an offering based on technology); [2] Identifies a market segment and specify the revenue generation mechanism (i.e., users to whom technology is useful and for what purpose); [3] Defines the structure of the value chain required to create and distribute the offering and complementary assets needed to support position in the chain; [4] Details the revenue mechanism(s) by which the firm will be paid for the offering; [5] Estimates the cost structure and profit potential (given value proposition and value chain structure); [7] Describes the position of the firm within the value network linking suppliers and customers (incl. identifying potential complementors and competitors); and [8] Formulates the competitive strategy by which the innovating firm will gain and hold advantage over rivals.” (p. 355, citing Chesbrough and Rosenbloom, 2002) |
| Johnson, 2010 | “Seeing the white space calls for the ability to innovate something more core than the core, to innovate the very theory of the business itself. I call that process business model innovation.” (p. 114) |
| Geissdoerfer et al., 2016 | “Business model innovation describes either a process of transformation from one business model to another within incumbent companies or after mergers and acquisitions, or the creation of entirely new business models in start-ups.” (p. 1220) |
characteristics of a sustainable business model — sustainable value creation, proactive multi-stakeholder management, and a long-term perspective. (2) four types of innovation — sustainable start-ups, sustainable business model transformation, sustainable business model diversification, sustainable business model acquisition. (3) creating a sustainable business model type — circular business models, social enterprises, bottom of the pyramid, and product-service systems. (4) the implementation of one or more sustainable business model strategies. An overview of sustainable business model innovation types, business model types and strategies is provided in Table 6.

*Sustainable business model innovation working definition*

Based on this, we define sustainable business model innovation as the conceptualisation and implementation of sustainable business models. This can comprise the development of entirely new business models, the diversification into additional business models, the acquisition of new business models, or the transformation from one business model to another.

3.5. *The design-implementation gap in sustainable business model innovation*

There seems to be a three-fold problem in sustainable business model innovation: 1) many business model innovation meetings and workshops are conducted, but the ideas are not followed up, 2) even promising sustainable business model concepts are not implemented, and 3) most implemented business models, especially in the start-up context, fail in the market. This is caused by different challenges, some of which were identified in a literature review by Evans et al. (2017). These challenges are presented in Table 7.

These challenges are confirmed by a range of authors in the business model innovation, strategic management, and change management literature. Chesbrough (2010) remarks that business model innovation often does not take place because the organisation cannot identify the appropriate business model for new technologies or solutions. Other authors, like Christensen (1997) and Christensen and Raynor (2003), see the problem further down the line in conflicts with the current business model and organisational logic that prevent implementation. These scholars see the difficulties that disruptive technology pose for firms not in the identification of the appropriate business model to exploit it, but in the inertia to change the current business model. This inertia is caused by often higher gross margins of the incumbent technology in the crucial early phases, and the consequent misallocation of resources. Similarly, according to Amit and Zott (2001), novelty, lock-in complementarities and efficiency are inherent aspects of business model innovation that require changes in the current configuration of assets. This causes conflicts with the managers of these assets who will consequently resist the innovation process.

This is reinforced by Prahalad and Bettis (1986) and Bettis and Prahalad (1995)'s concept of dominant logic that describes how organisations assess, select, and interpret information in often

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**Table 5**

| Source                         | Definition                                                                                                                                                                                                 |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Boons and Ludeke-Freund, 2013 | Sustainable business model innovation is understood as the adoption of the business model to overcome barriers within the company and its environment to market sustainable process, product, or service innovations. (p. 13) |
| Loorbach and Wijsman, 2013    | Sustainable business model innovation describes businesses “searching for ways to deal with unpredictable […] wider societal changes and sustainability issues.” (p. 20)                                                |
| Bocken et al., 2014           | “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 organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions.” (p. 44) |
| Geissdoerfer et al., 2016     | “Sustainable business innovation processes specifically aim at incorporating sustainable value and a pro-active management of a broad range of stakeholders into the business model.” (p. 1220)            |
| Roome and Louche, 2015        | Sustainable business model innovation describes the “processes through which […] new business models are developed by businesses and their managers […] how companies revise and transform their business model in order to contribute to sustainable development.” (p. 12) |
| Schaltegger et al., 2016      | Sustainable business model innovation describes the creation of “modified and completely new business models [that] can help develop integrative and competitive solutions by either radically reducing negative and/or creating positive external effects for the natural environment and society” (p. 3) |
| Yang et al., 2016             | “Sustainable business model innovation can be more easily achieved by identifying the value uncaptured in current business models, and then turning this new understanding of the current business into value opportunities that can lead to new business models with higher sustainable value.” (p. 2) |
Table 6
Overview of sustainable business model innovation types, business model types and strategies.

