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# Sustainable business model innovation and scaling through collaboration

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## ABSTRACT

Over the past decade, scholars and practitioners have increasingly paid attention to sustainable business models (SBM). How to upscale SBMs is a key question in transition research, but current research has rarely adopted a firm-level perspective to discuss the scaling strategies that initiators of SBMs can use. Collaboration with other actors is one of these scaling strategies, but its adoption by firms hinges on different factors. Considering the type of initiator of the SBM (newcomer vs. incumbent firm) and the differentiation of the SBM's value proposition (high or low), we propose a framework which distinguishes four 'scaling-through-collaboration' strategies that firms can use. We explain each strategy with illustrative examples and discuss the array of potential partners and the incentives to pursue collaboration with them. Our work shows how firms can contribute to sustainability transitions by leveraging collaboration to scale their SBM.

## 1. Introduction

Over the past decade, scholars and practitioners have increasingly paid attention to sustainable business models (SBMs), i.e., business models that “create significant positive and/or significantly reduced negative impacts for the environment and/or society” (Bocken et al., 2014, p. 44). SBMs are the result of a process of innovation, labelled by some as “business model innovation for sustainability” (Bocken et al., 2014), i.e., the “designed, novel, and non-trivial changes to the key elements of a [...] business model and/or the architecture linking these elements” (Foss and Saebi, 2017, p. 201) aimed at furthering environmental and/or social value creation. In transition research, business models have been discussed as vehicles to bring innovative technologies to the market, but also as powerful forms of innovation in and of themselves that can trigger regime change (e.g., Aagard et al., 2021; Bidmon and Knab, 2018; Wainstein and Bumpus, 2016).

The literatures on business models and transitions have both assigned increasing importance to the growth of SBMs and their diffusion to the mass market, as key to fostering the creation of environmental and social value. Indeed, in order to accelerate sustainability transitions and to address the widespread and pervasive presence and impact of issues such as poverty, plastic pollution, food waste and carbon dioxide emissions, it is critical that SBMs do not remain limited to niche markets, and that they reach numbers

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of customers and beneficiaries that match the scale of the issues to be addressed (e.g., Jolly et al., 2012). From a management perspective, SBM growth can be conceptualized as “scaling”. According to the entrepreneurship literature, scaling refers to organizations undertaking a “persistently rapid growth” (Reuber et al., 2021)<sup>2</sup>. A related concept is “scalability”, which refers to the capacity, residing in the business model itself, to reach a growing customer base and increase sales (Täuscher and Abdelkafi, 2018).

The business model literature has often discussed scaling and scalability particularly in the context of smart collaboration strategies (Bohnsack and Liesner, 2019). Transition research has rather explored “upscaling” processes, i.e., the diffusion of SBMs in the system and its disruption of existing regimes (e.g., Huijben et al., 2016; Jolienk and Niesten, 2015; Van Waes et al., 2018). Such research has taken recourse to work on the diffusion of innovation, which explains the rise of a novel technology as a self-reinforcing dynamic driven by increasing returns to adoption for both producers and users (Arthur, 1989; Rogers, 2003). The scaling and upscaling concepts are connected: when an individual organization is the initiator of an SBM, it will reach more customers and beneficiaries by scaling its SBM, hence diffusing the SBM in the market. Scaling SBMs in the mass market, however, is often a key challenge (Hockerts and Wüstenhagen, 2010; Schaltegger et al., 2016b). For instance, Palomares-Aguirre et al. (2018, p. 4507) suggest that the “lack of scalability is a major challenge for sustainable business models”. Transition researchers have also been very interested in the constraints that existing regime rules cause for SBMs’ upscaling, and they posit that the initiators of SBMs need to decide whether to fit-and-conform to these rules or find smart ways to stretch-and-transform them (e.g., Huijben et al., 2016; Meijer et al., 2019; Wesseling et al., 2020).

Collaboration with other actors is one feasible route to tackle the challenges inherent to scaling (Bloom and Chatterji, 2009) and has also been discussed for SBMs (e.g., Van Waes et al., 2018). From the vantage point of the firm that initiates the SBM, one critical factor that determines the need for collaboration is whether this firm is a newcomer operating in a market niche or an incumbent operating on the mass market. As Schaltegger et al. (2016b, p. 265) argue, “niche market players and mass market incumbents have different business models and, from a sustainable entrepreneurship perspective, different challenges in developing and establishing them”. Previous studies suggest that both incumbents and newcomers can bring SBMs to the market (Bocken et al., 2018; Bohnsack et al., 2014; Ciulli and Kolk, 2019; Halme et al., 2012; Roome and Louche, 2016). Whereas the latter are more likely to introduce entirely new SBMs, the former benefit from existing (non-financial) resources and networks which can be leveraged for the new endeavour (Bohnsack et al., 2014). For a comprehensive sustainability transformation of markets to occur, both the pursuance of sustainability-oriented opportunities by newcomers and the reorientation of incumbents targeting the mass market are required (Bocken and Geradts, 2020; Hockerts and Wüstenhagen, 2010; Schaltegger et al., 2012; Schaltegger et al., 2016b).

In the context of upscaling, the issue of how the SBMs that newcomers propose can ‘break out’ of niches and how this is accelerated or slowed down through collaboration with other actors has thus far received relatively more attention than the engagement and collaboration strategies of incumbents in SBMs (e.g., Huijben and Verbong, 2013; Van Waes et al., 2018). However, not only newcomers but also incumbents pursue collaboration to overcome barriers to SBM innovation and scaling (Dahan et al., 2010). Also, for both these actors, collaborations can range from more comprehensive and formal types (e.g., joint ventures) to looser (e.g., joint experiments) and narrow (e.g., collaborating on a specific activity) ones.

Drawing on the observation that the umbrella term ‘collaboration’ does not do justice to the different approaches to and forms of collaboration that market actors can use to scale SBMs, this paper suggests a framework to distinguish different ‘scaling-through-collaboration’ strategies. Building on extant literature, we propose a framework to determine an actor’s position regarding the need for collaboration, and subsequently use this framework to conceptually devise four possible strategies that newcomers and incumbents can use based on their position in the framework. To aid the accessibility of our arguments, we show how each strategy “look[s] like in practice” (Dyllick and Muff, 2016, p. 163) with short illustrative examples. Our framework provides a basis to discuss the firm- and business model-specific need for collaboration and the strategies that actors can pursue. This is helpful for advancing research on the role of SBMs in sustainability transitions; while the upscaling of SBMs has been identified as a critical issue by both transition and SBM researchers, the specific means that initiators of SBMs can use to scale have not yet received much attention. We then expand on the incentives to collaborate, suggesting that they can vary and may lead to different types of collaboration portfolios. This adds to the discussion of the benefits, but also the tensions that can emerge when incumbents or newcomers establish collaborations to scale their SBM.

The next sections are structured as follows: after explaining key aspects of SBMs and SBM innovation (Section 2), we highlight the important role of collaboration in facilitating the scaling of an SBM (Section 3). Section 4 then presents the theoretical framework, its two core dimensions and the four ideal strategies, including illustrative examples of how the latter work in practice. This is followed by a discussion of how different incentives may guide the need for collaboration when firms try to scale their SBM and of promising future research avenues, in Section 5. We conclude with the practical implications of our work.

## 2. Sustainable business models and scalability of innovation for sustainability

Over the last few years, research on sustainability transitions has increasingly leveraged concepts and frameworks from management theories to shed light on transformations leading to more sustainable systems (Sarasini and Langeland, 2021; Truffer et al., 2022). In this context, scholars have pointed at the “inertial and transformative potential” (Sarasini and Langeland, 2021, p. 229) of business models and have started adopting a (sustainable) business model lens to uncover firms’ role in sustainability transitions (e.g.,

<sup>2</sup> For a comprehensive discussion of scaling dimensions in the case of sustainability see Jolly et al. (2012).

Aagaard et al., 2021; Altunay et al., 2021; Sarasini and Linder, 2018).

The literature on SBMs, broadly defined, is rather recent; it has only emerged in the past decade. Stubbs and Cocklin (2008) introduced the concept of the “sustainability business model”, inspired by the already existing work on ‘generic’ business models. Over the years, different terms have been used to refer to business models that aim to create environmental and/or social value, with varying degrees of emphasis on the ‘non-financial’ aspects. Examples include “sustainable business model” (Bocken et al., 2014), “business model for sustainability” (Schaltegger et al., 2016a), “social business model” (Yunus et al., 2010), “Bottom of the Pyramid business model” (Kolk et al., 2014) or “circular business model” (Urbanati et al., 2017). While “sustainable business model” and “business model for sustainability” have been often interpreted as synonymous, the other concepts represent “different subcategories [...] for sustainable business models” (Geissdoerfer et al., 2018, p. 403), by zooming in on specific types of non-economic value creation (e.g., circularity for environmental value creation, value creation for the poor).

