Introduction to Business Models for Sustainability Transitions

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1 Why a Book on Business Models for Sustainability Transitions?

The prevalent literature on sustainability transitions has primarily been concerned with the long-term transformation towards sustainability of socio-technical systems of provision (e.g., transportation, water, and electricity supply) with the aim to satisfy basic human needs (e.g., food, heating, access to water) (Smith et al., 2010). A related strand of research has

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focused on the role of business models for sustainability, but with a strong emphasis on short-term and firm-level development and implementation of new business models in creating value through sustainable business models (e.g., Boons & Lüdeke-Freund, 2013). Recent years have witnessed a growing interest in exploring how these two research strands might be combined to offer new insights into how business model innovation may act as a catalyst for system-wide sustainability transitions (Bolton & Hannon, 2016; Foxon et al., 2015; Hannon, 2012; Hannon et al., 2013; Loorbach et al., 2010; Wells, 2013).

Thus, this book brings together in one volume the two streams of research that have hitherto been largely separate: sustainability transitions and business models for sustainability. These two realms of research and, increasingly, policy have their conceptual and epistemological roots in distinct and diverse traditions. Yet, there is scope for each tradition to learn from the other. This book therefore seeks a benign and mutually beneficial confluence of ideas, thereby contributing in an exploratory manner both to accelerated sustainable transitions and to flourishing business models for sustainability. The search for contributions to this book was guided by the question whether *business models and business model innovation can contribute to sustainability transitions*, that is, fundamental change at a societal level, and whether *change at the societal level can in turn contribute to the emergence of fundamentally different business models*. This book is meant to offer exemplary studies of *transformational and transformed business models*, which we simply call 'business models for sustainability transitions'. In contrast, business models may be contributory to transition failure (Turnheim & Sovacool, 2020), while influences from societal and system levels may inhibit more sustainable business models (Bidmon & Knab, 2018). Furthermore, the roles and behaviours of customers and users in collaborative value co-creation of sustainable business model innovation (Aagaard & Ritzén, 2019) are also critical to sustainability transitions in practice. However, as this book incorporates a business focus and emphasises 'successful' sustainability transitions, these aspects are beyond the scope of this book. However, they all point to important avenues for future research.

Sustainability transitions, understood as '… fundamental changes in socio-technical systems … to address grand challenges in a way that

meets the needs of the present without compromising the ability of future generations to meet their own needs (Markard et al., 2020, p. 1)', are an increasingly important concern for policy-makers, business, and wider society. Today, humanity uses the equivalent of 1.7 Earths to provide the resources we use and to absorb our waste. This implies that it takes Planet Earth more than one year and eight months to regenerate what we use in just one year. Current resource use is only possible because of the continued depletion of finite stocks and biocapacity. Thus, continuing the current population and consumption trends will require the equivalent of two Earths by the 2030s (Global Footprint Network, 2020). There are multiple indicators of planetary system stress in which boundaries are being exceeded (Stoknes & Rockström, 2018). Governmental policy interventions together with the adoption of sustainability strategies by corporations and recurring wake-up calls for more sustainable consumption led to some improvements in terms of eco-efficiency gains and socio-economic progress, at least in some parts of the world. However, these improvements are constantly overwhelmed by population growth coupled with increased material prosperity, again, in some parts of the world.

Sustainability transitions are characterised by fundamental changes in the man-made systems of production and consumption (e.g., the socio-technical system of energy provision), an orientation towards grand sustainability challenges (e.g., climate change), and—typically in hindsight—radical innovations and the emergence of struggles within existing paradigms and system characteristics (Markard et al., 2020). Those fundamental innovations include, for example, novel technologies (e.g., solar energy), business models (e.g., product-service systems), and changes in social practices (e.g., sharing instead of owning), which implies that business has a role to play in sustainability transitions. It is just one force among many which make up today's socio-technical systems, yet it is a critical one. The way business is done has a fundamental influence on how goods and services are produced and consumed. Business also influences other system elements, including lifestyles, how the environment and other living species are treated, how policies are made, and so on. Hence, there are good reasons to dedicate a book to the question how business activities—here, mainly seen through a business model lens—relate to sustainability transitions, and vice versa. How business models

can drive and inhibit sustainability transitions, and how, in turn, sustainability transitions can drive and inhibit new business models. In fact, various authors, at least implicitly, call for more research at the intersections of business model and sustainability transitions studies (e.g., Bidmon & Knab, 2018; Boons et al., 2013; Köhler et al., 2019; Markard et al., 2020).

2 Business Model for Sustainability Perspective

Over the recent decades, research on business models and business model innovation has received substantial attention from both academics and practitioners (e.g., Massa et al., 2017; Wirtz, Pistoia, et al., 2016; Zott et al., 2011). Taking a business model perspective offers holistic and systemic insights into how value is created, proposed, delivered, and captured by organisations (Massa et al., 2018; Teece, 2010), which, depending on the underlying theory or framework, includes strategy models, market models, or network and value chain models (Wirtz, Pistoia, et al., 2016). Acknowledging the fact that organisations are per se complex systems, respectively, systems of (sub-)systems, Massa et al. (2018) argue that a business model is 'a system level concept… centered on activities… spanning the boundaries of a focal organisation to include exchanges with a network of partners …, and overall trying to describe how that organisation functions in achieving its goals (p. 60)'.