| Sustainable business model innovation types | Examples | Description |
|--------------------------------------------|----------|-------------|
| 1) Sustainable start-ups:                  | A new organisation with a sustainable business model is created |
| 2) Sustainable business model transformation | The current business model is changed, resulting in a sustainable business model |
| 3) Sustainable business model diversification | Without major changes in the existing business models of the organisation, and additional, sustainable business model is established |
| 4) Sustainable business model acquisition | An additional, sustainable business model is identified, acquired, and integrated into the organisation |

| Sustainable business model types | Examples | Description |
|--------------------------------|----------|-------------|
| 1) Circular business models | Business models that are closing, slowing, intensifying, dematerialising, or narrowing resource loops |
| 2) Social enterprises | Business models that aim at social impact by generating profits from economic activity or reinvesting them entirely |
| 3) Bottom of the pyramid solutions | Business models that aim at customers at the bottom of the income pyramid |
| 4) Product-service systems | Business models that integrate products and services into customer offerings that provide a product, a functionality, or a result |

| Sustainable business model strategies | Examples | Description |
|-------------------------------------|----------|-------------|
| 1) Maximise material and energy efficiency | Aims at less material and energy input through more efficient processes |
| 2) Closing resource loops | Aims at closing resource loops through reuse, remanufacturing, and recycling |
| 3) Substitute with renewables and natural processes | Aims at replacing non-renewable resources with renewable ones and artificial processes with ones that mimic or use processes in nature |
| 4) Deliver functionality rather than ownership | Aims at providing the user with the functionality she requires without her owning the product that delivers the service |
| 5) Adopt a stewardship role | Aims at protecting natural systems by introducing a gatekeeper that controls access or incentivises certain behaviours |
| 6) Encourage sufficiency | Aims at providing information and incentives that encourage less consumption |
| 7) Repurpose for society or the environment | Aims at utilising organisational resources and capabilities to create societal or environmental benefits |
| 8) Inclusive value creation | Aims at delivering value to formerly unattended stakeholders or including them into the value creation process |
| 9) Develop sustainable scale up solutions | Aims at scaling sustainable solutions and technologies |

Table 7
Challenges for innovation towards sustainable business models (Evans et al., 2017).

| Challenges | Description | Authors |
|------------|-------------|---------|
| Triple Bottom Line Mind-set | The co-creation of profits, social and environmental benefits and the balance among them are challenging for moving towards sustainable business models. | Hart et al., 2003; Schaltegger et al., 2012; Stubbs and Cocklin, 2008 |
| Resources | Reluctance to allocate resources to business model innovation and reconfigure resources and processes for new business models. | Boons and Lüdeke-Freund, 2013; Johnson et al., 2008; Yu and Hang, 2010 |
| Technology innovation | Integrating technology innovation, e.g. clean technology, with business model innovation is multidimensional and complex. | Björkdahl and Holmén, 2013; Chesbrough, 2010; C Zott et al., 2011 |
| External relations | Engaging in extensive interaction with external stakeholders and business environment requires extra efforts. | Hart et al., 2003; Yu and Hang, 2010; Zott et al., 2011 |
| Methods and tools | Existing business modelling methods and tools, e.g. Osterwalder and Pigneur (2010) and Johnson et al. (2008), are few and rarely sustainability driven. | Boons and Lüdeke-Freund, 2013; Stubbs and Cocklin, 2008; Vladimirova, 2012 |

Chaotic and uncertain environments. This can prevent companies to utilise value creation opportunities that are different from their current business model and its logic.

Similarly, the change management field refers to organisational inertia as a reason why change efforts fail (Hughes, 2011). This inertia is caused by different barriers to organisational change, like insufficient top management involvement, job security concerns, power struggles, and agency problems (Burnes, 1996; Kegan and Lahey, 2001; Kotter, 2007) that also apply to business model innovation as a particularly comprehensive and complex change effort (Table 8).

**Working definition**

Based on this review, we define the design-implementation gap of sustainable business model innovation as the set of challenges that prevent organisations 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.

To conclude the literature review part, an overview of all working definitions that we develop in this section is illustrated in Table 9.

4. **Research gap**

In our review, we identified a research gap in the following three areas of sustainable business model innovation that undermine bridging its design-implementation gap: 1) the implementation of the business model innovation process; 2) its tools; and 3) its challenges.

Even though business model research is a relatively young field in management studies (Baden-Fuller and Morgan, 2010; Zott et al., 2011), a broad discourse on business model innovation has evolved in the last decade (e.g. Chesbrough and Rosenbloom, 2002; Chesbrough, 2007, 2010; Mitchell and Coles, 2003, 2004, 2004; Demil and Lecocq, 2010; Johnson, 2010; Johnson et al., 2008; Teece, 2010; Zott et al., 2011). However, the way organisations actually implement new business models is still unexplored (Chesbrough, 2010).
In academic research, several tools and processes have been developed to support organisations in the design of business models. More recently the area of tool development that is aiming to enhance sustainability performance is emerging. This development of tools that combine both notions and focus on using approaches are addressing single phases of the sustainable business model innovation process, with the notable exception of the work of Evans et al. (2014), which combines different individual tools into a more comprehensive process. While these tools can provide some support with the conceptual design of business models, they offer only limited guidance through most of the remaining business model innovation process.

Finally, in the reviewed literature, there seems to be little research on the challenges that business model innovation faces and on the reasons for low success rates in implementation. While the academic change management literature quotes failure rates of up to 70% (Hughes, 2011), there seem to be no comparable numbers for business model innovation. Popular and practitioner publications suggest that it might be as high as 90 percent (Patel, 2015). While there are theoretical discussions on the causes of the design-implementation gap, e.g. by Amit and Zott (2001), Chesnokov (2001), Christensen (1997), and Christensen and Raynor (2003), there is little evidence-based research on the underlying failure modes and root causes.