In this paper, we group these different terms under the umbrella concept ‘sustainable business model’ for two main reasons. First, as our study aims to cover the multifaceted nature of sustainability, the SBM concept is comprehensive in capturing different kinds of environmental and/or social value that can be created. Second, this concept is acknowledged across different research fields (e.g., Bocken et al., 2014; Bocken and Geradts, 2020; Clube and Tennant, 2020; Press et al., 2020; Sarasini and Linder, 2018). Scholars have considered the variety of business models to identify common traits that render them ‘sustainable’; in the process, they have proposed a range of definitions. The most widely adopted one is from Schaltegger et al. (2016a, p. 6): a sustainable business model “helps describing, analyzing, managing, and communicating (i) a company’s sustainable value proposition to its customers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries”.

Scholars have also advanced the understanding of the concomitant innovations (cf. Geissdoerfer et al., 2018), defined as those aimed “to create significant positive impacts, and significantly reduced negative impacts for the environment and society, through changes in the way the organization and its value-network create, deliver and capture value or change their value propositions” (Bocken and Geradts, 2020, p. 2). Business model innovation for sustainability may consist of different degrees of innovation. Degree of innovations differ, as firms may either undertake sustainability-oriented changes in individual components of existing, ‘conventional’ business models, or design a completely novel business model that integrates sustainability or even has it as core focus (Ciulli and Kolk, 2019; Kolk and Ciulli, 2020). For instance, Schaltegger et al. (2012) identified business model adjustment, business model adoption, business model improvement and business model redesign as potential forms of business model innovation. Given their comprehensive impact on the way value is created and captured, SBMs are often conceived of as a relatively radical form of innovation.

In order to realize such radically novel contribution to environmental and social value creation, scaling SBMs is paramount, and it encompasses different dimensions. For instance, Jolly et al. (2012) differentiate between deep scaling, which entails achieving a deeper impact among a given number of beneficiaries, and quantitative scaling, which refers to growing the number of beneficiaries. Particularly the latter is critical for SBMs, as it allows to drive a sustainability transformation in the industry and in the market (Bloom and Chatterji, 2009; Palomares-Aguirre et al., 2018; Schaltegger et al., 2016b). In order to make a real contribution to society and the environment, an SBM should not be limited to a niche but instead grow, expanding the number of customers and beneficiaries (Bocken et al., 2016; Palomares-Aguirre et al., 2018). This also helps to ensure the business model’s financial viability through, for instance, the recovery of initial investments and benefits from economies of scale (Bocken et al., 2016; Täuscher and Abdelkafi, 2018). Hence, more so than the mainstream business model literature, literatures on SBMs and sustainable entrepreneurship discuss growth as a means and as an end. For example, Jolink and Niesten (2015) posit that, in the case of SBMs, scaling can be motivated by both an environmental and a mass market effect and show that this is typically two sides of the same coin. In other words, growth ambitions may stem from an organization’s willingness to address environmental problems and/or increase its own economic performance.

Irrespective of firms’ motives, the more radical the departure from the status quo, the more difficult it can be for a novel business model to break through to the mainstream market (e.g., Bidmon and Knab, 2018; Wesseling et al., 2020). For example, previous work highlighted that sustainable innovations such as electric vehicles or solar PV initially tend to underperform on attributes such as the price/performance ratio in comparison to dominant solutions with mainstream customer appeal (e.g., Bohnsack and Pinkse, 2017). Moreover, they often require behaviour change by customers and users, or novel infrastructure and regulations (e.g., Huijben et al., 2016; Wesseling et al., 2020).

### 3. The role of collaboration in SBMs

The literature holds that external actors can play an important role in the diffusion of new products and services (Adner and Kapoor, 2010; Greenhalgh et al., 2004; Rogers, 2003). It has, for example, noted that networks and champions can support the active dissemination of innovations (Rogers, 2003) and that the success of an innovating firm often depends on the efforts of other innovators in its business environment (Adner and Kapoor, 2010). While this work mostly focuses on technological innovation, the importance of involving multiple stakeholders also holds for SBMs, as confirmed by several studies. Stemming from the complexity of the sustainability challenges that need to be tackled, research has highlighted the importance of pursuing business model innovation through the collaboration between different organizations and across sectors, for the co-creation of social and environmental value (e.g., Bocken et al. 2014; Kortmann and Piller, 2016; Lashitew et al., 2020; Oskam et al., 2018; Rey-Garcia et al., 2021; Urbanati et al., 2017), with recent work conceptualizing collaborative business models for sustainability (e.g., Pedersen et al., 2021).

The SBM literature has shown that collaboration can take a variety of forms. Ciulli and Kolk (2019) have explained that incumbents often partner with newcomers in order to join the sharing economy. Examples are car manufacturers that work with car-sharing and ride-hailing companies to test and scale-up innovative solutions such as autonomous vehicles (Wells et al., 2020). Wadin et al. (2017)

examined the development and failure of a “joint business model innovation” for sustainability which involved a large, incumbent, multinational utility and a small solar start-up. They identified the factors that may hamper the joint SBM innovation process: the strategic intent of the partners, as well as their culture, receptivity, transparency, complementary assets and conflicting assets. [Dahan et al. \(2010\)](#) instead highlighted how incumbents can co-create entirely new business models with non-governmental organizations (NGOs) to access local markets and create social value in developing countries.

Other studies underlined the importance of collaborating with a network of partners. For instance, [Hellström et al. \(2015, p. 227\)](#) explored the development of collaborative business models around renewables, showing how business models change “when firms move towards more cooperative arrangements, such as energy business ecosystems”. [Roome and Louche \(2016\)](#) pointed to the involvement of a network of parties in each stage of the innovation process. SBMs may involve designing ‘open’ business models, where collaborative value creation activities can be characterized by open boundaries that welcome new partners ([Oskam et al., 2021](#)), and actors external to the organization play an active role in environmental and social value creation (cf. [Kortmann and Piller, 2016](#)). SBMs in the context of the circular economy or platform business models in smart cities often require the interconnected efforts of multiple entities such as newcomers, incumbents and governmental actors to create value.

However, these studies also highlight that collaboration between different actors is rife with tensions and that organizations may have very different incentives to collaborate in an SBM ([Colaner et al., 2018](#); [DiVito et al., 2021](#); [Oskam et al., 2021](#)). Yet, deeper insights into these incentives and determinants of the need to collaborate are missing. Overall, this points to a need to better understand firms’ incentives and the BM-specific needs for collaboration and that “more research is still needed on how to better orchestrate the bricolage of collaborations between partners representing different organizations” ([Pedersen et al., 2021, p. 1043](#)).

Our paper addresses this gap by building on extant literature to develop a “conceptual” ([Quélin et al., 2017](#)), “theoretically informed typology” ([Allen et al., 2022](#)) of SBM scaling through collaboration. In keeping with previous conceptual studies (e.g., [Dyllick and Muff, 2016](#); [Quélin et al., 2017](#)), we devise the two “theoretical features or dimensions” ([Cornelissen, 2017](#)) of the framework by linking and integrating insights from prior research. We subsequently identify four ideal types of strategies that firms can plausibly adopt depending on their position along the two dimensions. As ideal types, such strategies are theoretically conceptualised based on logic and reasoning rather than on an aggregation of practices identified in a population. Similar to other conceptual studies that developed theoretical typologies (e.g., [Clark and Li, 2022](#), [Etchanchu and Djelic, 2019](#), [Schrage and Gilbert, 2021](#)), we then show what the ideal types of strategies “look like in practice” ([Dyllick and Muff, 2016](#)) with illustrative examples. Through purposeful sampling ([Seawright and Gerring, 2008](#)), we selected examples “as close as possible to the [...] [ideal] type that they represent” ([Etchanchu and Djelic, 2019, p. 901](#)). For all examples except one (Tesla), we were able to use information from interviews with the managers of the focal firms, complemented with secondary data (i.e., publicly available information); for Tesla only secondary data was used.

#### 4. SBM scaling through collaboration: a framework and illustrative examples

This section proposes a framework that considers, on the one hand, the type of actors that may be involved in SBM innovation and in initiating the scaling process and, on the other hand, the type of SBM which results from this engagement. The type of initiating actor is an important dimension because actors differ significantly in the resources that they have available, which represents their base for scaling. We differentiate between ‘large incumbents’ and ‘small newcomers’ as representing the endpoints of this continuum. The type of SBM is important because SBMs may differ significantly in the appeal they have for customers, i.e., the ease at which they can scale on their own. We distinguish between ‘high differentiation’ and ‘low differentiation’ of the value proposition. We posit that these two dimensions shape (a) how likely a firm is to establish collaborations to scale up the SBM, and (b) with which kind of actor(s) a firm is likely to pursue collaborations.

##### 4.1. Resource base of incumbents versus newcomers

Whatever form collaboration may take, it is important to understand the initiator(s) of SBM innovation, especially with an eye to the need for scaling, and the possible road to be taken for it. Analytically, it makes sense to separate incumbents and newcomers. Large (r) incumbent firms can integrate sustainability in their existing business model(s) to a greater or lesser degree ([Bocken and Geradts, 2020](#)), or add a new SBM to their portfolio. Often these changes are limited in terms of transformative potential ([Ciulli and Kolk, 2019](#)). On the other hand, usually smaller newcomers ([Bohnsack et al., 2014](#); [Hockerts and Wüstenhagen, 2010](#); [Schaltegger et al., 2016b](#)) more frequently introduce a radically different SBM that challenges the status quo in a certain sector. Importantly, these two actor types have very different resource bases at their disposal, whereby resources may refer to monetary resources, infrastructure (e.g., factories), access to a base for diffusion of a product/service (e.g., access to a solid value network) or to a new market segment, and intangible assets such as credibility, legitimacy and power ([Bohnsack et al., 2014](#); [Hockerts and Wüstenhagen, 2010](#)).

