Long Range Planning xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Long Range Planning

journal homepage: www.elsevier.com/locate/lrp

Leveraging global sources of knowledge for business model innovation

Stephan von Delft[a,*], Sebastian Kortmann[b], Carsten Gelhard[c], Niccolò Pisani[b]

[a] University of Glasgow, Adam Smith Business School, Gilbert Scott Building, Glasgow, G12 8QQ, United Kingdom
[b] University of Amsterdam, Amsterdam Business School, Plantage Muidergracht 12, 1018 TV, Amsterdam, The Netherlands
[c] University of Twente, Faculty of Engineering Technology, P.O. Box 217, 7500 AE, Enschede, The Netherlands

A B S T R A C T

This article explores the concept of leveraging global knowledge for business model innovation, whereby knowledge is transferred across space and firm boundaries for the reconfiguration of an incumbent firm's business model. Considering the implications of an ever-increasing fragmentation of global value chains and the associated dispersion of global knowledge sources, we propose that supply chain partners at foreign locations can provide valuable knowledge that incumbents can leverage to change their business model. Integrating insights from global supply chain, business model, and organizational learning literature, we theorize and empirically test how different organizational capabilities enable firms to acquire knowledge from foreign partners, integrate external with internal knowledge, transform knowledge through experimentation, and finally apply global knowledge in the form of business model innovation. We conclude with suggestions for future research.

Introduction

The increasing globalization of business operations gives rise to enormous opportunities for the creation of business model innovations, i.e., reconfigurations of established business models (Johnson et al., 2008; Massa and Tucci, 2014). New modes of offshore outsourcing, new relationships that boost re-manufacturing and re-use of goods produced and consumed in different parts of the world, and new platforms connecting various supply chain actors irrespective of their location have become a hotbed for companies that fundamentally change how they create and capture value.

To expand its medicine portfolio in emerging markets, the German pharmaceutical company Merck Serono, for instance, has reconfigured key elements of its business model by entering a long-term, global partnership with the Indian pharmaceutical company Lupin. In this integrative, cross-national partnership, the two companies perform different activities across the value chain: Lupin is responsible for product development and supply, whereas Merck Serono is in charge of sales and marketing of products in emerging markets. In this example, activities are “fine-sliced” and governed by different multinationals, while being orchestrated under a unifying business model. Another example is the Dutch design firm Niaga (the word “again” spelled backwards), which is experimenting with a business model innovation to sell or lease carpets that can be 100% recycled to new carpets after use. Niaga uses the lowest possible diversity of materials: only one material or two materials bound together with an adhesive that can be decoupled on demand and easily recovered. This drastic simplification on the supply and demand side required changes in the whole supply chain, from raw materials to the end customer, resulting in a new business model. To replace the established carpet production and use model, the company engaged with carpet manufacturers and retailers to share knowledge on how to stimulate the return flow, co-developed a recycling manual, set up road tests with supply chain partners around the world, and entered a joint venture with the

* Corresponding author.
E-mail addresses: stephan.vondelft@glasgow.ac.uk (S. von Delft), s.kortmann@uva.nl (S. Kortmann), c.gelhard@utwente.nl (C. Gelhard), n.pisani@uva.nl (N. Pisani).

https://doi.org/10.1016/j.lrp.2018.08.003
Received 7 December 2017; Received in revised form 30 August 2018; Accepted 31 August 2018

material science company DSM. Niaga is now offering its approach to all carpet manufacturers globally, with Mohawk Industries in the US being the first manufacturer to collaborate in this circular business model.

Prior literature on business model innovation only partially accounts for such occurrences. While there has been progress on establishing business model innovation as a distinct phenomenon (e.g., Amit and Zott, 2015; Casadesus-Masanell and Zhu, 2013; Teece, 2010), explaining the emergence of particular business model innovations (e.g., Gambardella and McGahan, 2010; Sanchez and Ricart, 2010; Yunus et al., 2010), and exploring performance implications of innovations in business models (e.g., Kastalli and Van Looy, 2013; Kim and Min, 2015; Zott and Amit, 2007), the consequences of the ever-increasing fragmentation of global value chains and the associated dispersion of knowledge sources for business model innovation remain largely unaddressed. It is important to recognize, however, that the search and transfer of knowledge (e.g., about new ways of conducting transactions) that precedes business model innovation increasingly occurs across space and firm boundaries. We, therefore, propose a needed theoretical advance and more globally oriented approach to business model innovation that explicitly synthesizes external and internal strategies and captures the organizational capabilities enabling the process of leveraging global knowledge. To this end, we integrate global supply chain, organizational learning, and business model literature to develop a conceptual model of how to access, integrate, transform, and apply global knowledge for business model innovation. We conclude by demonstrating the empirical utility of our conceptual model and suggesting areas for future business model research at the intersection of strategy, innovation, and international business.