### Table 8
Change management stages, actions, and pitfalls (Kotter, 2006).

| Stage | Actions needed | Challenges |
|-------|----------------|------------|
| Establish a sense of urgency | Examine market and competitive realities for potential crises and untapped opportunities. Convince at least 75% of your managers that the status quo is more dangerous than the unknown. | Underestimating the difficulty of driving people from their comfort zones. Becoming paralyzed by risks |
| Form a powerful guiding coalition | Assemble a group with shared commitment and enough power to lead the change effort. Encourage them to work as a team outside the normal hierarchy. | No prior experience in teamwork at the top. Relegating team leadership to an HR, quality, or strategic-planning executive rather than a senior line manager |
| Create a vision | Create a vision to direct the change effort. Develop strategies for realizing that vision. Use every vehicle possible to communicate the new vision and strategies for achieving it. | Presenting a vision that’s too complicated or vague to be communicated in 5 min. Undercommunicating the vision. Behaving in ways antithetical to the vision. |
| Communicate the vision | Teach new behaviours by the example of the guiding coalition. | Failing to remove powerful individuals who resist the change effort. |
| Empower others to act on the vision | Remove or alter systems or structures undermining the vision. Encourage risk taking and non-traditional ideas, activities, and actions. | Leaving short-term successes up to chance. Failing to score successes early enough (12–24 months into the change effort) |
| Plan for and create short-term wins | Define and engineer visible performance improvements. Recognize and reward employees contributing to those improvements. | Declaring victory too soon—with the first performance improvement. Allowing resisters to convince “troops” that the war has been won. |
| Consolidate improvements and Produce more change | Use increased credibility from early wins to change systems, structures, and policies undermining the vision. Hire, promote, and develop employees who can implement the vision. Reinforce the change process with new projects and change agents. | Not creating new social norms and shared values consistent with changes. Promoting people into leadership positions who don’t personify the new approach. |
| Institutionalise new approaches | Articulate connections between new behaviours and corporate success. Create leadership development and succession plans consistent with the new approach. | |

### Table 9
Summary of working definitions.

| Concept | Definition |
|---------|------------|
| Business model | A simplified representation of the elements and the interactions between these elements that the unit employs for value proposition, creation, delivery, and capture. However, since there can be several representations of the same organisational unit, perceptions of the term must be considered that assume an underlying abstract concept that is characteristic of the entity — analogue to capabilities, resources, or strategies, which can be documented in different ways without the document becoming the underlying concept. Not fully considered can be defined with reduced scope that assume identity of the business model with one of its elements, for example, the revenue model. |
| Sustainable business model | A business model that incorporates pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and which holds a long-term perspective. |
| Business model innovation | The transformation from one business model to another. It can affect the entire business model or individual or a combination of its elements. |
| Sustainable business model innovation | The analysis and planning of transformations to a more sustainable business model or from one sustainable business model to another. This comprises both the development of an entirely new business model and the transformation of an existing business model. The set of challenges that prevent organisations 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. |
| The design-implementation gap | |

Electronic copy available at: https://ssrn.com/abstract=3221448
5. Research questions

The objective of this research project is to improve the understanding of how organisations move to new, sustainable business models. The research addresses the theoretical research gap and the organisational management problem described in chapter 3.5. It investigates both the business model innovation process and the failure of organisations to successfully develop and launch sustainable business models. Consequently, the research’s purpose is to help organisations bridge the design-implementation gap of sustainable business model innovation.

From this objective, the following central research question is derived (Creswell, 2014):

RQ: How do organisations move from one business models to a more sustainable business model in practice?

To operationalise this research question, we break it down into three sub-questions:

1. What phases does an organisation undergo when creating new, sustainable business models?
2. What are the key activities in each of these phases?
3. What are the challenges that an organisation faces when creating new, sustainable business models?

To address the underlying practitioner problem of how to help organisations bridge the design-implementation gap of sustainable business model innovation, two additional sub-questions are proposed:

4. What are strategies to develop additional tools to support this process?
5. How do organisations use these tools to solve the challenges that arise during the business model innovation process?

6. Discussion and conclusions

This paper presents a comprehensive review of the sustainable business model innovation literature. We provide the raw data from the literature together with interpretations of this data and working definitions of the key underlying concepts and a clearly defined research gap. We also propose a range of research questions to address this gap.

Sustainable business model innovation is a relatively nascent field of research. This research has reviewed the field and has synthesised definitions for the key underlying concepts and identified a research gap in the implementation of the business model innovation process, in the challenges of this process, and in the tools to address these challenges. Based on the research gap we have formulated a research question and broke it down into five sub-questions. These research questions aim to generate descriptive knowledge about the process organisations undergo to move into new, sustainable business models, both in the start-up and corporate context. While this comprises the development of an entirely new business model from scratch in the context of start-ups, it describes the transformation from one business model to another, the acquisition and integration of new business models, or the process of business model diversification in a corporate setting.