*Needs of incumbents.* While the innovativeness of SBMs may be less radical when developed by incumbents, the scaling potential may be larger. Extant literature has illustrated that incumbents have dominant market shares and their competitors do not have the ability or willingness to defy them ([Hill and Rothaermel, 2003](#); [Zhang and Gimeno, 2010](#)). Such market power also implies large financial resources, strong branding and marketing capabilities, an infrastructure on which they can rely, as well as a solid base for diffusion of new products in terms of supplier and distribution networks that help incumbents maintain their dominant position ([Bohnsack et al., 2014](#); [Debruyne and Reibstein, 2005](#); [Hockerts and Wüstenhagen, 2010](#); [Tripsas, 1997](#)). The possibility to exploit their existing resources and capabilities supports incumbents in the development and scaling of (new) SBMs and, as a consequence, in having a wide sustainability impact ([Bohnsack et al., 2014](#); [Hockerts and Wüstenhagen, 2010](#); [Wadin et al., 2017](#)). Scholars have,

however, also noted that their existing configuration and dominant position may hinder the engagement of incumbents, if they perceive that the new SBM may jeopardize and/or cannibalize their existing business model, which – while less/not sustainable – has been driving their success (Halme et al., 2012; Lüdeke-Freund et al., 2016; Yunus et al., 2010). Moreover, incumbents often face structural barriers, as a new business model may require the reconfiguration or replacement of existing assets and processes and require novel, sustainability-related capabilities (Bocken and Geradts, 2020; Halme et al., 2012; Roome and Louche, 2016). Finally, incumbents may be confronted with reservations about their credibility in public when engaging in sustainable entrepreneurship and get accused of greenwashing or whitewashing (Laufer, 2003; Torelli et al., 2019). Frequently, their engagement is met with scepticism, and it is questioned whether they have an honest desire to magnify sustainable impact or rather try to keep strategic control of (emerging) markets.

*Needs of newcomers.* Conversely, a high flexibility and dynamism, combined with a stronger environmental/social mission, often enable newcomers to take the lead in launching novel SBMs, with the aim of triggering a sustainability-oriented change in the market (Hockerts and Wüstenhagen, 2010; Schaltegger et al., 2016b). In comparison to “wealthy elephants”, sustainable entrepreneurs are often seen as the “virtuous mouse” (Austin and Leonard, 2008). They have strong reputational assets and credibility for sustainable values, and they may face less challenges in targeting a niche of new customer segments (Bohnsack et al., 2014; Schaltegger et al., 2016b). Yet, newcomers are confronted with limitations related to, inter alia, restrained (non-)financial resources, lack of experience, low market power and the absence of an infrastructure and base for diffusion of their innovative, sustainable solutions (Bohnsack et al., 2014; Schaltegger et al., 2016b). These factors inevitably pose challenges to an SBM’s survival and constrain its upscaling potential, which is paramount to making a significant impact in the market (Austin and Leonard, 2008; Hockerts and Wüstenhagen, 2010). Therefore, such smaller firms often struggle to expand beyond a niche of concerned consumers (Schaltegger et al., 2016b). Collaboration with incumbents and/or other firms is one of the options that can be pursued for their scaling, in addition to partnerships with non-business actors, for example, NGOs.

Overall, incumbents and newcomers initiate an SBM with very different resources. An incumbent, traditionally, can leverage financial resources, market power, and an existing infrastructure and value network, but often lacks credibility on sustainability. Conversely, a newcomer may benefit from a higher credibility and may more easily access a niche of new customers, but it has low market power and cannot rely on financial resources and on a solid base for diffusion of its sustainable solution. To scale an SBM, the most critical resource gaps have to be filled. Hence, we expect the resource base an actor has at its disposal to substantially impact the incentives to engage in collaboration for scaling.

#### 4.2. Differentiation of the value proposition

The insights from the previous section suggest the key role of collaboration in SBM innovation and scaling. It is, however, important to dive deeper into the nature of an SBM in order to understand how collaboration with other actors may facilitate its success in the market. Indeed, and as recognized in the literature, a business model is not monolithic; according to Osterwalder and Pigneur (2010), it consists of nine components. Recent studies have compiled these components into three core elements, namely: value proposition, value network (also called “value creation and delivery”), and value capture (also called “revenue and cost model”) (Bocken et al., 2014; Bohnsack et al., 2021). While each of these three elements determines the strengths and weaknesses of an SBM, it is the value proposition that is particularly critical, because it forms the starting point for the design of a business model (Bocken et al., 2018; Fjeldstad and Snow, 2018; Osterwalder and Pigneur, 2010). The *differentiation* of the value proposition, defined in the sense of Porter (2004) as superior attractiveness compared to other offers on the market, determines whether an SBM needs to compensate shortcomings (low differentiation) or offers something that stands out (high differentiation).

*Low differentiation.* In order for an SBM to have a substantial positive effect, its sustainable value proposition must not be bound to a small niche, but it must attract a much larger customer segment or even the mass market (Olson, 2013; Schaltegger et al., 2016b). The broad appeal of a sustainable value proposition is a core requirement for the scaling of an SBM, but this has been very difficult in practice, particularly with respect to individual consumers, as suggested by previous studies (Olson, 2013). While a small segment of ‘concerned’ consumers may be seen as unconditionally prioritizing environmental/social value creation in their purchases (Gupta and Ogden, 2009; Olson, 2013), several barriers deter the majority from choosing sustainable products over non-sustainable ones (Gleim et al., 2013; Griskevicius et al., 2010; Luchs et al., 2010; Tarkiainen and Sundqvist, 2009). Researchers have observed a frequent occurrence of an ‘attitude-behaviour gap’ (e.g., Bray et al., 2011; Young et al., 2010), as consumers often do not buy sustainable products despite caring about environmental and social problems (Gupta and Ogden, 2009; Olson, 2013). Key factors are related to the perception of sustainable products’ lower quality and functional benefits as well as higher (non-) monetary costs (e.g., higher price, time, cognitive effort) compared to conventional products (Barbarossa and De Pelsmacker, 2016; Gleim et al., 2013; Griskevicius et al., 2010; Lin and Chang, 2012; Ozaki, 2011).

In particular, the prioritization of products’ conventional attributes (e.g., performance, quality, availability, price), and the existence (or perception) of trade-offs between conventional and environmental/social attributes are frequently highlighted in extant literature as having a strong negative influence on the purchase of sustainable products (Moser, 2016; Olson, 2013; Vega-Zamora et al., 2014). Luchs et al. (2010), for example, found that a barrier to buying sustainable products is that they are perceived as being less effective than conventional products. For instance, fair trade products are often associated with lower quality, because consumers deem that the company’s focus is on ensuring the fulfilment of ethical requirements rather than on guaranteeing high quality (Bray et al., 2011; Hockerts, 2015). Moreover, higher prices of sustainable products can prevent customers from buying them (Gleim et al., 2013; Moser, 2016; Tarkiainen and Sundqvist, 2009), particularly “where they [see] no significant tangible reward” (Bray et al., 2011, p. 601).

These barriers denote the difficulty to distinguish a sustainable product from a conventional one (Moser, 2016; Tarkiainen and Sundqvist, 2009; Vega-Zamora et al., 2014). As the purchase of sustainable products often requires a change in consumers’ habits and routines, which carries a (perceived) risk and demands cognitive efforts and/or additional time, consumers may not be willing to do this if there is no clear benefit or ‘compensation’ when shifting from conventional, well-known strong brands and products to sustainable ones (Griskevicius et al., 2010; Tarkiainen and Sundqvist, 2009). Due to the perceived drawbacks of sustainable products, consumers may not see the advantage of purchasing them if they think that the actual beneficiaries of their purchase are ‘just’ other stakeholders, such as the environment or local communities (Kronrod et al., 2012). Work on value reconfiguration tactics (e.g., Bohnsack and Pinkse, 2017) has suggested collaboration is a common approach to enhance the perceived value of a novel solution and make up for points of inferiority compared to the mainstream solution on the market. Previous literature has also shown that endorsement from a credible source improves consumers’ perception of a sustainable product’s value (Lin and Chang, 2012). Thus, we conclude that when the differentiation of a sustainable value proposition is low or not yet equal to mainstream solutions, firms are relatively more inclined to pursue collaboration than when there is already a highly differentiated value proposition.