This systems perspective invites looking beyond single organisations and considering their embeddedness in value chains, stakeholder networks, and inter-organisational collaboration. In other words, it invites going beyond the micro-level of single organisations into spheres of more complex social phenomena at meso- and macro-levels (cf. Starik et al., 2016). This offers various innovation opportunities, including new business infrastructures, customer offerings, and ways of connecting to stakeholders (Foss & Saebi, 2017; Lüdeke-Freund et al., 2018; Remane et al., 2017; Wirtz, Göttel, & Daiser, 2016), which can have effects far beyond

a single organisation. Hence, it is reasonable to assume that business models and business model innovation offer promising pathways for incumbents and new entrants to develop and introduce more sustainable ways of doing business and, in the best case, create positive effects for the natural and social systems surrounding them (Aagaard, 2019; Lüdeke-Freund et al., 2020; Schaltegger, Lüdeke-Freund, & Hansen, 2016; Wells, 2013), and hence contribute to sustainability transitions.

Although growing circles in academia and business as well as at the political and societal levels are discussing sustainability (Dryzek, 2005), its influence on the ways that production and consumption are organised is still rather weak (Bansal, 2005; Schaltegger, Hansen, & Lüdeke-Freund, 2016; Stubbs & Cocklin, 2008). There are motivating success stories such as a growing number of green and social start-ups, the sustainable business model transformations of incumbents (e.g., US carpet manufacturer Interface), and even paradigm shifts in whole industries (e.g., Germany's exit from using nuclear power). However, there are also overwhelming indications that the 'greening of industry' and the proliferation of corporate social responsibility have failed to deliver substantial and enduring sustainability benefits.

The new quest for business models for sustainability transitions can be seen as a reaction to these (indeed dissatisfying) developments, which call for fundamental change at all levels and increasing transformation dynamics to leave business-as-usual behind (Markard et al., 2020). This quest integrates two dynamically growing, yet hardly connected, research fields: on the one hand research on responsible, inclusive, and circular business models, more broadly speaking business models for sustainability (e.g., Aagaard, 2019; Boons & Lüdeke-Freund, 2013; Lüdeke-Freund & Dembek, 2017; Wells, 2013), and on the other hand research on socio-technical and sustainability transitions (e.g., Geels, 2005; Geels et al., 2016; Grin et al., 2010; Köhler et al., 2019; Markard et al., 2020; Sovacool et al., 2020). Making both research communities talk to each other was also part of the motivation for this book. Maybe the most important part.

3 Sustainability Transitions Perspective

The grand sustainability challenges we encounter are global, multi-dimensional, multi-actor, and systemic in nature. Therefore, to achieve global long-term sustainability goals, the core systems of our societies will have to change dramatically (EEA, 2019). Our assumption is that business models for sustainability transitions have the potential to contribute to this transformation of economy and society. First, by enabling change within business operations, practices, and strategies (*transformed* business models), and second, by new ways for business to interact with markets, supply chains, policy-making, regulation, consumers, and many more (*transformational* business models). The latter speaks to the core issue of sustainability transitions studies, defined as 'long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption' (Markard et al., 2012, p. 956).

In theories of socio-technical transition, an important question is that of how socio-technical systems change. That is, transitions are changes from one socio-technical regime to another, respectively, from one dynamic equilibrium to another. Subsidiary questions then revolve around the cause of the 'failure' of existing regimes, and of the emergence to dominance of new regimes. In this case, socio-technical transitions are conceptualised as the status of regimes in socio-technical systems that emerge as a result of the interrelationship of two modes: change and stability. This theoretical framing developed out of systems theory, evolutionary economics, and innovation studies. In consequence, Geels and Schot (2007) developed the concept of transition pathways, as a typology of ideal types, to describe pathways as more or less coherent sequences of change events over time. Constituent elements of a socio-technical regime exhibit a co-evolutionary dynamic that may alter under conditions of change along these pathways (Berkhout et al., 2004; Geels, 2005). The 'ideal types' identified by Geels and Schot (2007) comprise the following categories:

1. Reproduction in which the regime is said to be dynamically stable, changing but not so far as to disrupt the socio-technical system as a whole.

2. Transformation under which moderate external pressures for change may lead to modifications of development pathways and enhanced levels of innovation.
3. De-alignment and re-alignment in which large-scale and rapid changes in external pressures can undermine an existing regime (causing 'de-alignment') and, in the absence of a candidate nascent set of niche practices, can create the space for re-alignment.
4. Technological substitution. Under this pathway a pre-existing niche can rapidly flourish when there are large-scale and rapid changes in external pressures.
5. Reconfiguration. Here the established regime at the heart of the socio-technical system may seek to capture symbiotic innovations and thereby adjust the regime to changed circumstances without being destabilised.

Importantly, transition pathways are not regarded as simply conforming to these ideal types, particularly as regime transitions are considered to be highly contextualised and contested with uncertain outcomes. Contestation is played out within and between all the regime constituents (both incumbent and emergent). Pathways of change thus emerge out of market interactions (supply and demand, price signals, organisational competition) including of course businesses. However, transition is also an emergent property of technological innovation; regulation and governance; behavioural, cultural, and attitudinal norms; environmental imperatives; and political contestation. In consequence, the pathways or sequences are less coherent in practice than the ideal types suggest.