This also contributes to the more established field of business model innovation. The literature reveals comprehensive advantages that sustainable business models have for organisations (Nidumolu et al., 2009; Porter and Kramer, 2011). The authors argue that these advantages will make the concept of non-sustainable business models obsolete and sustainable business models will eventually supersede the notion of business models, analogous to competitive advantage and sustainable competitive advantage. Therefore, the conceptual advances of this review will become increasingly relevant for the field at large.

Deliberate, planned business model innovation process is also potentially required in many bigger innovation projects, like new product or service introductions, to align all elements of the business model optimally for exploitation and gain competitive advantages compared to conventional diversification activities (Mitchell and Coles, 2004). This indicates that sustainable business model innovation research might complement established strategic management fields like corporate and product diversification.

Furthermore, we believe that business model innovation can replace some strategic mergers and acquisitions (M&A). Both the high failure rate of business model innovation and sinking transaction costs (Coase, 1937) lead to both disruptive (Bower and Christensen, 1995) but also incremental innovation increasingly being developed in start-ups rather than within incumbent corporations. This has interestingly lead to a return of conglomerates (Manral and Harrigan, 2017) like Alphabet or Alibaba that have acquired the capability to identify, buy, and integrate start-ups strategically. As more and more corporates wake up to this approach, identifying and buying adequate start-ups becomes more difficult. This increases the costs and risks of these activities. Therefore, we propose business model diversification through the development of in-house start-ups as a complement to this M&A approach to business model innovation.

The research questions aim at developing a sustainable business model innovation framework. This framework could guide companies through their business model innovation process by mapping the necessary key activities, potential challenges, and available tools. This will be the basis for developing a tool development framework to develop individual management tools and combine them into comprehensive and potentially synergistic toolboxes.

Helping managers by proving guidance and the anticipation of challenges related to sustainable business model innovation would yield societal implications. It is intended to lead to a higher adoption rate of more sustainable business models and higher success rate of sustainable venturing and start-ups. This would allow more efficient and effective deployment of more sustainable solutions and technologies in industry (Rashid et al., 2013), generating more customer benefit, shareholder value, and economic growth. In turn, the creation of more social, economic, and environmental value for a broader set of stakeholders might work towards the goal of all economic activity - increased happiness (Evans et al., 2014; Frey and Stutzer, 2001).

Acknowledgements

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Appendix A. Considered business model definitions

| Source | Definition |
|--------|------------|
| (Timmers, 1998) | The business model is “an architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues” (p. 4) |
| (Amit and Zott, 2001) | “A business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities” (p. 493) |
| (Dahan et al., 2010) | “The major components of a business model are customer interface, core strategy, strategic resources, and value network. These basic components are linked by three, bridging components: customer benefits, configuration of activities, and company boundaries” (p. 10) |
| (Chesbrough and Rosenbloom, 2002) | The business model is “the heuristic logic that connects technical potential with the realization of economic value” (p. 529). “The business model provides a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs” (p. 532). |
| (Hawkins, 2002) | In other words, a business model describes how an enterprise gears up its resources, planning capabilities and processes to the revenue producing potential of a specific product or service. By focusing on this relationship to revenue producing potential, a new context is provided for assessing the planning and operational aspects of an enterprise, and for assessing the relationship between online and off-line trading environments” (p. 308) |
| (Knyphausen-Aufsees and Meinhardt, 2002) | A business model is a simplified representation of a profit aimed venture, consisting of its essential elements and their interconnections. “[Business models] are, at heart, stories—stories that explain how enterprises work [and answer the following questions:] Who is the customer? And what does the customer value? It also answers the fundamental question every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to the customers at an appropriate cost?” (p. 87) |
| (Mangenatin et al., 2003) | “A business model is a description of the commercial relationship between a business enterprise and the products and/or services it provides in the market.” (p. 299) |
| (Mitchell and Coles, 2003) | “A business model is the combination of, ‘who’, ‘what’, ‘when’, ‘where’, ‘why’, ‘how’, and ‘how much’ an organisation uses to provide its goods and services and develop resources to continue its efforts” (p. 17) |
| (Pateli and Giaglis, 2004) | “Business models are not conceived as a purely management-related concept, but embrace a broad spectrum of organisational activities, from the operational processes to the strategic level. Moreover, given the evolution of networked organisations and the growing adoption of eBusiness, the definition of business models has been extended to include inter-organisational activities, roles, and elements as well.” (p. 308) |
| (Rappa, 2004) | “A business model is a method of doing business. All business models specify what a company does to create value, how it is situated among upstream and downstream partners in the value chain, and the type of arrangement it has with its customers to generate revenue” (p. 34) |
| (Downing, 2005) | The business model “is a set of expectations about how the business will be successful in its environment” (p. 186). |
| (Morris et al., 2005) | “At the most rudimentary level, the business model is defined solely in terms of the firm’s economic model. The concern is with the logic of profit generation. Relevant decision variables include revenue sources, pricing methodologies, cost structures, margins, and expected volumes.” (p. 727) |
| (Johnson et al., 2008) | “A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value [...] Customer value proposition [...] Profit formula [...] Key resources [...] Key processes [...]” (p. 690) |
| (Richardson, 2008) | A business model is “a conceptual framework that helps to link the firm’s strategy, or theory of how to compete, to its activities, or execution of the strategy. The business model framework can help to think strategically about the details of the way the firm does business.” (p. 135) “The three major components of the framework — the value proposition, the value creation and delivery system, and value capture — reflect the logic of strategic thinking about value. The essence of strategy is to create superior value for customers and capture a greater amount of that value than competitors.” (p. 138) |
| (Zott and Amit, 2008) | “In this paper, we […] introduce[e] the firm’s business model as a new contingency factor that captures the structure of a firm’s boundary spanning exchanges and asking: How do the firm’s business model and its product market strategy interact to impact firm performance?” (p. 1) |
| (Doganova and Eyquem-Renault, 2009) | “The business model is a narrative and calculative device that allows entrepreneurs to explore a market and plays a performative role by contributing to the construction of the techno-economic network of an innovation.” (p. 1559) |
| (Baden-Fuller and Morgan, 2010) | “Business models have a multivalent character as models. They can be found as exemplar role models that might be copied, or presented as nutshell descriptions of a business organisation: simplified, short-hand descriptions equivalent to scale models. We can think of them not only as capturing the characteristics of observed kinds in the world (within a taxonomy), but also as abstract ideal types (in a typology)” (p. 167) |
| (Casadesus-Masanell and Ricart, 2010) | “A business model is [...] a reflection of the firm’s realized strategy” (p. 195). |
| (Dahan et al., 2010) | “Firms and NGOs use business models to structure and map the mechanisms whereby they intend to deliver value [...] to their target public, and how the necessary costs and revenues will be structured.” (p. 329) |
| (Demil and Leccoo, 2010) | “The business model concept generally refers to the articulation between different areas of a firm’s activity designed to produce a proposition of value to customers. Two different uses of the term can be noted. The first is the static approach - as a blueprint for the coherence between core business model components. The second refers to a more transformational approach, using the concept as a tool to address change and innovation in the organisation, or in the model itself.” (p. 227) |
| (Osterwalder and Pigneur, 2010) | “A business model describes the rationale of how an organisation creates, delivers, and captures value” (p. 14) |
| (Svejano et al., 2010) | Individuals business models describe activities, the organisation, and the implication of strategic resources that organisational agents use to pursue their interests and motivations and create value and revenues in the process. |
| (Teece, 2010) | “A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value” (p. 249) |
| (Weiner et al., 2010) | “A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore, we must consider which concepts and relationships allow a simplified description and representation of what value is provided to whom, how this is done and with which financial consequences” (p. 23) |
| (Wirtz et al., 2010) | A business model represents a strongly simplified and aggregated illustration of the relevant activities of a venture. It explains how the value creation component of a venture creates marketable information, products, and/or services. Besides the architecture of value creation, the strategic, as well as the customer and market component are considered to realise the superordinate goal objective of (continued on next page)
### Appendix B. Considered sustainable business model definitions