**High differentiation.** Extant literature posits that, due to the increasing diffusion of environmental and social concerns, sustainable products that do not present trade-offs or “that are also superior to [conventional] products on most conventional attributes, such as price, quality, and performance, are likely to be chosen by nearly all buyers” (Olson, 2013, p. 172). Griskevicius et al. (2010, p. 399) have added that consumers are more likely to buy a sustainable product when it allows them to increase their status and altruistic reputation in their social network, signalling a “willingness and ability to incur costs” in order to have a positive social and/or environmental impact and thus to create value for everyone. In addition, sustainable products that are widely available (e.g., at major retailers) and require limited cognitive effort and time are more likely to be preferred to conventional ones (Young et al., 2010). Hence, firms with sustainable value propositions, which consist of products/services that create environmental and/or social value, may be confronted with specific challenges, depending on the extent to which these goods have a “differentiation advantage” (Makadok and Ross, 2013). Goods are not seen as a commodity when it is possible for customers to clearly distinguish between sustainable and non-sustainable products belonging to the same product category, and when it is possible to create ‘superior’ customer value by delivering conventional as well as sustainable attributes. The extent to which the value proposition is differentiated should thus have a significant impact on the scaling of the SBM. In fact, customers’ hesitation or resistance to choose a sustainable product, due to the perceived absence of customer value, not only hampers the scaling of the SBM but also threatens its very survival.

The general relationship holds that the higher the value ratio of an offer, the greater the motivation to adopt it. In the context of sustainability, this means that SBMs that not only differentiate on the sustainability dimension but also offer advantages on other more

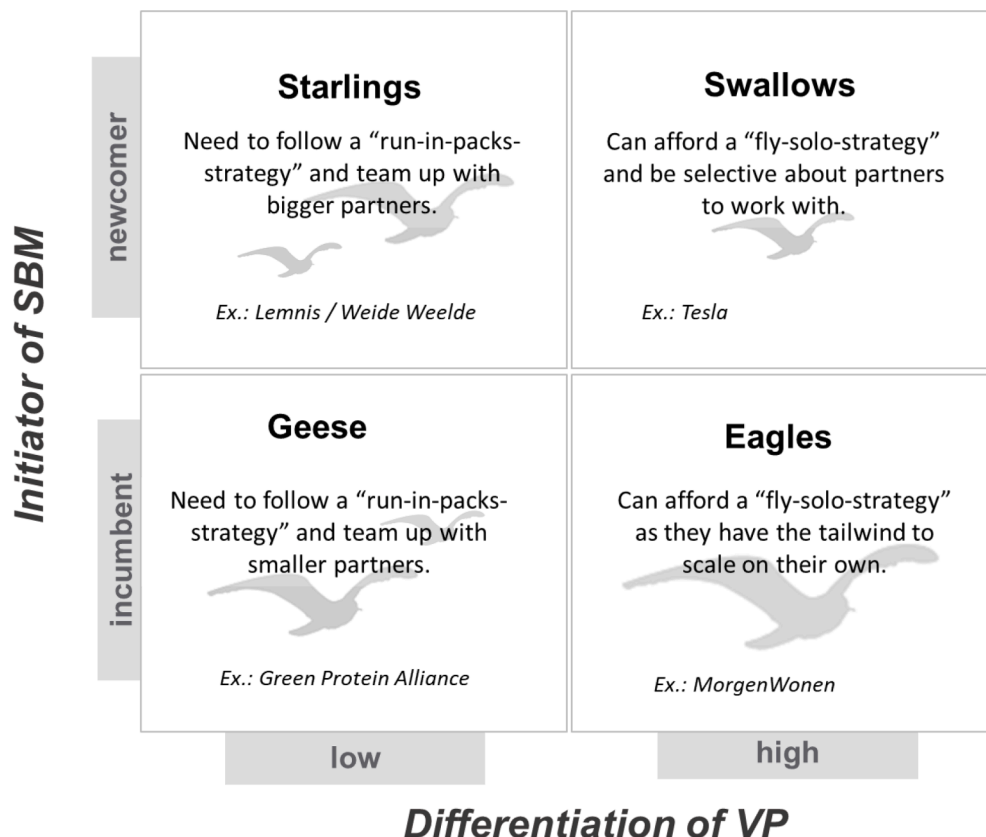


Fig. 1. SBM initiator and differentiation of the value proposition: Implications for collaboration to scale.

conventional dimensions are likely to scale much more easily than SBMs that only differentiate on the sustainability dimension. Engagement in specific forms of collaboration may help to overcome this limited differentiation.

#### 4.3. Strategies for scaling sustainable business models through collaboration

We ordered in a framework the insights on scaling derived from extant literature (see Fig. 1), as explained above. We distinguish between the type of actor who initiates the SBM (large incumbent or newcomer), and the degree of differentiation of the value proposition (here presented as a low-high dichotomy). Based on this framework, we devise four distinct positions to pursue collaboration for scaling an SBM. For ease of understanding, we use labels from the animal kingdom to elucidate each strategy. In the following sections, we explain each strategy and highlight how it works in practice with illustrative examples.

##### 4.3.1. Starling strategy

The *starling* strategy (left upper quadrant) refers to a situation in which the initiator of the SBM is a newcomer with a value proposition that creates environmental and social value but low additional customer value compared to rival offerings. The newcomer will likely have limited financial resources, lack a base for diffusion and have low market power. Although a newcomer would generally have less difficulties in building credibility around the environmental and social component of the offer, given the low differentiation it will find it challenging to convince customers of the overall worth of its value proposition. It is thus likely to be particularly difficult for the small firm to scale the SBM beyond a niche of concerned customers. In this case we expect a collaborative attitude to overcome these difficulties. The analogy with starlings (small birds) is that these birds flock together in large groups (collaborative strategy) as a defence strategy against raptors.

Lemnis Lighting epitomizes a firm adopting a starling strategy. Lemnis Lighting was founded in 2005 to stimulate the transition to energy-efficient LED technology in the lighting industry. As newcomer, it aimed to reduce the environmental impact of lighting, which was considered a pressing issue at that time, given that energy-inefficient incandescent lamps still fully dominated the lighting market. Yet, as newcomer Lemnis also had limited financial resources, no base for diffusion and hardly any market power. Moreover, the first LED lamp was a product with low differentiation. It provided light, like a normal lamp, but was much more expensive. In the end, there was a return on investment due to a higher energy efficiency and lifetime, but it was initially unknown to what extent these long-term benefits were appealing to customers. Although Lemnis developed many collaborations in its early years, the two that we include here were vital to its scaling.

First, Lemnis partnered with an emerging actor in energy sector, OXXIO, in 2006. Together they introduced Lemnis' first retrofit LED light (the Pharox lamp) that could substitute a 40W incandescent bulb. The sale and distribution went through OXXIO, which pre-financed the lamps for their customers, an 'investment' that would pay itself back through the energy saved on their energy bills when using the lamps in their houses. In this way, 100.000 lamps were distributed to the customers of OXXIO (Op het Veld, 2006), a collaboration which made OXXIO a strong distributor and provider of capital for Lemnis that supported the further expansion of Lemnis' lamp. At the same time, the collaboration with Lemnis allowed OXXIO to add credibility to their image as a green electricity provider, collaborating with a local company that aimed to reduce electricity consumption.

Later, Lemnis started a collaboration with a non-profit lottery (NPL). This collaboration aimed to introduce Lemnis' substitute for 60W incandescent lightbulbs. In the collaboration, Lemnis acted as the producer of retrofit LED lights that were co-branded with the logo of the lottery and that were handed out to all the participants in the lottery in the fall of 2009. By leveraging its ambassadors and contacts in the media and by providing a large advertising budget to promote the "retrofit LED" product category, the lottery provided resources that contributed to the legitimization of the new product that Lemnis would not have been able to gather without this collaboration. In this way, 2.5 million consumers were given the opportunity to pick up a LED lamp, which provided scale to the initial production of Lemnis' lamps and familiarized a large number of households with retrofit LED lamps as a substitute for incandescent bulbs. Contracts with major retailers like Ikea, that would engage in selling Lemnis' retrofit LED lamps, followed soon after this promotional activity. In essence, the scaling of Lemnis' business model involved partnerships with actors that were already in contact with large numbers of consumers, which provided a base for diffusion, and capital (OXXIO) and could help spread the innovation quickly and broadly in the media (NPL), addressing Lemnis' low market power.

Another example of starling strategy is Weide Weelde. In this case, a few farmers in the Netherlands formed a new business model to create market value for 'nature-inclusive milk' called Weide Weelde. Consumers would pay € 0.02 extra per litre with these additional revenues to be invested in measures for meadow birds' conservation. The differentiation of the product was very low because, apart from the sustainability claim, taste and texture were the same as regular milk. It was very challenging for the farmers to develop the SBM, since they were part of a dairy cooperative that mixed the milk of all associated farmers and they were newcomers in the milk consumer market. This means that they lacked the infrastructure to scale their SBM and had no power in the market. The dairy cooperative did not want to organize a different milk stream for the purpose of this new SBM. Through an external consultant, the farmers were connected to another dairy cooperative, which was willing to deliver separate milk streams and provide the farmers with a price premium.

In order to create awareness and legitimacy for their new milk brand, the farmers cooperated with the Dutch Bird Protection NGO, which had already high legitimacy for environmental protection and many donors. By communicating to their donors about this initiative, a market was created. In addition, the Bird Protection NGO allowed the farmers to put its logo on the milk cartons to convey the reliability of the environmental message. The complete business model was built around the development of a narrative that marketed the milk very well. "We started many demos to tell the story to consumers...not to let them taste the milk per se; it's not such a sexy product that people come for this, but it gave us the opportunity to tell where we stand for, what the farmers do, the whole story.

