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Sustainable Business Models through Service Design

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Abstract

In the face of growing sustainability challenges, pressure on businesses to decouple environmental impacts from growth is mounting. New sustainable business models can be a systemic driver for change in industry and the wider business innovation literature suggests that strategic design approaches can be at the heart of business model innovation. One such approach, service design, involves solving problems through a service response, which unlocks value for each stakeholder in a value chain. Nevertheless, the value of service design to sustainable business is still often overlooked. Through a literature review and five illustrative case studies this paper systematically analyses how businesses can leverage service design for sustainable business model innovation. The research highlights how service design can support sustainable business model innovation by uncovering strategic as well as operational synergies between these complementary fields.

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1. Introduction

It is estimated that by 2030, three billion new consumers will enter the global economy [1]. Global consumption patterns are already unsustainable [2] and society faces serious environmental challenges, from rising global resource demands, to climate change, water scarcity, threats to biodiversity and air pollution [3]. Urgent action is needed to implement systems that foster technological, social and organizational innovation for sustainability [4].

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In Europe services are an engine for economic growth, contributing two thirds of EU employment and over 70% of gross value added in many member states [5]. Transitioning to services is put forward as a strategy to shift to the so-called circular economy (CE), itself a driver for more sustainable practices in industry [1]. The CE conceives an industrial shift from the current linear economy, which is based on a system of take-make-waste, to a closed loop system, which cycles and cascades resources between industries (as feedstock) to unlock multiple value streams [1]. Indeed, circular business models (one type of sustainable business model) have been discussed that focus on retaining products in a closed loop supply chain through repair, remanufacturing and refurbishment and materials through recycling and upcycling [1]. Such approaches require new types of service offerings and service skills including, product remarketers, sales platforms, remanufacturers and reverse logistics companies.

These grand challenges are often described as 'wicked problems', problems with poorly defined parameters, fuzzy boundaries and non-binary solutions [6]. Strategic design approaches, such as service design, are promising methods to grapple with such complexity [7]. Service design is the process of planning and organizing people, technology and material components to enhance the quality of interactions between customers and providers [8]. Nevertheless, while it has been suggested that service design can be a facilitator of service-led business model innovation (BMI) [9] further research is still required to build knowledge of how to deliver such services in the context of sustainable business [9].

In this paper we aim to uncover the synergies and points of divergence between BMI and service design from the viewpoint of sustainability: How can service design thinking, methods and tools contribute to sustainable BMI? The research includes five illustrative case studies of firms at various stages of BMI centered on service integration. The cases are supported by a theoretical framework derived from a literature review on BMI, sustainable business models and service design theory. The research contributes to the fields of service design and sustainable BMI by unpicking the conceptual and practical synergies between these complementary fields.

2. Literature

2.1. Service design

Service design involves solving problems through a service response, which unlocks and magnifies new forms of value for each stakeholder in a value chain. Schneider & Stickdorn [10] describe it as an iterative process of designing, evaluating, measuring and redesigning. Early descriptions of service design focus on the creative yet functional delivery of a service, involving planning and shaping usable and tangible elements of a service experience [11]. Designing for these functional service interactions involves designers translating intangible experiences into tangible forms, through methods such as personas, customer journey maps, service blueprints, storyboards, scenarios and experience prototypes [12]. Taking a service design approach can disrupt traditional channels to market, lead to innovation, increase customer satisfaction, improve firm effectiveness and offer a means for differentiation to ultimately boost competitiveness [8]. While the fruits of a service design process can be tangible and discrete services for clients, an alternative view sees service design as a human-centered design thinking approach [13]to develop people-centered service systems focused on stakeholders [14, 15]. Service design can open up opportunities for systemic innovation, in the absence of a specific service offering [11]. Treating the service system (people, technologies, resources) as a unit of analysis allows for the study of complex configurations of resources, which in turn create value for firms [11]. So doing, service design can foster strong connections to improve the workings of a whole system and therein optimize value for all stakeholders. Indeed, a key element of service-centered businesses involves unpicking intangible and non-monetary value attributes of a service offering [11]. Nevertheless, the suitability of existing service design tools, for more systemic types of innovation remains unclear [11].