| Source | Definition |
|--------|------------|
| Yunus et al., 2010 | generating respectively securing the competitive advantage. The business model reflects the systemic output of an organisation, the way the organisation works and creates value. “among the plethora of definitions [of business models], three elements are usually distinguished: the product/service proposed to customers, the way the company is organized so as to deliver this product and service to its customers, and the revenue model.” (p. 311) |
| Zott and Amit, 2010 | “we conceptualize a firm’s business model as a system of interdependent activities that transcends the focal firm and spans its boundaries. The activity system enables the firm, in concert with its partners, to create value and also to appropriate a share of that value [and is defined by] design elements - content, structure and governance - that describe the architecture of an activity system; and design themes - novelty, lock-in, complementarities and efficiency – that describe the sources of the activity system’s value creation.” (p. 216). |
| Bieger and Kysi, 2011 | A business model describes the basic logic of how an organisation creates value by defining 1) the organisation’s value offering, 2) how the value is created within the organisational system, 3) how the created value is communicated and delivered to the customer, 4) how it is captured in the form of revenues by the company, 5) how the value is distributed within the organisation and to stakeholders, and 6) how the basic logic of value creation is refined to ensure the sustainability of the business model in the future. |
| Wells, 2016 | “Business model is the way in which a business chooses to create, deliver, capture and exchange value” (p. 10) |
| Geissdoerfer et al., 2016b | “we describe business models as simplified representations of the elements e and interactions between these elements e that an organisational unit chooses in order to create, deliver, capture, and exchange value.” (p. 1218) |
| Schallmo, 2013 | “In broad terms, a business model can be defined as having three constituent elements: the value network and product/service offering that defines how the business is articulated with other businesses and internally (i.e., how value is created); the value proposition that defines how products and/or services are presented to consumers in exchange for money (i.e., how value is captured); and the context of regulations, incentives, prices, government policy and so on (i.e., how value is situated within the wider socioeconomic framework).” (p. 37) |
| Wirtz et al., 2016 | “A business model is a simplified and aggregated representation of the relevant activities of a company. It describes how marketable information, products and/or services are generated by means of a company’s value-added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the superordinate goal of generating, or rather, securing the competitive advantage. To fulfil this latter purpose, a current business model should always be critically regarded from a dynamic perspective, thus within the consciousness that there may be the need for business model evolution or business model innovation, due to internal or external changes over time.” (p.411) |
| Massa et al., 2017 | “a business model is a description of an organisation and how that organisation functions in achieving its goals (e.g., profitability, growth, social impact. . .)” (p. 73) |