Then you hope that people are charmed, like the product, and will buy it” (Vermunt et al., 2019).

This example clearly shows how very small entrepreneurs (farmers) collaborated to create a sufficient supply of products (in this case milk). The collaboration with a new dairy cooperative was necessary to access the infrastructure needed to create the product; and the collaboration with a credible actor like a large NGO was critical to build legitimacy for the new product as being sustainable. Without these collaborations it would have been impossible for the individual farmers to scale up the SBM.

#### 4.3.2. Swallow strategy

The *swallow* (a small bird that uses exceptional flying skills for catching insects) strategy refers to newcomers with a highly differentiated value proposition, positioned in the right upper quadrant of Fig. 1. While a newcomer does not have an established value network, infrastructure and market power, the high differentiation of the value proposition may compensate for the lack of these resources, as it allows to build a strong credibility and to quickly and easily access a wider customer segment, which “fuels” its growth. The newcomer with a differentiated value proposition has thus a lower need for partnering with external actors.

Tesla is an example of a swallow strategy: a newcomer that can afford to “fly solo”. Its electric cars were characterized by high differentiation, not only compared to conventional cars but also to other electric cars on the market (e.g., Bohnsack and Pinkse, 2017; Thomas and Maine, 2019). Features like its design, comfort and, recently, autonomous driving set Tesla models apart. Tesla’s first model, the Roadster, was a luxury-sports vehicle sold at a price point of 109,000 US dollars and accelerated in 4 s to 100 km/h. This was faster than a Porsche 911 Carrera at the time (Körbel, 2021). As a consequence, Tesla did not only attract buyers who were environmentally conscious, but also a much broader target group. Waiting lists for Tesla models are long, and the company can afford to do very little advertising relative to other car manufacturers. A highly differentiated and attractive value proposition allowed Tesla to not depend on existing distribution networks and to independently develop its own sales channels and showrooms. Especially in its early years, it did not partner with existing dealerships or other car manufacturers and sought to remain financially independent. While as newcomer Tesla did not have existing financial resources, in the company’s first financing round in 2004, 6.35 out of 6.5 million US dollars were contributed by a single investor and founder of Tesla, Elon Musk, which gave the firm the freedom to act on its own accord (Körbel, 2021). Meanwhile, Tesla is listed on the stock exchange, but its shares are in such high demand that many analysts deem the company overvalued. Tesla’s need for collaboration was and continues to be limited, because the attractiveness of its value proposition has compensated for its initial lack of resources.

#### 4.3.3. Eagle strategy

The *eagle* strategy, in the right lower quadrant, refers to SBMs initiated by a large incumbent that leverages its considerable financial resources, infrastructure and base for diffusion, as well as its capabilities, to scale the SBM in the mass market. In this case collaboration is much less needed, therefore the incumbent adopting an eagle strategy will rely on its own existing resources to scale the SBM. The analogy with an eagle is used, since these large birds can depend on their exceptional skills to hunt solo.

MorgenWonen (“Tomorrow Living”) is an example of an eagle strategy. It was created in 2014 by a large incumbent, VolkerWessels, which is one of the major Dutch construction companies. With MorgenWonen, VolkerWessels launched a new housing concept, which consisted of (a) producing all the prefabricated elements of a house on an industrial platform in the factory, and (b) assembling the components at the final location within just one day. The sustainability of this new business model resides, first, in the fact that its standardized and modular construction allows for a reduction of waste in both construction stages, as the components can be (dis)assembled, thus minimizing material loss and usage. Moreover, MorgenWonen’s houses are built using sustainable materials and are zero energy thanks to high-quality insulation, heat-recovery systems, heat pumps, smart meters, and solar panels on the roofs. In addition, the streamlined production and logistics processes considerably shortens construction times, leading to less transportation to/from the construction site, and lower concomitant emissions. For the buyer, the advantage of this new business model is a very low energy bill and very fast construction process.

In line with the position of the SBM in the framework, VolkerWessels engaged external parties only to a very limited extent for MorgenWonen. Instead, this is an example of an SBM developed through the involvement of actors within the incumbent, which thus also exercises internal control. Indeed, as stated by MorgenWonen (2014, n.p.): “We do not work with different parties that are chosen per project based on their price offer. Instead, we work together with our own trusted VolkerWessels co-makers. Each of them is responsible for one integral and complete platform element”. One of its managers explains: “We produce 80% of the house inside VolkerWessels. That is normally 20% on average” (VolkerWessels, 2014, p. 46). MorgenWonen thus brings together a group of VolkerWessels’ business units as permanent partners to perform core activities of the SBM, i.e., the product’s design, supply of components, logistics management and assembly.

#### 4.3.4. Geese strategy

The final, left lower quadrant refers to the *geese* strategy, adopted by large incumbents with a low differentiation of the value proposition. Geese are relatively large birds who fly in collaborative V-shape formation to reduce air resistance. In analogy, large firms may also collaborate with others in the case of low product differentiation. Indeed, although incumbents have the financial resources and the infrastructure to develop the value proposition, this is not sufficiently attractive for customers. Hence, they are likely to partner with external actors particularly to build credibility around their offer, in order to scale the SBM in the mass market.

The Green Protein Alliance (GPA) is an example of a geese strategy. In the GPA several firms, including large incumbents such as the Dutch supermarket chain Albert Heijn as well as the food producers Alpro and Bonduelle, collaborate to speed up the diffusion of plant-based proteins. This is remarkable as the latter two are also competitors. These incumbents develop and sell meat substitutes that resemble meat as closely as possible. As such there is low product differentiation compared to meat, apart from the vegetarian/vegan



sustainability label. Each of these incumbents is able to develop, produce, offer and market these meat substitutes making use of their resources and competences related to product development, value network, market access, reputation and marketing. Yet, the market for this type of products is still very small. By teaming up, they intend to increase the power of their voice and collectively increase the market size of these meat substitutes, through collective media campaigns which increase attention to the movement, and through engaging in other forms of awareness creation which increase the legitimacy of the product (Tziva et al., 2020; 2021).

## 5. Discussion

This paper set out to shed light on the collaboration choices that firms make in order to scale an innovative SBM. The proposed framework distinguishes between four ideal ‘scaling-through-collaboration’ strategies. By considering the type of initiator (newcomer or incumbent) and the degree of differentiation of the value proposition (high or low), our framework helps to further advance insights into firm- and business model-specific choices in sustainability transitions. Currently, transition research remains somewhat limited to the basic approaches of “fit-and-conform” versus “stretch-and-transform” when it comes to the strategies that initiators of SBMs in a niche can use (Huijben et al., 2016; Meijer et al., 2019; Wesseling et al., 2020). Only a few exceptions at the interface of transition research and business model literature (e.g., Jolly et al., 2012; Van Waes et al., 2018) deal with different approaches and strategies to scale. Considering the type of initiator and the differentiation of the SBM’s value proposition as dimensions that steer the choice of a strategy to scale an SBM, our work can thus be seen as a first step for enabling a more nuanced view of the kind of collaboration strategy a firm can adopt, and for explaining why a given newcomer or incumbent might opt for a ‘run-in-packs’ or ‘fly-solo’ strategy. Next, the conceptual distinction between four different ‘ideal types’ (geese, eagles, swallows, starlings) has analytical value because they represent typical approaches to collaboration for the scaling of sustainable solutions. Illustrative examples show how these strategies “look in practice” and that the collaborations that firms establish can vary significantly, ranging from endorsements and co-promotions over more instrumental and temporary forms of cooperation to strategic and long-term alliances. Unfortunately, a more nuanced discussion of the incentives that give rise to these different constellations is still largely missing in the literature. The distinction between two dimensions (actor type, differentiation of the value proposition) can serve as an initial conceptual step toward discussing the incentives that firms have to establish collaborations for scaling SBMs.

The question *with whom* to collaborate is an important aspect of this collaboration-for-scaling decision. Here, our paper helps to improve the understanding of the unique resources different actors bring to the table which, in turn, enables the discussion of the potential but also the tensions that can arise when engaging in collaboration for scaling SBMs. Recent work on collaborative business models has emphasized the tensions that can arise in the process (Dentoni et al., 2021; DiVito et al., 2021; Freudenreich et al., 2020; Ordóñez-Ponce et al., 2021; Oskam et al., 2021). For instance, scholars have highlighted how tensions can arise when actors do not perceive the division of value captured across the actors as being fair (e.g., Oskam et al., 2021). The incentives for actors entering collaboration are critical for understanding why such tensions may arise. By making the resources that organizations bring to a collaboration more explicit, our illustrative example descriptions hint at the various ways in which organizations can contribute to scaling an SBM. For instance, in the starling strategy, we show how a collaborator can add credibility and capital to start up production, and provide experiences in media strategies and distributional reach, or add power, legitimacy and attention to the movement representing the SBM. Such resources may be crucial for scaling the SBM, to the extent that firms do not just collaborate with organizations that operate in other sectors but even with their own competitors, such as in the example of the GPA. Lastly, collaboration may involve both business and non-business actors, also including stakeholders in government and society, i.e., “non-governmental organizations, government and communities or civil society” (Gray and Stites, 2013, p. 17). For instance, the Weide Weelde example illustrated that NGOs played an important role in providing legitimacy to newcomers in the case of sustainable milk.