4 Business Model Innovation and Sustainability Transitions

As Sovacool et al. (2020, p. 7) note in their wide-ranging review, which referenced 447 publications from science and technology studies (STS): 'Research of whole system transition, however, requires a broader approach that simultaneously analyses multiple niche-innovations

(including business model and social innovations)'. The diffusion of innovations is thus considered a process of societal embedding (Geels & Johnson, 2018) of which business strategies are a part. Business actors may perceive that technological innovations offer a new set of ways to define and then realise expectations. Yet complementary roles of business models may impact transition dynamics in multiple ways as stressed by Bidmon and Knab (2018): (1) As part of the socio-technical regime, existing business models hamper transitions by reinforcing the current regime's stability; (2) as intermediates between the technological niche and the socio-technical regime, business models drive transitions by facilitating the stabilisation process of technological innovation and supporting their breakthrough; and (3) as non-technological niche innovation, novel business models drive transitions by building up a substantial part of a new regime without relying on technological innovation.

It is probable that sustainability transitions theorisation such as that offered by Sovacool et al. (2020) underplays the power of corporate actors, who are often more than mere expendable niche experimenters. Businesses are, after all, the predominant mode of resource allocation in capitalist society, having privileged access to government, finance, and other key resources that need to be mobilised to enact societal change. The authors, considering the broader field of studies of technology and society with respect to energy, conclude that: The STS community needs to also reach beyond academic research as a whole to engage with other key stakeholders, ranging from business firms and governmental organisations to user groups, trade unions, and marginalised populations (ibid., p. 27).

Neither is business a monolithic single vested interest, and the outcomes sought by business may not be realised. Firms may fail to capture the benefits of their own innovations, for instance (Teece, 2006). Equally, changes in the regulatory framing of, for example, electricity generation and supply in many countries were largely undertaken to 'liberalise' the energy market, break up state monopolies, and reduce costs to consumers. One consequence, however, has been to open the space for alternative technology suppliers with innovative market propositions and business models.

Each individual moment of business model innovation is one tiny data point in the grand history of socio-technical transition, a bit of 'noise' in

the signal. However, each moment of business model innovation is also potentially contributory to a transition pathway or, alternatively, to continuing inertia enabling incumbents to resist change (Wells & Nieuwenhuis, 2012). From a transitions perspective, it could be argued that transitions pathways help to create the 'space' for innovative business models. This space can be understood as the consequence of disruptive technological innovations that enable business model innovation, or as shifts in regulatory, governance, and market opportunities that then become accessible via business model innovation (Bolton & Hannon, 2016). Hence, transitions processes may underwrite business model innovation, and simultaneously be a product of that innovation, by virtue of the business model design space that they enable (Huijben et al., 2016; Wesseling et al., 2020). Considering the above discussed characteristic of business models as complex systems of (sub-)systems—which can interrelate in various ways with other business models, organisations, stakeholders, and further system elements—makes us realise that identifying, studying, and understanding how business model innovation, sustainability, and socio-technical transitions interrelate is anything but trivial.

It is a task of some urgency, therefore, to engage in research that helps in understanding whether and how business model innovation for sustainability is also contributory to the societal challenge of achieving sustainability transitions. A fundamentalist perspective is to see the entire episode of capitalist market expansion over more than 200 years as one 'deep' transition (Schot & Kanger, 2018). In this view, it is unlikely that business organisations embedded in neo-liberal market economies can possibly also be participants in the end state of a transition to a sustainable economy and society. However, it is possible that even if such a post-capitalist world was to emerge, business organisation transformations might still be a constituent part of the mechanisms by which that end state is achieved. Rare examples, such as the business experiment going on at Welsh car designer Riversimple, offer insights into how businesses can help to 'change the system from within.' In the case of Riversimple, this is attempted by combining an eco-designed product with a business model that promotes using instead of owning cars and that is governed by a radically stakeholder-inclusive system of stewards and management board (Wells, 2016).

Key to understanding the contribution of business model innovation then becomes an understanding of context within specific domains of production and consumption relations, as these are key to determining the design space available to business model innovation (Huijben et al., 2016; Wesseling et al., 2020). Extant research into business model innovation for sustainability has tended to emphasise the significance of issues beyond the narrow boundary of the firm, compared with neo-classical economic treatments (a pioneering and still up-to-date paper in this regard is Stubbs & Cocklin, 2008). This 'beyond the boundaries' understanding of the firm also extends to a 'beyond profit' understanding of the business logic. Hence the location of the firm in this sense is within a constellation of related participants, interest groups, and social actors that rather reflects the characterisation of a regime in socio-technical transitions—albeit on a micro scale. Here, again, the 'system of (sub-) system' characteristic of business models, which is typically neglected in business model studies, but can be very useful in combination with a sustainability transitions perspective, comes to the fore (Massa et al., 2018). There are intersections with concepts such as business networks, business ecosystems, extended producer responsibility, circular economies, and others. There is an almost fractal quality to the respective theorisations, even though the temporal and societal scales are widely different, and even though the epistemological foundations of the respective schools of thought are also widely distanced. Indeed, it is evident that many individual actors within business organisations have a distinct social vision of the alternative, more sustainable, future they are seeking to create.

The theoretical and empirical opportunity therefore is to envisage business model innovation for sustainability and sustainability transitions as two ends of a continuum in which there are multiple possible intermediary concepts that act to bridge between these extremes. From a business model innovation for sustainability perspective, those concepts might include aspects of boundary crossing or redefinition that relate to the business ecosystem, actor networks, supply chains, and other constellations of corporate activity that are greater than one individual business. From a sustainability transitions perspective, intermediate or related macro-societal and political economy concepts might include degrowth, the circular economy, deep transitions, or green growth.