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### Table 1: Source and Definition of Business Models

| Source | Definition |
|--------|------------|
| Stubb and Cocklin (2008) | A sustainable business model is “a model where sustainability concepts shape the driving force of the firm and its decision making [so that] the dominant neoclassical model of the firm is transformed, rather than supplemented, by social and environmental priorities.” (p. 103) |
| Birken et al., 2009a, 2009b | Sustainable business models are “new business models for sustainable development [that] are operating and appraising their performances within the four classes of information identified in the cloverleaf account of sustainable development (namely mass balance, life-cycle impacts, stakeholders and ecological resilience), [and] these operations are […] integrated by a comprehensive new understanding that […] could have more to do with societal and value issues than technical and managerial ones. In this way, some companies specifically did report that their decisions are based upon issues wider than traditional economics, accounting or market theory.” (2009b, p. 288) |
| Garrett and Taisch, 2012 | Sustainable business models “have a global market perspective, taking into account the development of new industrialised countries as well as the need for more sustainable products and services.” (p. 88) |
| Schaltegger et al., 2012 | Sustainable business models “create customer and social value by integrating social, environmental, and business activities” (p. 112) |
| Bocken et al., 2013 | “Sustainable business models seek to go beyond delivering economic value and include a consideration of other forms of value for a broader range of stakeholders.” (p. 484) |
| Boons and Lüdeke-Frentzens, 2013 | A sustainable business model is different from a conventional one through four propositions, “1. The value proposition provides measurable ecological and/or social value in concert with economic value […] 2. The supply chain involves suppliers who take responsibility towards their own as well as the focal company’s stakeholders […] 3. The customer interface motivates customers to take responsibility for their consumption as well as for the focal company’s stakeholders […] 4. The financial model reflects an appropriate distribution of economic costs and benefits among actors involved in the business model and accounts for the company’s ecological and social impacts” (p. 13) |
| Wells, 2013 | A business model for sustainability “would assist in the achievement of sustainability [by] following major principles […] for sustainability”, which Wells defines as 1) resource efficiency, 2) social relevance, 3) localisation and engagement, 4) longevity, 5) ethical sourcing, and 6) work enrichment. (p. 65) |
| Bocken et al., 2014 | “a sustainable business model aligns interests of all stakeholder groups, and explicitly considers the environment and society as key stakeholders.” (p. 44) |
| Evans et al., 2014 | A sustainable business model “is the holistic value logic that encompasses economic, environmental and social goals while aligning the interests of all stakeholder groups” (p. 9) |
| Abdelkaafi and Tauscher, 2016 | Sustainable business models, “incorporate sustainability as an integral part of the company’s value proposition and value creation logic. As such, BMIS [Business models for Sustainability] provide value to the customer and to the natural environment and/or society.” (p. 75) |
Business model innovation describes either a process of transformation from one business model to another within incumbent companies or into the business you are already in. Differentiation from the competitors is possible that allows to consolidate customer relations, to build a competitive advantage, to foster innovations in industry models, in revenue models and in enterprise models. Thus, a business model innovation is about benchmarking, but about creating new mechanisms to create value and derive revenues. Rather, business model innovation is not about looking back, because the past indicates little about what is possible in terms of future business models. Business model innovation is about looking to competitors, since business model innovation is not about copying or cloning. Business model innovation is not about looking back, because the past indicates little about what is possible in terms of future business models. Rather, business model innovation is about creating something more core than the core, to innovate the very theory of the business itself. I call that process business model innovation. [Seizing the white space] calls for the ability to innovate something more core than the core, to innovate the very theory of the business itself. [Seizing the white space] calls for the ability to innovate something more core than the core, to innovate the very theory of the business itself. This is the creation of entirely new business models in start-ups. (p. 111)

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"Business model innovation describes either a process of transformation from one business model to another within incumbent companies or into the business you are already in — the kind of variety that is highly valued by customers" (p. 111)

"Business model innovation describes either a process of transformation from one business model to another within incumbent companies or into the business you are already in — the kind of variety that is highly valued by customers" (p. 111)

When a company makes business model replacements that provide product or service offerings to customers and end users that were not previously available, we refer to those replacements as business model innovations. [...] We also refer to the process of developing and making these novel replacements as the process of business model innovation.” (p. 17) (Osterwalder and Pigneur, 2005)

A business model innovation changes one or more dimensions of a business model (which are perceived by the authors as product-market configuration, the architecture of the value creation, and the revenue model) so that a novel configuration of the elements is created and implemented. (pp. 897 f.) (Osterwalder and Pigneur, 2005)

Business model innovation comprises one or a combination of: innovations in industry models, in revenue models and in enterprise models. (p. 27) (Giescn et al., 2007)

"Innovation becomes BMI [business model innovation] when two or more elements of a business model are reinvented to deliver value in a new way. [...] BMI can provide companies a way to break out of intense competition, under which product or process innovations are easily imitated”. (p. 2) (Labbé and Mazet, 2005)

Business model innovation is to “advance [the] business model [...] from very basic (and not very valuable) models to far more advanced (and more valuable) models.” (p.15) (Chesbrough, 2007)