To tentatively indicate which core contribution different types of actors can bring relative to others, Table 1 suggests the resources that various types of organizations can provide when collaborating for scaling SBMs. These combinations are based on plausible expectations, considering the kind of actor and its core assets. For instance, relative to the other actors, investors and financial institutions are likely to be able to contribute more financial resources, NGOs are more likely to be able to contribute legitimacy, and so forth. Indications such as those given in Table 1 can help understand how firms weigh whether it is worth to access external resources and initiate a collaboration.

However, while our work contributes to the discussion on collaboration for scaling SBMs, it is a conceptual piece. Future research could therefore empirically examine the use of the scaling-for-collaboration strategies, and test Table 1 on different SBMs. For instance, studies could investigate the impact of the initiator of the SBM and of the differentiation of the value proposition on the strategies chosen to scale an SBM and on the actors selected as partners. Moreover, the framework proposes four ideal types of strategies, yet the dimensions we identified should be understood as a continuum. Hence, firms may find themselves “stuck in the middle”, e.g., their value proposition may be differentiated, but only to a limited extent or only for a specific customer segment. This can lead to the dilemma of deciding which is the best strategy to adopt and which actor(s) to involve. Scholars could therefore build on our framework to explore, through a multiple case study design, the strategies adopted by firms with different positions in the framework.

Relatedly, an aspect that our paper could not discuss in depth, but that ought to be considered in future research, is that actors’ motives for entering collaboration may not be unidimensional and evolve over time. Recent research on actor engagement and boundary work in multi-stakeholder partnerships, for instance, indicates that the roles of organizations can transform and go beyond those negotiated at the start of a collaboration (Brodie et al., 2019; Velter et al., 2020). Thus, further studies might trace the evolution of an SBM and how this impacts the use of collaboration-for-scaling strategies. Furthermore, future research could explore in greater depth how different scaling motives influence the choice of partners and how they interact. For instance, it could be interesting to investigate whether different strategies are chosen when the initiator of a SBM aims at increasing the number of beneficiaries versus

**Table 1**  
Resources of different actor types for the scaling of SBM innovation<sup>11</sup>.

Actors involved in SBM innovation and scaling Resources	Private firm / Sustainable Start-up	Private firm / Large incumbent	Industry associations	Investors / Financial organizations	Non-governmental organizations	Governmental actors
Base for diffusion	-	✓ ✓ ✓	✓	-	✓	✓
New target segments	✓ ✓	✓ ✓	✓	-	✓	✓
Financial resources	✓	✓ ✓ ✓	-	✓ ✓ ✓	-	✓
Credibility/ Legitimacy	✓ ✓ ✓	✓	-	-	✓ ✓	✓ ✓
Infrastructure investments	-	✓ ✓	-	✓ ✓	-	✓ ✓ ✓
Power	✓ ✓	✓ ✓ ✓	✓ ✓	✓	✓	✓ ✓ ✓

increasing the impact among the existing beneficiaries. It would be also valuable to shed light on which trade-offs arise between different scaling motives. Here, a fruitful avenue seems connecting existing work on the various motivations for scaling (e.g., Jolly et al., 2012) and the scaling-through-collaboration strategies suggested in this paper.

Finally, we adopted an organizational perspective to sustainability transitions. It would be valuable to combine this with a macro-level analysis, to explore how firm-specific incentives for collaboration interact with contextual factors for the scaling of an SBM. More specifically, connecting our insights with research on strategic niche management, further studies could examine the interplay of collaboration choices at the niche level with factors at the regime and landscape levels. An interesting research avenue could consist of examining how firms' collaboration-for-scaling decisions are influenced by the power dynamics between regime actors (cf. Ampe et al., 2021) as well as by the strength of the regimes, i.e., the level of institutionalization of their core components (Fuenfschilling and Truffer, 2014; Kern et al., 2015). A further direction for investigation entails considering the influence of developments at the landscape level, i.e., in "the broad cultural, environmental, economic, and political context" (Rosenbloom et al., 2016, p. 1276) and how this affects the challenges to SBM scaling and, in turn, firms' collaboration-for-scaling decisions.

## 6. Conclusion

This paper focused on the scaling of SBMs, which is critical to have meaningful environmental and social impact, and on the facilitating role of collaboration. Building on extant literature, we contend that the degree to which scaling an SBM can benefit from collaboration with others depends on the type of initiating actor (newcomer vs. incumbent) and the differentiation of the value proposition (high vs. low). Depending on the starting position, firms that develop an SBM are more or less likely to engage in different forms of collaborations to scale it. We further suggest that the firm- and business model-specific need for collaboration are likely to determine who is chosen as a collaborator. While the upscaling of SBMs has been identified as critical but also challenging for advancing sustainability transitions by both transition and SBM researchers, the specific means that initiators of SBMs can use to scale have not yet received much attention. Overall, our paper heeds calls in transition research to focus more on the micro level, meaning the choices and actions of single actor groups in transitions (e.g. Köhler et al., 2019), and specifically the role of organizations, their business models, and collaboration for transitions (e.g., Aagaard et al., 2021; Altunay et al., 2021; Pedersen et al., 2021; Sarasini and Linder, 2018). The theoretical framework and ideal strategies we propose provide a basis that future empirical studies can build on to advance the understanding of SBM scaling through collaboration.

Our paper offers several implications to practitioners. First, our framework can help foster higher awareness on the role of collaboration among firms with SBMs. By considering their resources and the characteristics of their SBM's value proposition, decision makers can develop a more strategic approach to collaborating with other actors. We suggest that collaboration can be useful but is not always necessary; firms are therefore prompted to assess to what extent they need to collaborate. Furthermore, our work indicates that firms may establish a portfolio of partnerships by collaborating with very different actors depending on their needs. Once a firm has decided for an ideal type of strategy, indications such as those provided in Table 1 can support the selection of the most suitable collaborations based on the resources needed. Overall, this study brings practitioners' attention to the importance of linking the need to scale their SBM with the potential value collaborations can provide, in order to contribute to sustainability transitions.

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None.

## Data Availability

The authors do not have permission to share data.