The following 'spiral' analogy is a first conceptual attempt to illustrate the continuum between micro-level considerations and phenomena related to business models and business model innovation and meso- and macro-level issues of sustainability transitions.

5 The 'Spiral' of Business Models for Sustainability Transitions

The 'spiral' was motivated by several observations made while reviewing and discussing the chapters in this book as well as our reading of the current literature on business models for sustainability and sustainability transitions. These observations include the following:

- Authors typically struggle to consider, conceptualise, and investigate micro-, meso-, and macro-level phenomena simultaneously with sufficient depth and grounding in the respective bodies of literature. This may be due to the 'natural' limitations of their respective disciplinary backgrounds, including the epistemologies and ontologies they typically apply.
- The resulting studies are either weak in terms of business model theory and analysis, which is an admittedly very heterogeneous field, or they show weaknesses in terms of how they connect to major assumptions and insights from the field of sustainability transition studies, which is no less and maybe even more heterogeneous.
- The preceding two points lead to an interesting observation: Many authors tend to turn their attention to meso-level phenomena, including inter-organisational phenomena such as networks and collaboration, multi-stakeholder issues, or other phenomena that provide insights about how organisations connect to and interact with their environments.
- While contributing new approaches to the study of meso-level phenomena and of what is going on between organisations and their socio-technical environment, understanding business models for sustainability transitions requires embracing the duality of system structures and patterns of action—or, in other words, the boundary

conditions shaping business activities and how business is trying to influence and change these boundary conditions.
- Time is crucial in studying transitions. However, time is hardly considered. Influential transition studies typically take a historical point of view and *re*construct transitions, their causes, dynamics, and their consequences. But sustainability transition studies are to a large extent looking into the future, hence showing a tendency of *pre*constructing a sustainable future. Time must be considered in relation to the phenomena under investigation, but also in terms of its methodical, epistemological, and ontological consequences.
- Further, business model innovation is characteristically short term, while socio-technical transitions permeate society over decades, and yet the temporal dynamics must intersect.

The following 'spiral' framework includes several theoretical assumptions and conceptual components that, as we think, are important to consider when studying business models for sustainability transitions, that is, transformational and transformed business models. It is meant to be an initial framework responding to the aforementioned observations (Fig. 1).

The spiral represents how the scope, or sphere of influence, of business activities extends over time. It begins with a rather narrow focus on an existing or new business model, which is connected to networks, collaborating partners, and other meso-level entities. Finally, its influence (e.g., new ways of producing and consuming) reaches the system level. This is, of course, a theoretical ideal. Although companies may aim to come up with influential business models for sustainability transitions, their influence may be very limited, or even negative in the case of unintended consequences.

The duality of (current and anticipated) system structures and (current and planned) patterns of action requires considering the boundary conditions under which companies develop and implement their business models (e.g., current and anticipated regulations, consumption trends) and at the same time the business models themselves. The latter may be

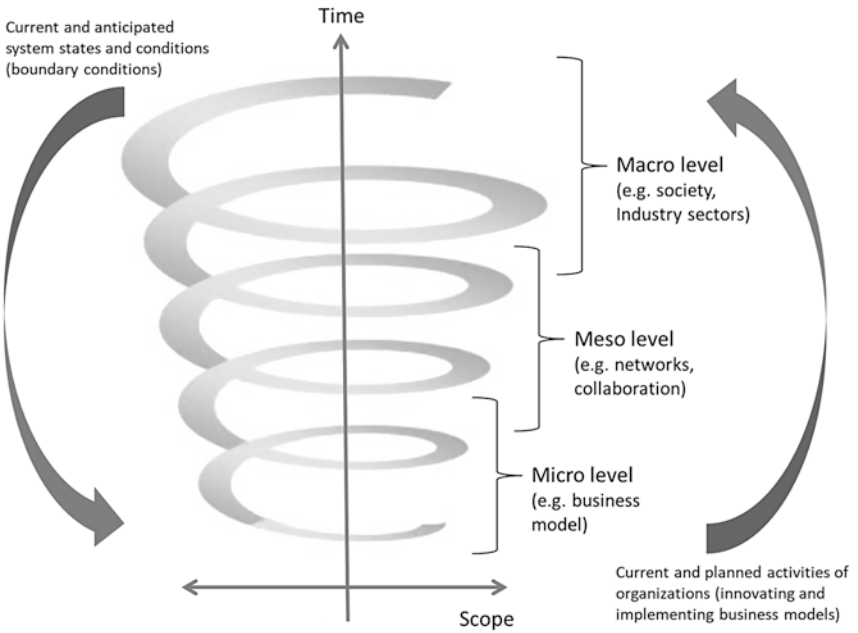

Fig. 1 The 'spiral'—Framework connecting business models to sustainability transitions

developed to both adapt to current boundary conditions and to try to influence and change these, which reminds of the different transition pathways defined by Geels and Schot (2007) discussed above.

While the spiral framework motivates thinking systematically about the scope of a transition phenomenon across time, as well as the dynamics between boundary conditions and business models, it also provides a structure in terms of micro-level phenomena and those to be located at meso and macro levels. This can help in providing clarity when it comes to studying phenomena on different levels simultaneously. Appropriate theories and methods of investigation can be systematically selected to fit with the respective framework elements and their interrelations.