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### Appendix D. Considered sustainable business model innovation definitions

| Source | Definition |
|--------|------------|
| (Schaltegger et al., 2012) | “business model innovations may be required to support a systematic, ongoing creation of business cases for sustainability” (p. 95) and connects defensive, accomodative, and pro-active sustainability strategies with business model adjustment, adoption, improvement, and redesign. |
| (Boons & Lüdeke-Friedrich, 2013) | Sustainable business model innovation is understood as the adaption of the business model to overcome barriers within the company and its environment to market sustainable process, product, or service innovations. (p. 13) |
| (Iles & Martin, 2013) | Sustainable business model innovation (in the chemical industry) describes “how firms are devising business models to address the challenges of making the business case for [its offering] and addressing sustainability.” (p. 39) |
| (Loorback and Wijmans, 2013) | Sustainable business model innovation describes businesses “searching for ways to deal with unpredictable […] wider societal changes and sustainability issues.” (p. 20) |
| (Bocken et al., 2014) | “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 organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions.” (p. 44) |
| (Geissdoerfer et al., 2016) | “Sustainable business innovation processes specifically aim at incorporating sustainable value and a pro-active management of a broad range of stakeholders into the business model.” (p.1220) |
| (Roome and Louche, 2016) | Sustainable business model innovation describes the “processes through which […] new business models are developed by businesses and their stakeholders in order to transform their business model in order to contribute to sustainable development.” (p. 12) |
| (Schaltegger et al., 2016) | Sustainable business model innovation describes the creation of “modified and completely new business models [that] can help develop integrative and competitive solutions by either radically reducing negative and/or creating positive external effects for the natural environment and society” (p. 3) |
| (Yang et al., 2016) | “Sustainable business model innovation can be more easily achieved by identifying the value uncaptured in current business models, and then turning this new understanding of the current business into value opportunities that can lead to new business models with higher sustainable value.” (p. 2) |

### References

Abdelkafi, N., Tauscher, K. 2016. Business models for sustainability from a system dynamics perspective. Organ. Environ. 29, 74–96. https://doi.org/10.1177/1086026615592930.

Afua, A. 2004. Business Models: A Strategic Management Approach. McGraw-Hill/ Irwin, Boston.

Amir, R., Zott, C. 2001. Value creation in ebusiness. Strat. Manag. J. 22, 493–520. https://doi.org/10.1002/smj.187.

Ansoff, I. 1957. Strategies for diversification. Harv. Bus. Rev. 35, 113–124. https://doi.org/10.1002/04703612507900498.

Baden-Fuller, C., Morgan, M. 2010. Business models as models. Long. Range Plan. 43, 151–171.

Baumann, H., Boons, F., Brandt, A. 2002. Mapping the green product development field: engineering, policy and business perspectives. J. Clean. Prod. 10, 409–425. Beattie, V., Smith, S.J., 2013. Value creation and business models: refocusing the intellectual capital debate. Br. Account. Rev. 45, 243–254. https://doi.org/10.1016/j.bar.2013.06.001.

Bettis, R.A., Prahalad, C.K., 1995. The dominant logic: retrospective and extension. Strat. Manag. J. 16, 5.

Biegter, T., Krys, C., 2013. Das wrtsbasierte geschmdsmodell - ein aktualisierter strukturierungsansatz. In: Biegter, T., Knyhhausen-Aufseß, D., Krys, C. (Eds.). Innovative Geschmdsmodelle. Springer, Berlin.

Biegter, T., Reinhold, S., 2013. Das wrtsbasierte geschmdsmodell-ein aktualisierter strukturierungsansatz. In: Biegter, T., Knyhhausen-Aufseß, D., Krys, C. (Eds.). Innovative Geschmdsmodelle. Springer, Berlin, Heidelberg.

Birkin, F., Cashman, A., Koh, S.C.L., Liu, Z., 2009a. New sustainable business models in China. Bus. Strat. Environ. 18, 64–77. https://doi.org/10.1002/bse.568.

Birkin, F., Poliesie, T., Lewis, T., 2009b. A new business model for sustainable development: an exploratory study using the theory of constraints in Nordic organizations. Bus. Strat. Environ. 18, 277–290. https://doi.org/10.1002/bse.581.

Bjodahl, J., Holmen, M., 2013. Editorial: business model innovation - the challenges ahead. Int. J. Prod. Dev. 18, 213–225.

Bocken, N., Allwood, J., 2011. Development of an eco-ideation tool to identify stepwise greenhouse gas emissions reduction options for consumer goods. J. Clean. … 19, 1297–1298 doi:Development of an eco-ideation tool to identify stepwise greenhouse gas emissions reduction options for consumer goods, Bocken, N.M.P., Short, S., Rana, P., Evans, S., 2013. A value mapping tool for sustainable business modelling. Corp. Gov. Int. J. Bus. Soc. 13, 482–497. https://doi.org/10.1108/CG-06-2013-0078.

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 U6.