2.2. Sustainable business model innovation

A business model is a conceptual tool to describe the interconnected activities that determine business transactions between customers, partners and vendors [16] which can convey how successfully a business creates, captures and delivers value [17, 18]. Boons and Lüdeke-Freund [4] describe a generic business model framework as the combination of: a value proposition; the supply chain; the customer interface; and the financial model. A sustainable business model then, is a template for a sustainable business and considers the triple bottom line (environment, society,

economy) [4, 18]. Boons and Lüdeke-Freund [4] describe three interdependent categories of sustainable business models: organisational; technological and social. Nevertheless, it has been suggested that such practices still fail to penetrate wider industry [19]. The related concept of business model innovation (BMI), in essence business redesign, has grown in recent years and involves redesigning the architecture of a firm by looking at how those partners are integrated, value is created for customers, and profits are generated [20]. BMI is a temporal, systematic and iterative process of innovation where external and internal dimensions of a firm rationalize each other for both radical and incremental innovation [5]. Bonakdar & Gassmann [21 citing Gassmann et al. 2014] define distinct phases within the process of BMI: initiation, ideation, integration and implementation.

To-date the topic of services has been integrated in the sustainable business literature through Product-Service-Systems (PSS) and servitization. A PSS is an integrated bundle of products and services which aims at creating customer utility and generating value [22, 23, 24] and can include product leasing, sharing, pooling and pay-per-use amongst others [23, 24]. However, PSS are *also* perceived to have failed to translate into business action [24, 25] due to a combination of factors such as internal firm culture, capabilities, the need for new forms of multi-firm collaboration, poor consumer acceptance, as well as barriers related to competitiveness and cost of labour in new PSS business models [24, 26]. In the past, Tukker & Tischner [27] critiqued a lack of consideration of wider business management theory as well as the omission of the client in PSS literature. While an explicit intention of PSS is to foster customer value [24] it still remains a gap in the PSS literature today, which overemphasizes production-related aspects of the PSS while consumption-related factors, have been overlooked [28]. This oversight is important when considering a successful transition to service-centered business is predicated on the consumer of products, becoming a user of services. In addition, the servitization literature focuses on the path companies take to service-centered business models rather than probing *how* transitions are undertaken [29].

2.3. Conceptual links between service design and sustainable business model innovation

The wider business innovation and management literature suggests that strategic design approaches can be at the heart of BMI [13, 15, 21, 30]. Bonakdar & Gassmann [21] describe how the process of BMI can draw parallels with the iterative process of design thinking. Tukker [24] alludes to the conceptual links between service design and sustainable business models (such as PSS) and Ceschin [26] formulates a transition process to PSS, underpinned by service design methods. In summary, the processes of service design and BMI are synergistic yet still have to be unpicked within the broad context of sustainable BMI. Table 1 compares the core conceptual synergies between sustainable BMI and service design.

Table 1. Conceptual Comparison of Sustainable Business Model Innovation and Service Design

Element	Sustainable Business Model Innovation	Service Design
Goal-oriented	Articulates strategic value for stakeholders in a business context	Uncover, articulate and deliver strategic value for multiple customers / users based on relationships and experiences
	Focus: single firm and its opportunity to extend the triple bottom-line (ecological, economic & social value)	Focus: user-centred uncovering multiple firms' needs in context of social value and traditional financial capital*
Processual	Transitional: initiate, ideate, integrate, implement	Iterative: design, evaluate, measure and redesign
	Systemic: the business model unit fosters a systems approach	Systemic: the service design approach is derived to tackle wicked problems involving multiple needs and contexts
Functional	Stakeholder-based	User-centred
	Strategic decision-making	Strategic as well as operational decision-making
	Resource, social, economic value	Social, economic value*

Sources: Sustainable business model: [4, 18, 24, 31] *Service design:* [10, 24, 32, 33] *(*denotes exception of sustainable PSS)*

First, the sustainable business model concept is underpinned by the benefit of fostering a broader remit of value exchange supported by multiple stakeholder relationships, rather than a unilateral resource transaction, or sale of a specific product [15, 26]. Similarly, while service design ultimately leads to the provision of a service, theoretically, service design focuses on user experiences, interactions and value to foster mutually beneficial relationships [10, 15]. Second, both can be seen as processes characterized by iteration and dynamic learning to foster systemic innovation. Third, both foster stakeholder-driven approaches for strategic decision-making, oriented towards value creation, beyond the financial.