6 Themes and Chapters Contained in This Book

In the following, the main themes and contributions contained in this book will be introduced and, where appropriate, connected to the spiral framework.

Part I: Crossing the Chasm: Integrating Business Model and Sustainability Transition Perspectives *Part I presents new frameworks that integrate micro-, meso-, and macro-level concepts and phenomena. New perspectives are offered that allow considering current and anticipated system states and conditions (boundary conditions such as given industrial practices) while at the same time using a business model perspective to discuss current and planned activities of organisations that are both transformative and transformed.*

Transformative Business and Sustainability Transitions: A Framework and an Empirical Illustration *by PJ Beers, Marjo Baeten, Erwin Bouwmans, Bram van Helvoirt, Jos Wesselink, Ruud Zanders* New business models have been widely touted for their promise of sustainability. However, conceptual approaches to new business models largely fail to connect to sustainability transitions. In this contribution, we draw upon sustainability transitions research to introduce a transformative business model framework. Given the radically incremental nature of sustainability transitions, we propose that the radicalism and potential of new business models should be assessed in relation to their capacity to influence wider institutional settings and to the transition to which they belong. We report on an exploratory study of six transformative business cases in the context of the Dutch agri-food transition. Our results suggest that, in order to be transformative, businesses need to co-evolve with specific wider institutional, discursive, practical, and relational developments.

The Networked Business Model for Systems Change: Integrating a Systems Perspective in Business Model Development for Sustainability Transitions *by Julia Planko, Jacqueline Cramer* To realise sustainability transitions, firms need to collaborate in networks and carry out system-

changing activities. In this way, they pro-actively build a more sustainable system and change the environment in which they operate. This in turn will help them to market their own sustainable product or service. Partners in a network can co-develop a 'networked business model', which takes on a systemic perspective and helps them to align their sustainability efforts. This latter model comprises transition goals, system building activities, system resources, benefits created for stakeholders, and costs to the network. The networked business model feeds into each network member's individual firm-centric business model and vice versa. The business models at the firm level and the system level are interconnected and mutually influence one another.

Sustainable Value Creation for Advancing Sustainability Transition: An Approach to Integrate Company- and System-Level Sustainability *by Minttu Laukkanen, Kaisa Manninen, Janne Huiskonen, Nina Kinnunen* While a sustainable business model is recognized as providing a link between an individual company and the larger socio-technical system to which it belongs and as leveraging wider sustainability transition, relatively little integration between business and management research and system transition research has been done to explore how companies enable wider sustainability transition through their business models. Based on a review of the prior literature on sustainable business models and sustainability transition and a single in-depth case study, this study proposes sustainable value creation, which is a central part of any sustainable business model, as an approach to integrate company-level sustainability into broader system-level sustainability transition. This study contributes to the literature by describing how companies make their business sustainable, leverage wider sustainability transition, and advance system-level sustainability through sustainable value creation. For managers, this study offers five key recommendations, which highlight the most crucial points to be considered for adopting a sustainable value creation approach.

Building BOP Business Models for Sustainable Poverty Alleviation: System Tips and System Traps *by Jodi C. York, Krzysztof Dembek* Sustainable development requires both long-term and large-scale changes to production and consumption patterns and the eradication of

extreme poverty. In this study, we argue that pursuing these goals independently can result in business models that tie poverty alleviation to increased environmental degradation, and thus work at cross purposes to sustainability transition. We explore how three types of business models for addressing poverty at the bottom of the pyramid (BOP)—delivering, sourcing, and reorganising models—can either impede or support sustainability transition in the global south by enacting different business model roles. We use examples from 17 business models from Indonesia and the Philippines to explore the sustainability misalignment risks each model type is prone to and distil key business model design features and enablers that support their alignment with sustainability transition by enabling them to avoid common system traps.

Part II: Beyond Business-as-Usual: Alternative Value Creation Logics Driving Sustainability Transitions *Sufficiency, sharing, and non-commercial approaches to creating value for stakeholders are discussed in Part II. The business model perspective offers a micro-level lens that helps in understanding the niche dynamics of these approaches and how actors try to change industries and society. Their potential to influence meso-level constellations (such as inter-organisational cooperation and networks) and even macro-level structures* (e.g.*, consumption trends) is discussed.*

The Business Model of Enough: Value Creation for Sufficiency-Oriented Businesses *by Maren Ingrid Kropfeld, André Reichel* In this chapter we conceptualize a generic business model for a transition toward a sustainable economy and society as an ideal-type by (a) focusing on sufficiency in order to highlight a more radical perspective on sustainability transformations in line with the notion of strong sustainability, and its implications for changing business models and the environment of business, as well as (b) undertaking a reconstruction of the business model concept from the viewpoint of social practice theory, which will give us a much clearer theoretical framework to infer connections between business and consumer practices. We show how such a 'Business Model of Enough' can constitute the core for communities of sufficiency practice, thus enabling institutional change within the political-economic background of business, and we discuss which role sufficiency-based business models and consumers play in transition pathways, for example, by intro-

ducing and supporting boundary spanning practices and including the perspective of fundamental transformations in everyday consumer practices.