Bocken, N.M.P., de Pauw, I., Bakker, C., van der Grinten, B., 2016. “Product design and business model strategies for a circular economy. Journal of Industrial and Production Engineering, Taylor & Francis 33 (5), 308–320. Boons, F., Lüdeke-Friedrich, 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 MA. Bower, J.L., Christensen, C.M., 1995. Disruptive technologies: catching the wave. Harv. Bus. Rev. 73, 43–53. The Federal Government of Germany (Bundesregierung). 2014. The New High-tech Strategy Innovations for Germany (Berlin).

Burnes, B., 1996. No such thing as … a “one best way” to manage organizational change. Manag. Decis. 34, 11–18. https://doi.org/10.1002/1097-4613(19960106)34:1<11::AID-MD3>3.0.CO;2-P.

Byggeth, S., Hochscherner, E., 2006. Handling trade-offs in ecodesign tools for sustainable product development and procurement. J. Clean. Prod. 14, 1420–1430. https://doi.org/10.1002/jclepp.2005.03.024.

Casadesus-Masanell, R., Ricart, J.E., 2010. From strategy to business models and onto tactics. Long. Range Plan. 43, 195–215. https://doi.org/10.1016/j.lrp.2009.07.010. Chesbrough, H., 2007. Business model innovation: it’s not just about technology anymore. Strat. Leader. 35, 12–17. https://doi.org/10.108857701833714.

Chesbrough, H., 2010. Business model innovation: opportunities and barriers. Long. Range Plan. 43, 354–363. https://doi.org/10.1016/j.lrp.2010.04.011. Chesbrough, H., Rosenbloom, R., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation’s technology spin-off companies. For. Ind. 11, 529–555. Choi, J., Wang, H., 2009. Stakeholder relations and the persistence of corporate financial performance. Strat. Manag. J. 30 (8), 895–907.

Christensen, C., 1997. The Innovator’s Dilemma: when New Technologies Cause Great Firms to Fail. Harvard Business School Press, Cambridge, MA.

Christensen, C., Raynor, M., 2003. The Innovator’s Solution: Creating and Sustaining Successful Growth. Harvard Business School Press, Cambridge, MA.

Coase, R.H.J., 1937. The nature of the firm. Economica 4, 386–405.

Cresswell, J.W., 2014. In: Research Design, Internatio. Sage, Los Angeles, London, New Delhi, Singapore, Washington, DC.

Dahan, N., Doh, J., Oetzel, J., Yaziji, M., 2010. Corporate-NGO collaboration: Co-creating new business models for developing markets. Long. Range Plan. 43, 326–342. http://dx.doi.org/10.1016/j.lrp.2009.11.003.

Deffourny, J., Nyssens, M., 2010. Conceptions of social enterprise and social entrepren-}
Aktueller Stand in Forschung und Praxis. Fraunhofer IAO, Stuttgart.
Wells, P.E., 2008. Alternative business models for a sustainable automotive industry. In: Tukker, A., Charter, M., Vezzoli, C., Sta, E., Andersen, M.M. (Eds.), Perspectives on Radical Changes to Sustainable Consumption and Production 1. System Innovation for Sustainability. Greenleaf, Sheffield, pp. 80–98.
Wells, P.E., 2013. Business Models for Sustainability. Edward Elgar, Cheltenham.
Wells, P., 2016. Economies of scale versus small is beautiful: a business model approach based on architecture, principles and components in the beer industry. Organ. Environ. 29, 36–52. https://doi.org/10.1177/1086026615590882.
Wirtz, B., Schilke, O., Ullrich, S., 2010. Strategic development of business models: implications of the Web 2.0 for creating value on the internet. Long. Range Plan. 43, 272–290. https://doi.org/10.1016/j.lrp.2010.01.005.
Wirtz, B.W., Pistoia, A., Ullrich, S., Götzel, V., 2016. Business models: origin, development and future research perspectives. Long. Range Plan. 49, 36–54. https://doi.org/10.1016/j.lrp.2015.04.001.
Yang, M., Evans, S., Vladimirova, D., Rana, P., 2016. Value uncaptured perspective for sustainable business model innovation. J. Clean. Prod. https://doi.org/10.1016/j.jclepro.2016.07.102.
Yang, M., Vladimirova, D., Evans, S., 2017. Creating and capturing value through sustainability: the sustainable value analysis tool. Res. Technol. Manag. 60, 312–332.
Yang, M., Vladimirova, D., Rana, P., 2014. Sustainable value analysis tool for value creation. Asian J. Manag. Sci. Appl. 1 (4), 312–332.
Yu, D., Hang, C., 2010. A reflective review of disruptive innovation theory. J. Manag. Rev. 12, 435–452.
Yunus, M., Moingeon, B., Lehmann-Ortega, L., 2010. Building social business models: lessons from the Grameen experience. Long. Range Plan. 43, 308–325. https://doi.org/10.1016/j.lrp.2009.12.005.
Zott, C., Amit, R., 2008. The fit between product market strategy and business model: implications for firm performance. Strat. Manag. J. 29, 1–26. https://doi.org/10.1002/smj.642.
Zott, C., Amit, R., 2010. Business model design: an activity system perspective. Long. Range Plan. 43, 216–226. https://doi.org/10.1016/j.lrp.2009.07.004.
Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. J. Manag. 37, 1019–1042. https://doi.org/10.1177/0149206311406265.