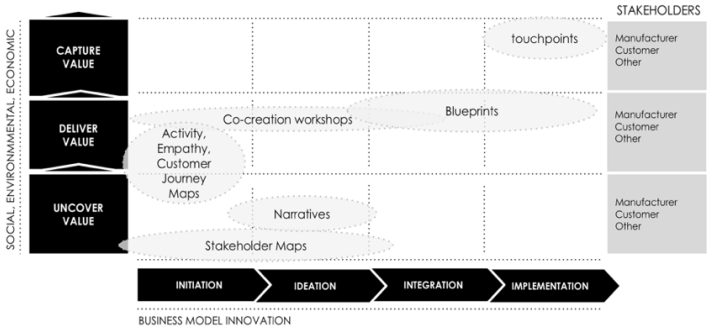


Fig. 1. Mapping Service Design to sustainable BMI [17, 18, 21, 33]

2.4. Research & practice gap

While design can be at the heart of BMI, the value of service design in facilitating new strategic sustainable business activities has yet to be explored. Service design appears to be overlooked in the sustainable business literature with little empirical research up to now on the potential of service design within the context of sustainable BMI. To-date service design has mainly been considered in the context of PSS [24, 26]. Indeed, while multiple stakeholder value has long been recognized as critical to achieve a more sustainable society [34] there is still a lack of tools to aid the process of clarifying stakeholder benefits [35]. Service design thinking, methods and tools, offer opportunities to bridge this gap. Offering diagrams, user interviews, context and user journey maps, can help to uncover needs where service prototyping and blueprinting tools can bridge between stakeholders needs [33] and satisfied through service touch-points [15]. Simonchik et al., [36] describe how co-creation workshops, including maps, narratives and flows, can aid manufacturers with understanding customers, in the early stages of BMI towards a PSS. This gap combined with the conceptual synergies (section 2.3), show a need for an overarching discussion to unify these topics. Fig. 1 describes the conceptual framework underpinning the work, linking service design methods to different stages of BMI [21 citing Gassman et al., 2014] for sustainable value creation [4, 18].

Table 2. Overview of Cases

	Company	Sector	Type	Case Focus	Maturity of the business	BMI maturity
1	Bundles *(founded 2014)*	Laundry Services	B-to-C	Providing laundry services	Start-up	Early stage
2	Nudie Jeans *(founded in 2001)*	Clothing & Apparel	B-to-C	Selling and repairing jeans	Medium-sized company	Late-stage
3	Fairphone *(founded 2013)*	Mobile Technology	B-to-C	Mobile technology	Start-up	Mid-stage
4	Orangebox *(founded 1998)*	Furniture	B-to-B	Furniture remanufacturing	Medium-sized established business	Mid-late stage
5	British Telecom *(founded 1969)*	Telecommunications	B-to-B	Wireless broadband router provision	Large multinational established business	Late-stage

3. Methodology

The research is exploratory, using a literature review supported by desk-research to generate illustrative case studies on the interplay between service design and sustainable BMI. This desk-research involved reviewing reports, grey and company literature and company websites. The chosen cases illustrate a range of examples from those operating in business-to-business and business-to-consumer markets, as well as start-ups to established businesses seeking more sustainable business practices. The unit of analysis is the business model of the companies analyzed and the cases are analyzed thematically. The objective of the paper is not to evaluate the sustainability of a given business approach but rather to uncover the (potential) role of service design in facilitating transitions to more sustainable business practices.