Collaborative Business Models and Platforms in Shared Mobility Transitions: The Case of Bikeshare Integration *by Brett John Mathew Petzer, Anna Wieczorek, Geert Verbong* Collaboration between organizations plays an increasingly fundamental role in a growing number of sectors, including Mobility-as-a-Service (MaaS), and has given rise to the Collaborative Business Model (CBM). A review of literature on CBMs provides an overview of CBM interpretations, and finds that tensions between collaboration and competition, and those related to the commons, are major emerging tensions. A further review of MaaS business model literature, and a case study of three platforms attempting to deliver bikeshare-inclusive MaaS, focuses on these tensions. The means by which common resources are made available to MaaS CBMs is found to be a significant determinant of how far these CBMs depart from conventional business model logic and morphology, in part because they determine the leverage that city governments can bring to bear on MaaS CBMs.

Upscaling Sustainable Niches: How a User Perspective of Organisational Value Logics Can Help Translate Between Niche and System *by Alexandra Palzkill, Karoline Augenstein* A great variety of business organisations, environmentally or socially motivated entrepreneurs, aim to contribute to the development of more sustainable societies. A key question is how these organisations can move beyond isolated, protected niches and increase their impact on the mainstream without compromising their sustainability-oriented core mission and values? In this chapter, this question is approached by focusing on the organisational value logics of sustainability-oriented entrepreneurs and how these are related to, translated, and defended against dominant regimes built around market and commercial logics. It will discuss how a user perspective of organisational value logics can shed light on the process of niche-regime interaction and the upscaling potential of sustainable niches or provide a way to manage different logics using an outside-in-perspective. This chapter presents a case study of a civil society initiative's entrepreneurial activities and reflects on the question of how organisations

can contribute to sustainability transitions while confronted with different and often fundamentally incompatible niche and regime logics.

Part III: Being the Change: Transformative and Transformed Business Models in Selected Industries *The chapters contained in Part III present exemplary cases in industries such as textile services, clothing, energy services, and smart technologies for buildings. While new technologies are important drivers for change, boundary conditions such as regulation, stakeholder expectations, social acceptance, and also the limits of technology itself are critical drivers and barriers. The case studies presented in Part III provide insightful and fresh examples of how organisations try to be the change and to extend the scope and effects of their transformative and transformed business models.*

IoT-Driven Reuse Business Models: The Case of Salesianer Textile Rental Services *by Andres Alcayaga, Hanna Geyerlechner, Erik G. Hansen* Service business models such as rental, leasing, and performance contracting can contribute to a circular economy by keeping products, components, and materials longer in use and thereby preserving their value over time. These business models are, however, subject to higher complexity and information demand. Smart products and the Internet of Things facilitate the optimisation of such closed-loop value creation processes. We present an in-depth case study of a textile rental firm, in the business-to-business domain, that has recently become a front-runner in using textiles equipped with RFID chips. The firm has used smart textiles to improve the transparency of the product life cycle, raise awareness on textile losses, and improve procurement decisions. We show that combining smart textiles with a rental business model could accelerate the transition towards circularity and sustainability.

Business Models for Smart Sustainability: A Critical Perspective on Smart Homes and Sustainability Transitions *by Lara Anne Blasberg* This chapter examines the sustainability of smart technologies in the housing segment of the building sector critical perspective. It considers the prerequisites for digital technologies, business models, and user practices to support a sustainable trajectory of the housing segment. This research adopts socio-technical and practice-based perspectives to investigate the interrelated dynamics of individuals, organisations, and institutions for sustainable socio-technical transitions. It is based on an

organisational ethnography of the VELUX Group and the Active House Alliance, as well as interviews across the building industry, centring on two demonstration projects in Brussels, Belgium, and Toronto, Canada. This chapter points towards the following prerequisites for a sustainability trajectory of smart homes: integrated building performance that can deliver measurable sustainability results; balancing personal data usage with the personal significance of digital technology uses; and considering housing sustainability as a joint responsibility between producers and consumers. Altogether, this chapter outlines both the basis of these prerequisites and how business models can interlink the changes needed on multiple levels for sustainable socio-technical transitions.

Business Models for Energy Efficiency Services: Four Archetypes Based on User-Centredness and Dynamic Capabilities *by Ruth Mourik, Carolina Castaldi, Boukje Huijben* Energy Efficiency Services (EES) represent a promising solution to increase energy efficiency and contribute to reducing emissions. Unfortunately, they are still underdeveloped and companies delivering them are struggling to remain viable. In this study, we study EES through the lens of business models. We propose that business models of companies delivering EES can be analysed along two conceptual dimensions: how user-centred they are and what dynamic capabilities they require. We use this framework to analyse 46 cases in five European countries and South Korea. Four business model archetypes emerge, with varying degrees (low, medium, high) of user-centredness and a focus on different dynamic capabilities. Based on the insights from our qualitative analysis, we discuss the opportunities and barriers for further market uptake of EES and possible policy interventions.

Reverse Logistics Process for Business Transition: An Example from the Clothing Industry *by Ignes A. Castro Contreiras de Carvalho, Pascale Schwab Castella, Marcos Queiroz* The negative environmental impact of clothing industry is well known and requires the effort for redesigning one of the world's most polluting industries. Its image is tied up with a strong production of textile waste and a large amount of use of chemicals, energy, water, and other essential resources. However, some actors are demonstrating opportunities for the development of sustainability transi-

tions using new business models. This research focuses on the drivers of socio technical transitions integrating a life-cycle perspective and open innovation in the design of sustainable business models. The applications of conceptual frameworks reveal possibilities for the promotion of slow fashion practices through a case study.