## References

- Aagaard, A., Lüdeke-Freund, F., Wells, P.E., 2021. *Business Models for Sustainability Transitions: How Organisations Contribute to Societal Transformation*. Palgrave Macmillan, Cham, Switzerland.
- Adner, R., Kapoor, R., 2010. Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations. *Strat. Manag. J.* 31 (3), 306–333.
- Allen, M., Wood, G., Demirbag, M., 2022. Developing theoretically informed typologies in international business: Why we need them, and how to do it. *J. Int. Bus. Stud.* <https://doi.org/10.1057/s41267-022-00529-3>.
- Altunay, M., Bergeck, A., Palm, A., 2021. Solar business model adoption by energy incumbents: the importance of strategic fit. *Environ. Innov. Soc. Trans.* 40, 501–520.
- Ampe, K., Paredis, E., Asveld, L., Osseweijer, P., Block, T., 2021. Incumbents' enabling role in niche-innovation: Power dynamics in a wastewater project. *Environ. Innov. Soc. Trans.* 39, 73–85.
- Arthur, W.B., 1989. Competing technologies, increasing returns, and lock-in by historical events. *Econ. J.* 99 (394), 116–131.
- Austin, J.E., Leonard, H.B.D., 2008. Can the virtuous mouse and the wealthy elephant live happily ever after? *Calif. Manag. Rev.* 51 (1), 77–102.
- Barbarossa, C., De Pelsmacker, P., 2016. Positive and negative antecedents of purchasing eco-friendly products: a comparison between green and non-green consumers. *J. Bus. Ethics* 134 (2), 229–247.
- Bidmon, C.M., Knab, S.F., 2018. The three roles of business models in societal transitions: new linkages between business model and transition research. *J. Clean. Prod.* 178, 903–916.
- Bloom, P.N., Chatterji, A.K., 2009. Scaling social entrepreneurial impact. *Calif. Manag. Rev.* 51 (3), 114–133.
- Bocken, N.M., Fil, A., Prabhu, J., 2016. Scaling up social businesses in developing markets. *J. Clean. Prod.* 139, 295–308.
- Bocken, N.M., Geradts, T.H., 2020. Barriers and drivers to sustainable business model innovation: organization design and dynamic capabilities. *Long Range Plann.* 53 (4), 101950.
- Bocken, N.M.P., Schuit, C.S.C., Kraaijenhagen, C., 2018. Experimenting with a circular business model: lessons from eight cases. *Environ. Innov. Soc. Trans.* 28, 79–95.
- 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.
- Bohnsack, R., Ciulli, F., Kolk, A., 2021. The role of business models in firm internationalization: an exploration of European electricity firms in the context of the energy transition. *J. Int. Bus. Stud.* 52 (5), 824–852.
- Bohnsack, R., Liesner, M.M., 2019. What the hack? A growth hacking taxonomy and practical applications for firms. *Bus. Horiz.* 62 (6), 799–818.
- Bohnsack, R., Pinkse, J., 2017. Value propositions for disruptive technologies: reconfiguration tactics in the case of electric vehicles. *Calif. Manag. Rev.* 59 (4), 79–96.
- Bohnsack, R., Pinkse, J., Kolk, A., 2014. Business models for sustainable technologies: exploring business model evolution in the case of electric vehicles. *Res. Policy* 43 (2), 284–300.
- Bray, J., Johns, N., Kilburn, D., 2011. An exploratory study into the factors impeding ethical consumption. *J. Bus. Ethics* 98 (4), 597–608.
- Brodie, R.J., Fehrer, J.A., Jaakkola, E., Conduit, J., 2019. Actor engagement in networks: defining the conceptual domain. *J. Serv. Res.* 22 (2), 173–188.
- Ciulli, F., Kolk, A., 2019. Incumbents and business model innovation for the sharing economy: implications for sustainability. *J. Clean. Prod.* 214, 995–1010.
- Clark, K., Li, Y., 2022. Organizational event stigma: typology, processes, and stickiness. *J. Bus. Ethics.* <https://doi.org/10.1007/s10551-022-05173-3>.
- Clube, R.K., Tennant, M., 2020. Exploring garment rental as a sustainable business model in the fashion industry: does contamination impact the consumption experience? *J. Consum. Behav.* 19 (4), 359–370.
- Colaner, N., Imanaka, J.L., Prussia, G.E., 2018. Dialogic collaboration across sectors: partnering for sustainability. *Bus. Soc. Rev.* 123 (3), 529–564.
- Cornelissen, J., 2017. Editor's comments: developing propositions, a process model, or a typology? Addressing the challenges of writing theory without a boilerplate. *Acad. Manag. Rev.* 42 (1), 1–9.
- Dahan, N., Doh, J., Oetzel, J., Yaziji, M., 2010. Corporate-NGO collaboration: co-creating new business models for developing markets. *Long Range Plann.* 43 (2/3), 326–342.
- Debruyne, M., Reibstein, D.J., 2005. Competitor see, competitor do: incumbent entry in new market niches. *Mark. Sci.* 24 (1), 55–66.
- Dentoni, D., Pinkse, J., Lubberink, R., 2021. Linking sustainable business models to socio-ecological resilience through cross-sector partnerships: a complex adaptive systems view. *Bus. Soc.* 60 (5), 1216–1252.
- DiVito, L., van Wijk, J., Wakkee, I., 2021. Governing collaborative value creation in the context of grand challenges: a case study of a cross-sectoral collaboration in the textile industry. *Bus. Soc.* 60 (5), 1092–1131.
- Dyllick, T., Muff, K., 2016. Clarifying the meaning of sustainable business: Introducing a typology from business-as-usual to true business sustainability. *Organ. Environ.* 29 (2), 156–174.
- Etchanchu, H., Djelic, M.L., 2019. Old wine in new bottles? Parentalism, power, and its legitimacy in business–society relations. *J. Bus. Ethics* 160 (4), 893–911.
- Fjeldstad, Ø.D., Snow, C.C., 2018. Business models and organization design. *Long Range Plann.* 51 (1), 32–39.
- Foss, N.J., Saebi, T., 2017. Fifteen years of research on business model innovation: How far have we come, and where should we go? *J. Manag.* 43 (1), 200–227.
- Freudenreich, B., Lüdeke-Freund, F., Schaltegger, S., 2020. A stakeholder theory perspective on business models: value creation for sustainability. *J. Bus. Ethics* 166 (1), 3–18.
- Fuensschilling, L., Truffer, B., 2014. The structuration of socio-technical regimes—conceptual foundations from institutional theory. *Res. Policy* 43 (4), 772–791.
- Geissdoerfer, M., Vladimirova, D., Evans, S., 2018. Sustainable business model innovation: a review. *J. Clean. Prod.* 198, 401–416.
- Gleim, M.R., Smith, J.S., Andrews, D., Cronin Jr, J.J., 2013. Against the green: a multi-method examination of the barriers to green consumption. *J. Retail.* 89 (1), 44–61.

<sup>1</sup> This is an indicative classification inspired by our work and based on plausible expectations; actor types are not exhaustive.

- Gray, B., Stites, J.P., 2013. Sustainability through partnerships: capitalizing on collaboration. *Netw. Bus. Sustain.*
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., Kyriakidou, O., 2004. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q.* 82 (4), 581–629.
- Griskevicius, V., Tybur, J.M., Van den Bergh, B., 2010. Going green to be seen: status, reputation, and conspicuous conservation. *J. Pers. Soc. Psychol.* 98 (3), 392–404.
- Gupta, S., Ogdén, D.T., 2009. To buy or not to buy? A social dilemma perspective on green buying. *J. Consum. Mark.* 26 (6), 376–391.
- Halme, M., Lindeman, S., Linna, P., 2012. Innovation for inclusive business: intrapreneurial bricolage in multinational corporations. *J. Manag. Stud.* 49 (4), 743–784.
- Hellström, M., Tsvetkova, A., Gustafsson, M., Wikström, K., 2015. Collaboration mechanisms for business models in distributed energy ecosystems. *J. Clean. Prod.* 102, 226–236.
- Hill, C.W., Rothaermel, F.T., 2003. The performance of incumbent firms in the face of radical technological innovation. *Acad. Manage. Rev.* 28 (2), 257–274.
- Hockerts, K., 2015. How hybrid organizations turn antagonistic assets into complementarities. *Calif. Manage. Rev.* 57 (3), 83–106.
- Hockerts, K., Wüstenhagen, R., 2010. Greening goliaths versus emerging Davids— theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *J. Bu. Ventur.* 25 (5), 481–492.
- Huijben, J.C.C.M., Verbong, G.P.J., 2013. Breakthrough without subsidies? PV business model experiments in the Netherlands. *Energy Policy* 56, 362–370.
- Huijben, J.C.C.M., Verbong, G.P.J., Podoyntsyna, K.S., 2016. Mainstreaming solar: stretching the regulatory regime through business model innovation. *Environ. Innov. Soc. Trans.* 20, 1–15.
- Jolink, A., Niesten, E., 2015. Sustainable development and business models of entrepreneurs in the organic food industry. *Bus. Strat. Environ.* 24 (6), 386–401.
- Jolly, S., Raven, R., Romijn, H., 2012. Upscaling of business model experiments in off-grid PV solar energy in India. *Sustain. Sci.* 7 (2), 199–212.
- Kern, F., Verhees, B., Raven, R., Smith, A., 2015. Empowering sustainable niches: comparing UK and Dutch offshore wind developments. *Technol. Forecast. Soc. Change* 100, 344–355.
- Köhler, J., Geels, F.W., Kern, F., Markard, J., Onsongo, E., 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., Pel, B., Raven, B., Rohrachner, 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. *Environ. Innov. Soc. Trans.* 31, 1–32.
- Kolk, A., Ciulli, F., 2020. The potential of sustainability-oriented digital platform multinationals: a comment on the transitions research agenda. *Environ. Innov. Soc. Trans.* 34, 355–358.
- Kolk, A., Rivera-Santos, M., Rufin, C., 2014. Reviewing a decade of research on the “Base/Bottom of the Pyramid” (BOP) concept. *Bus. Soc.* 53, 338–377.
- Körbel, A., 2021. Ford gegen Tesla. *Brand Eins* 22–28. <https://www.brandeins.de/magazine/brand-eins-wirtschaftsmagazin/2021/kapitalismus/ford-gegen-tesla>.
- Kortmann, S., Piller, F., 2016. Open business models and closed-loop value chains: redefining the firm-consumer relationship. *Calif. Manage. Rev.* 58 (3), 88–108.
- Kronrod, A., Grinstein, A., Wathieu, L., 2012. Go green! Should environmental messages be so assertive? *J. Mark.* 76 (1), 95–102.
- Lashitew, A.A., Bals, L., van Tulder, R., 2020. Inclusive business at the base of the pyramid: the role of embeddedness for enabling social innovations. *J. Bus. Ethics* 162 (2), 421–448.
- Laufer, W.S., 2003. Social accountability and corporate greenwashing. *J. Bus. Ethics* 43 (3), 253–261.
- Lin, Y.C., Chang, C.C.A., 2012. Double standard: the role of environmental consciousness in green product usage. *J. Mark.* 76 (5), 125–134.
- Luchs, M.G., Naylor, R.W., Irwin, J.R., Raghunathan, R., 2010. The sustainability liability: potential negative effects of ethicality on product preference. *J. Mark.* 74 (5), 18–31.
- Lüdeke-Freund, F., Massa, L., Bocken, N., Brent, A., Musango, J., 2016. Business models for shared value. *Netw. Bus. Sustain. S. Afr.*
- Makadok, R., Ross, D.G., 2013. Taking industry structuring seriously: a strategic perspective on product differentiation. *Strat. Manag. J.* 34 (5), 509–532.
- Meijer, L.L.J., Huijben, J.C.C.M., Van Boxstael, A., Romme, A.G.L., 2019. Barriers and drivers for technology commercialization by SMEs in the Dutch sustainable energy sector. *Renew. Sustain. Energy Rev.* 112, 114–126.
- MorgenWonen (2014). Anders denken over duurzaam ontwikkelen en bouwen.**
- Moser, A.K., 2016. Consumers’ purchasing decisions regarding environmentally friendly products: an empirical analysis of German consumers. *J. Retail. Consum. Serv.* 31, 389–397.
- Olson, E.L., 2013. It’s not easy being green: the effects of attribute tradeoffs on green product preference and choice. *J. Acad. Mark. Sci.* 41 (2), 171–184.
- Op het Veld, R., 2006. Philips-telgen concurreren met Philips. *Het Financiële Dagblad*, 9 Oktober.
- Ordóñez-Ponce, E., Clarke, A.C., Colbert, B.A., 2021. Collaborative sustainable business models: understanding organizations partnering for community sustainability. *Bus. Soc.* 60 (5), 1174–1215.
- Oskam, I., Bossink, B., De Man, A.P., 2018. The interaction between network ties and business modeling: case studies of sustainability-oriented innovations. *J. Clean. Prod.* 177, 555–566.
- Oskam, I., Bossink, B., de Man, A.-P., 2021. Valuing value in innovation ecosystems: How cross-sector actors overcome tensions in collaborative sustainable business model development. *Business & Society* 60 (5), 1059–1091.
- Osterwalder, A., Pigneur, Y., 2010. Business model generation: a handbook for visionaries, game changers, and challengers. John Wiley & Sons.
- Ozaki, R., 2011. Adopting sustainable innovation: what makes consumers sign up to green electricity? *Business Strategy and the Environment* 20 (1), 1–17.
- Palomares-Aguirre, I., Barnett, M., Layrisse, F., Husted, B.W., 2018. Built to scale? How sustainable business models can better serve the base of the pyramid. *J. Clean. Prod.* 172, 4506–4513.
- Pedersen, E.R.G., Lüdeke-Freund, F., Henriques, I., Seitani, M.M., 2021. Toward collaborative cross-sector business models for sustainability. *Bus. Soc.* 60 (5), 1039–1058.
- Porter, M.E., 2004. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. The Free Press, New York.
- Press, M., Robert, I., Maillefert, M., 2020. The role of linked legitimacy in sustainable business model development. *Ind. Mark. Manag.* 89, 566–577.
- Quélin, B.V., Kivleniece, I., Lazzarini, S., 2017. Public-private collaboration, hybridity and social value: towards new theoretical perspectives. *J. Manag. Stud.* 54 (6), 763–792.
- Reuber, A.R., Tippmann, E., Monaghan, S., 2021. Global scaling as a logic of multinationalization. *J. Int. Bus. Stud.* 52 (6), 1031–1046.
- Rey-García, M., Mato-Santiso, V., Felgueiras, A., 2021. Transitioning collaborative cross-sector business models for sustainability innovation: multilevel tension management as a dynamic capability. *Bus. Soc.* 60 (5), 1132–1173.
- Rogers, E.M., 2003. *Diffusion of Innovations*, 5th ed. Free Press, New York.
- Roome, N., Louche, C., 2016. Journeying toward business model for sustainability: a conceptual model found inside the black box of organizational transformation. *Organ. Environ.* 29 (1), 11–35.
- Rosenbloom, D., Berton, H., Meadowcroft, J., 2016. Framing the sun: a discursive approach to understanding multi-dimensional interactions within socio-technical transitions through the case of solar electricity in Ontario, Canada. *Res. Policy* 45 (6), 1275–1290.
- Sarasini, S., Langeland, O., 2021. Business model innovation as a process for transforming user mobility practices. *Environ. Innov. Soc. Trans.* 39, 229–248.
- Sarasini, S., Linder, M., 2018. Integrating a business model perspective into transition theory: the example of new mobility services. *Environ. Innov. Soc. Trans.* 27, 16–31.
- Schaltegger, S., Hansen, E., Lüdeke-Freund, F., 2016a. Business models for sustainability: origins, present research, and future Avenues. *Organ. Environ.* 29 (1), 3–10.
- Schaltegger, S., Lüdeke-Freund, F., Hansen, E., 2012. Business cases for sustainability: the role of business model innovation for corporate sustainability. *Int. J. Innov. Sustain. Dev.* 6, 95–119.
- Schaltegger, S., Lüdeke-Freund, F., Hansen, E., 2016b. Business models for sustainability: a co-evolutionary analysis of sustainable entrepreneurship, innovation and transformation. *Organ. Environ.* 29 (3), 264–289.
- Schrage, S., Gilbert, D.U., 2021. Addressing governance gaps in global value chains: introducing a systematic typology. *J. Bus. Ethics* 170 (4), 657–672.
- Seawright, J., Gerring, J., 2008. Case selection techniques in case study research: a menu of qualitative and quantitative options. *Polit. Res. Q.* 61 (2), 294–308.