4. Results & Analysis

4.1. Bundles

Bundles is an early stage Dutch start-up founded in 2014, whose mission is to provide clean clothes on a pay-per-wash basis. Its sustainable business model provides access *to* a washing service [37]. The customer pays a deposit and a monthly subscription fee yet customers can close the contract at any time*, flexibility which* increase*s* customer*'s* positive response to the model. For the customer, the integration of Bundles' *smart data*-tracking technology offers real-time data on wash cycle duration, temperature and machine load, each of which can add cost. In addition, Bundles offers a repair and maintenance service and the technology also provides insight into the optimum time for product replacement, repair and/or remanufacturing. The financial model brings high-quality products to customers who may not be able to afford the upfront cost of high-end appliances ordinarily, which may also benefit through a lower life-cycle cost for the client.

4.2. Fairphone

Fairphone is a Dutch social enterprise with a vision to create a fairer economy by creating a movement for fairer mobile technology through repair [38]. Its sustainable business model is focused on transparent supply chains, promoting self-repair by providing instructional guides and offering an in-house repair service. It has taken a user-centered co-creation approach through in-depth user interviews, to segment its customer base into five key groups. This, in turn, informs its hybrid business model through which products are both leased and sold [39]. This allows new value propositions to be opened up for different customer segments (including lower tech price sensitive options). Service blueprints were used during the development process to clarify stakeholder needs [ibid.].

4.3. Nudie Jeans

Nudie Jeans is a medium-sized Swedish apparel company founded in 2001 with a vision to establish a 100% transparent supply chain. Its sustainable business model focuses on product life extension through repair, supported by further upcycling and finally recycling of old jeans into new products. The service offering is rolled out through a network of repair shops where customers can avail of a free repair service. Alternatively, if travelling to a repair point is cumbersome or infeasible, Nudie will provide free repair kits to its customers. The services harness customer values of *slow consumption* and the opportunity for personalization [40].

4.4. Orangebox

Orangebox is a design-led manufacturer of office furniture, with expertise in designing sustainable task chairs. Since 2013, Orangebox has explored the potential to offer remanufacturing services to its customers, through a combination of sales and lease contracts, depending on client preferences. Throughout the process of BMI, it incorporated multiple service design techniques for multiple purposes. During the early stages it used user interviews, personas and stakeholders maps to uncover customer perceptions, needs and values of the proposed innovation [33].

This ensures the value for the client is fully rationalized in the service, and in the later stages of the BMI, the implementation stage, service blueprints and prototypes are used [ibid.].

4.5. BT

British Telecom is a multinational telecommunications company. Its Net Good vision sets out the firm's aim to live within the constraints of the planet [41]. Through life cycle analysis, it identified carbon losses during the home delivery service of its Homehub wireless broadband routers [ibid.]. By focusing on environmental needs as well as customer-oriented solutions it identified a key inefficiency in the latter stages of its delivery process. Missed deliveries gave rise to high transport and carbon costs and increased customer dissatisfaction. To resolve this BT adopted a service design approach to conceive its Swap Box solution, combined with a redesigned slimmer router, which could fit through any letterbox. The Swap Box can be used by the client to easily return the old router. The solution avoids unnecessary redelivery courier trips, fees, as well as inconvenience for the customer having to collect products at a depot [ibid.]. This saved transport costs for the company and reduced its carbon emissions (37 tonnes annually) [ibid.].

4.6. Cross-case analysis

The cases described illustrate instances where service design tools are explicitly integrated during processes of BMI as well as instances where opportunities to utilize service design thinking can be observed. Table 3 summarizes benefits identified, relevant tools and the stage of BMI the firm is at.

Table 3 Cross Case Analysis

Service Offering	Benefit of Service Design for BMI	Relevant Service Design Tools	Stage of BMI
Bundles' smart devices track user behaviour and machine performance	• Information feedback to producer on optimal point for repair remanufacturing • Allows user to manage use and reduce operating costs • Opens market for high end goods to customers on lower incomes	Co-creation workshops, user interviews, user personas, user journeys	Early
Fairphone offers repair services for its mobile technology devices.	• Customer segmentation reveals new value propositions • Increased customer satisfaction by mapping stakeholder needs upfront	Co-creation workshops* Service blueprints*	Mid-Late
Nudie Jeans offers free repair service and a trade-in discount at the point of new sales	• Better awareness of services on offer • Increased customer satisfaction • Personalisation taps into customer value / identity	User journeys*	Mid-Late
Orangebox offers remanufacturing services, through a combination of sales and lease contracts.	• Optimisation of the service delivery • Stakeholder attitudes to the proposed innovation	Personas*, customer journey* maps*, user interviews* Blueprints*, service prototypes*, ethnography*, shadowing*	Early-Mid Mid-Late
BT offers first time delivery service for its, providing a Swap-Box which the customer can use to return the old modem	• Service focuses on optimal convenience for user, ensuring viability of BM • Allows the customer to send back old products conveniently • Ensures BT receive a reverse flow of product	Personas, stakeholder journeys, user interviews Blueprints, service prototypes	Early-Mid Mid-Late