7 Summary and Outlook

Research at the intersection of business models and socio-technical transitions towards sustainability is emerging as a new, yet nascent, research field. Over the last decades, sustainable development has become a priority in some parts of the world where it holds the potential to cause fundamental shifts in many industries, markets, and lifestyles. Thus, knowledge on how to drive transitions to sustainability and how to deal with them becomes critical. Consequently, this edited book attempts to answer how business models and business model innovation may contribute to sustainability transitions (i.e., fundamental change in socio-technical systems) and whether change at systems level can contribute to the emergence of fundamentally different business models.

The book offers exemplary studies of transformational and transformed business models, which we have presented as 'business models for sustainability transitions'. Thus, the aim is to explore how these two research strands might be combined to offer new knowledge of how business model innovation can be applied as a catalyst for system-wide sustainability transitions, and vice versa. The theoretical frameworks and case studies presented in this edited book provide new knowledge on both the socio-technological transitions and the unique role of business, networks, and collaborations in making sustainable transformations and transitions happen. We therefore hope that this book will (1) inspire academia in progressing research in the field of business models for sustainable transitions and (2) provide knowledge and models for businesses and society to pursue the necessary transformations in their domains and at large.

In referring back to Wells (2013), we conclude that the conceptual integration of business model and sustainability transition research can indeed contribute considerably to a 'more structured contextual explanation' of business models and complement transition theory with

explanations of 'more detailed causal mechanisms (p. 42)'. This book integrates research on business models and sustainability transitions to acknowledge the interrelation between organisations and their wider environment, respectively, the systems in which they are embedded, while they try to contribute to sustainable development.

The chapters contained in this book touch upon a number of key areas in understanding and leveraging business models for sustainability transitions through three themes: Part I: Crossing the Chasm: Integrating Business Model and Sustainability Transition Perspectives; Part II: Beyond Business-as-Usual: Alternative Value Creation Logics Driving Sustainability Transitions; and Part III: Being the Change: Transformative and Transformed Business Models in Selected Industries.

The research gaps identified by discussing these themes point to several interesting questions for future research. For one, we need to explore the role of time for business models for sustainability transitions. Second, we need to explore how business models may assist in understanding the interaction patterns between organisations and society in transition processes. Third, how do the transition pathways, as described in the transition literature (e.g., Geels et al., 2016), impact business models, and vice versa? And finally, we have to open the black-box of public policy and its role for motivating business models for sustainability transitions and socio-technical system change.

References

Aagaard, A. (2019). *Sustainable business models: Innovation, implementation and success*. Palgrave Macmillan.

Aagaard, A., & Ritzén, S. (2019). The critical aspects of co-creating and co-capturing sustainable value in service business models. *Creativity and Innovation Management, 29*(2), 292–302.

Bansal, P. (2005). Evolving sustainability: A longitudinal study of corporate sustainable development. *Strategic Management Journal, 26*, 197–218.

Berkhout, F., Smith, A., & Stirling, A. (2004). Sociotechnical regimes and transition contexts. In B. Elzen, F. W. Geels, & K. Green (Eds.), *System innovation and the transition to sustainability: Theory, evidence and policy* (pp. 48–75). Edward Elgar.

Bidmon, C. M., & Knab, S. F. (2018). The three roles of business models in societal transitions: New linkages between business model and transition research. *Journal of Cleaner Production, 178*, 903–916.

Bolton, R., & Hannon, M. (2016). Governing sustainability transitions through business model innovation: Towards a systems understanding. *Research Policy, 45*(9), 1731–1742.

Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: State-of-the-art and steps towards a research agenda. *Journal of Cleaner Production, 45*, 9–19.

Boons, F., Montalvo, C., Quist, J., & Wagner, M. (2013). Sustainable innovation, business models and economic performance: An overview. *Journal of Cleaner Production, 45*, 1–8.

Dryzek, J. S. (2005). *The politics of the earth: Environmental discourses*. Oxford University Press.

EEA Report. (2019). Sustainability transitions: Policy and practice. No 09. ISSN 1977-8449. Access online here: https://www.eea.europa.eu/publications/sustainability-transitions-policy-and-practice

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

Foxon, T., Bale, C., Busch, J., Bush, R., Hall, S., & Roelich, K. (2015). Low carbon infrastructure investment: Extending business models for sustainability. *Infrastructure Complexity, 2*, 4.

Geels, F. W. (2005). *Technological transitions and system innovations: A co-evolutionary and socio-technical analysis*. Edward Elgar Publishing Ltd.

Geels, F. W., & Johnson, V. (2018). Towards a modular and temporal understanding of system diffusion: Adoption models and socio-technical theories applied to Austrian biomass district-heating (1979–2013). *Energy Research and Social Science, 38*, 138–153.

Geels, F. W., Kern, F., Fuchs, G., Hinderer, N., Kungl, G., Mylan, J., Neukirch, M., & Wassermann, S. (2016). The enactment of socio-technical transition pathways: A reformulated typology and a comparative multi-level analysis of the German and UK low-carbon electricity transitions (1990–2014). *Research Policy, 45*, 896–913.

Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy, 36*, 399–417.

Global Footprint Network. (2020). World footprint. Global Footprint Network website. http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/. Accessed Mar 2020.

Grin, J., Rotmans, J., & Schot, J. W. (Eds.). (2010). *Transitions to sustainable development. New directions in the study of long term transformative change* (Routledge studies in sustainability transitions). ebrary, Inc. Routledge.