- Stubbs, W., Cocklin, C., 2008. Conceptualizing a “sustainability business model. *Organ. Environ.* 21, 103–127.
- Tarkiainen, A., Sundqvist, S., 2009. Product involvement in organic food consumption: does ideology meet practice? *Psychol. Mark.* 26 (9), 844–863.
- Täuscher, K., Abdelkafi, N., 2018. Scalability and robustness of business models for sustainability: a simulation experiment. *J. Clean. Prod.* 170, 654–664.
- Thomas, V.J., Maine, E., 2019. Market entry strategies for electric vehicle start-ups in the automotive industry - lessons from Tesla Motors. *J. Clean. Prod.* 235, 653–663.
- Torelli, R., Balluchi, F., Lazzini, A., 2019. Greenwashing and environmental communication: Effects on stakeholders' perceptions. *Bus. Strat. Environ.* 29 (2), 407–421.
- Tripsas, M., 1997. Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry. *Strat. Manag. J.* 18 (S1), 119–142.
- Truffer, B., Rohrer, H., Kivimaa, P., Raven, R., Alkemade, F., Carvalho, L., Feola, G., 2022. A perspective on the future of sustainability transitions research. *Environ. Innov. Soc. Trans.* 42, 331–339.
- Tziva, M., Negro, S.O., Kalfagianni, A., Hekkert, M.P., 2020. Understanding the protein transition: the rise of plant-based meat substitutes. *Environ. Innov. Soc. Trans.* 35, 217–231.
- Tziva, M., Negro, S.O., Kalfagianni, A., Hekkert, M.P., 2021. Alliances as system builders: on the conditions of network formation and system building in sustainability transitions. *J. Clean. Prod.* 318, 128616.
- Urbinati, A., Chiaroni, D., Chiesa, V., 2017. Towards a new taxonomy of circular economy business models. *J. Clean. Prod.* 168, 487–498.
- van Waes, A., Farla, J., Frenken, K., de Jong, J.P.J., Raven, R., 2018. Business model innovation and socio-technical transitions. A new prospective framework with an application to bike sharing. *J. Clean. Prod.* 195, 1300–1312.
- Vega-Zamora, M., Torres-Ruiz, F.J., Murgado-Armenteros, E.M., Parras-Rosa, M., 2014. Organic as a heuristic cue: what Spanish consumers mean by organic foods. *Psychol. Mark.* 31 (5), 349–359.
- Velter, M.G.E., Bitzer, V., Bocken, N.M.P., Kemp, R., 2020. Sustainable business model innovation: the role of boundary work for multi-stakeholder alignment. *J. Clean. Prod.* 247, 119497.
- Vermunt, D., Negro, S., Verweij, P., Kuppens, D., Hekkert, M., 2019. Exploring barriers to implementing different circular business models. *J. Clean. Prod.* 222, 891–902.
- VolkerWessels (2014).** *VolkerWessels Duurzaamheidsverslag 2014*. Retrieved from [https://www.volkerwessels.com/dynamics/modules/SFIL0200/view.php?file\\_id=351253](https://www.volkerwessels.com/dynamics/modules/SFIL0200/view.php?file_id=351253).
- Wadin, J., Ahlgren, K., Bengtsson, L., 2017. Joint business model innovation for sustainable transformation of industries – a large multinational utility in alliance with a small solar energy company. *J. Clean. Prod.* 160, 139–150.
- Wainstein, M.E., Bumpus, A.G., 2016. Business models as drivers of the low carbon power system transition: a multi-level perspective. *J. Clean. Prod.* 126, 572–585.
- Wells, P., Wang, X., Wang, L., Liu, H., Orsato, R., 2020. More friends than foes? The impact of automobility-as-a-service on the incumbent automotive industry. *Technol. Forecast. Soc. Chang.* 154, 119975.
- Wesseling, J.H., Bidmon, C., Bohnsack, R., 2020. Business model design spaces in socio-technical transitions: the case of electric driving in the Netherlands. *Technol. Forecast. Soc. Chang.* 154, 119950.
- Young, W., Hwang, K., McDonald, S., Oates, C.J., 2010. Sustainable consumption: green consumer behaviour when purchasing products. *Sustain. Dev.* 18 (1), 20–31.
- Yunus, M., Moingeon, B., Lehmann-Ortega, L., 2010. Building social business models: lessons from the Grameen experience. *Long Range Plann.* 43 (2/3), 308–325.
- Zhang, Y., Gimeno, J., 2010. Earnings pressure and competitive behavior: evidence from the US electricity industry. *Acad. Manag. J.* 53 (4), 743–768.