** Indicates instances where the methods were actually used by the case companies*

The cases allow for an updated framework (Fig. 2) showing when a given service design approach may be used during a BMI process and the benefits for stakeholders.

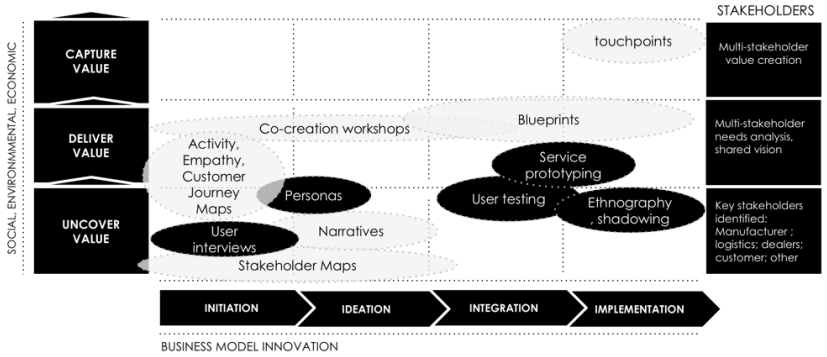


Fig. 2. Mapping service design to sustainable BMI through case observations.

5. Discussion

BMI for sustainability is viewed as a promising lever to change businesses at a systems-wide level [4, 16]. To date, few if any papers have linked BMI to service design and even in well-established sustainable business model literature on PSS, service design is only addressed by a few key authors [45]. This paper has compared the two concepts and identified several synergies and opportunities for service design to support sustainable BMI. First, service design and sustainable business model literature both focus on satisfying stakeholder concerns. Second, both are focused on improving and optimising an "overall system" (e.g. a whole business or service). Third, both adopt an iterative and dynamic process of change for innovation. Fourth, both areas benefit from a range of emerging tools and methods targeted at practitioners. However, there is no standard framework or clear synergy between these tools and methods as yet. Finally, both concepts help businesses uncover, capture and create value at various stages of business maturity.

Sustainable business models incorporate multiple stakeholder concerns in the way business is done, whereas service design is focused on the customer where they are the key 'stakeholder' [20]. Service design as a concept can easily be used to the benefit of multiple-stakeholder business model redesign. Indeed, adopting a service-led approach focused on stakeholders, opened up a clearer vision of the entire system needs [55]. A broad range of additional business benefits are put-forward in the service design literature, nevertheless the benefits achieved through service design methods have yet to be considered in the context of sustainable BMI. Here, benefits of service design are identified for manufacturers seeking both innovative and *sustainable* business models including: new markets; customer segmentation; performance optimisation; increased customer satisfaction; means to develop new value propositions; and improved information flow.

6. Conclusion

This article contributes to both the service design and sustainable business model literature by showing the synergies between these topics with respect to goal-oriented; processual and functional characteristics (Table 3). In addition, the opportunities to adopt service design tools during a predefined process of BMI is outlined (Fig. 2). In this conceptual framework, the opportunity to use a particular service design approach (such as stakeholder mapping) is mapped to a specific stage of the BMI (such as ideation), which value activity it relates to and for whom. This paper draws on five illustrative cases and therefore there are some limitations to the conclusions drawn. However, the article outlines a basis for future research on this topic. In particular, the following areas for further investigation are identified: How and when can service design benefit stages of the sustainable BMI? To what extent are service design tools sufficient to satisfy the needs of sustainable BMI? How can the process of sustainable BMI draw on the processes of service design? Can service design improve the viability of new business models?

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