Hannon, M. (2012). *Co-evolution of innovative business models and sustainability transitions: The case of the Energy Service Company (ESCo) model and the UK energy system*. PhD thesis. School of Earth and Environment, University of Leeds.

Hannon, M. J., Foxon, T. J., & Gale, W. F. (2013). The co-evolutionary relationship between energy service companies and the UK energy system: Implications for a low-carbon transition. *Energy Policy, 61*, 1031–1045.

Huijben, J. C. C. M., Verbong, G. P. J., & Podoynitsyna, K. S. (2016). Mainstreaming solar: Stretching the regulatory regime through business model innovation. *Environmental Innovation and Societal Transitions, 20*, 1–15.

Köhler, J., Geels, F. W., Kern, F., Markard, J., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S., Nykvist, B., Onsongo, E., Pel, B., Raven, R., Rohracher, H., Sandén, B., Schot, J., Sovacool, B., Turnheim, B., Welch, D., & Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions, 31*, 1–32.

Loorbach, D., Van Bakel, J. C., Whiteman, G., & Rotmans, J. (2010). Business strategies for transitions towards sustainable systems. *Business Strategy and the Environment, 19*, 133–146.

Lüdeke-Freund, F., Carroux, S., Joyce, A., Massa, L., & Breuer, H. (2018). The sustainable business model pattern taxonomy—45 patterns to support sustainability-oriented business model innovation. *Sustainable Production and Consumption, 15*, 145–162.

Lüdeke-Freund, F., & Dembek, K. (2017). Sustainable business model research and practice: Emerging field or passing fancy? *Journal of Cleaner Production, 168*, 1668–1678.

Lüdeke-Freund, F., Rauter, R., Pedersen, E. R. G., & Nielsen, C. (2020). Sustainable value creation through business models: The what, the who and the how. *Journal of Business Models, 8*, 62–90.

Markard, J., Geels, F. W., & Raven, R. (2020). Challenges in the acceleration of sustainability transitions. *Environmental Research Letters, 15*(8), 81001.

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions. An emerging field of research and its prospects. *Research Policy, 41*(6), 955–967.

Massa, L., Tucci, C., & Afuah, A. (2017). A critical assessment of business model research. *Academy of Management Annals, 11*(1), 73–104.

Massa, L., Viscusi, G., & Tucci, C. L. (2018). Business models and complexity. *Journal of Business Models, 6*, 59–71.

Remane, G., Hanelt, A., Tesch, J., & Kolbe, L. M. (2017). The business model pattern database — A tool for systematic business model innovation. *International Journal of Innovation Management, 21*(01), 1750004.

Schaltegger, S., Hansen, E. G., & Lüdeke-Freund, F. (2016). Business models for sustainability: Origins, present research, and future avenues. *Organization & Environment, 29*(1), 3–10.

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business models for sustainability: A co-evolutionary analysis of sustainable entrepreneurship, innovation, and transformation. *Organization & Environment, 29*(3), 264–289.

Schot, J., & Kanger, L. (2018). Deep transitions: Emergence, acceleration, stabilization and directionality. *Research Policy, 47*, 1045–1059.

Smith, A., Vos, J.-P., & Grin, J. (2010). Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. *Research Policy, 39*, 435–448.

Sovacool, B. K., Hess, D. J., Amir, S., Geels, F. W., Hirsh, R., Medina, L. R., Miller, C., Palavicino, C. A., Phadke, R., Ryghaug, M., & Schot, J. (2020). Sociotechnical agendas: Reviewing future directions for energy and climate research. *Energy Research & Social Science, 70*, 101617.

Starik, M., Stubbs, W., & Benn, S. (2016). Synthesising environmental and socio-economic sustainability models: A multi-level approach for advancing integrated sustainability research and practice. *Australasian Journal of Environmental Management, 23*(4), 402–425.

Stoknes, P., & Rockström, J. (2018). Redefining green growth within planetary boundaries. *Energy Research and Social Science, 44*, 41–49.

Stubbs, W., & Cocklin, C. (2008). Conceptualizing a sustainability business model. *Organization & Environment, 21*(2), 103–127.

Teece, D. J. (2006). Reflections on "Profiting from Innovation". *Research Policy, 35*(8), 1131–1146.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long Range Planning, 45*(2–3), 172–194.

Turnheim, B., & Sovacool, B. K. (2020). Exploring the role of failure in socio-technical transitions research. *Environmental Innovation and Societal Transitions, 37*, 267–289.

Wells, P. (2013). *Business models for sustainability*. Edward Elgar.

Wells, P. (2016). Degrowth and techno-business model innovation: The case of Riversimple. *Journal of Cleaner Production*. https://doi.org/10.1016/j.jclepro.2016.06.186

Wells, P., & Nieuwenhuis, P. (2012). Transition failure: Understanding continuity in the automotive industry. *Technological Forecasting and Social Change, 79*, 1681–1692. https://doi.org/10.1016/j.techfore.2012.06.008

Wesseling, J. H., Bidmon, C., & Bohnsack, R. (2020). Business model design spaces in socio-technical transitions: The case of electric driving in the Netherlands. *Technological Forecasting and Social Change, 154*, 119950.

Wirtz, B., Göttel, V., & Daiser, P. (2016). Business model innovation: Development, concept and future research directions. *Journal of Business Models, 4*, 1–28.

Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business models: Origin, development and future research perspectives. *Long Range Planning, 49*(1), 36–54.

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