Theoretical background

This section is organized as follows. First, we define the term “business model” and discuss its relationship with (global) supply chains. Second, we review prior business model innovation literature and connect it to prior work on organizational learning. We further propose a conceptual model to examine how global knowledge flows translate into business model innovation.

Business models and (global) supply chains

A business model can be understood as a representation of how an organization creates, delivers, and captures value in concert with transaction partners (Teece, 2010; Zott and Amit, 2008). While studies on business models differ in terms of the applied definition, recent reviews unanimously emphasize the importance of a component-based perspective (Wirtz et al., 2016; Zott et al., 2011). Typically referred to as “design elements” (Amit and Zott, 2001), “building blocks” (Osterwalder and Pigneur, 2010), or “decision variables” (Morris et al., 2005), this stream of the literature identifies relevant components that together explain how an organization is “doing” business. For the purpose of this study, we follow Johnson et al. (2008) and use a business model framework that consists of four interlocking elements, namely the customer value proposition, the profit formula (which defines resource velocity, scale, and margins required to achieve an attractive return while providing value to the customer), the key resources (e.g., technology, brand, partnerships), and the key processes (e.g., R&D, product design) necessary to deliver the value proposition on a reliable and repeatable basis. This four-box business model framework is consistent with other business model definitions (see Wirtz et al. (2016) for a detailed review).

Since the business model elucidates what inputs are used to create and deliver the value proposition, and how a company is linked to transaction partners on the supply and demand side, it refers to “the overall gestalt of […] interlinked boundary-spanning transactions” (Zott and Amit, 2008, p. 3) between supply chain partners. The business model is, therefore, a structural template of how a company connects factor and product markets, thus reflecting the position of a company in the supply chain. Although related, business models and supply chains are different concepts: while the supply chain captures the entire material, component, information, and product/service flows across different production/service stages, it does not depict how a company creates, delivers, and captures value together with its stakeholders in the pursuit of sustainable competitive advantage. The business model, on the other hand, defines the unique configuration of internally and externally performed tasks at a specific position in the supply chain to meet customer and supplier requirements. This includes the structure of contractual arrangements between suppliers and customers (e.g., who performs what key processes in the business model) and the transaction rules, norms, and metrics designed to support the conversion of inputs to outputs (e.g., conditions of material sourcing). Hence, multiple business models can co-exist and compete against each other at the same stage of a supply chain. These differences across various business models can, for example, relate to distribution costs, arrangements for sourcing inputs (e.g., leasing vs. purchasing), and ways of satisfying customer needs. While supply chain characteristics undoubtedly inform business model choices (e.g., how to allocate governance resources across multiple supply chain relationships, what information systems to implement to manage logistics), the supply chain itself does not prescribe how a firm creates and captures value.

An important development in the relationship between supply chains and business models concerns drastic changes in business activities as a result of increasing globalization. Through a shift in organizations and geographies, we observe a new underlying reality of supply chains that has implications for a firm's business model: the rise of global supply chain partners as providers of valuable knowledge. Instead of leveraging internal knowledge sources, global connectivity to supply chain partners such as customers, suppliers, vendors, and distributors provides “born-global” firms (Knight and Cavusgil, 2004) with opportunities to create new forms of collaboration and redefine entire supply chains. Moreover, it exposes them to new ways of organizing exchanges far beyond home markets (Cano-Kollmann et al., 2016; Tallman et al., 2018). For example, offshore outsourcing has evolved from an operational issue into a key strategic concern (Alcacer and Oxley, 2014). Apart from outsourcing low value-added activities, such as help desks or accounting services, firms increasingly reallocate high value-added activities, such as marketing or R&D, to foreign partners, thus integrating them closely into their business model (Buckley and Strange, 2015; Contractor et al., 2010; Lewin et al., 2009). This

integration demands close coordination and mutual learning as the new, more open model unfolds (e.g., because of cultural differences) (Kortmann and Piller, 2016; Winter and Szulanski, 2001). Another example is the creation of new business models that span borders and connect transaction partners on platforms. Platform business models like Airbnb, eBay, and Uber enable and enrich interactions between various users to create, exchange, and consume value in a variety of places (Parker et al., 2016). The open business-to-consumer platform Tmall, for instance, connects businesses worldwide to consumers in China, Hong Kong, Macau, and Taiwan by providing transaction infrastructure, including payment solutions and instant messaging, and by defining transaction rules. The orchestration of a wide range of partners around the world, such as third-party providers that assist merchants transacting on the platform, requires Tmall to acquire and apply global knowledge to the continuous development and improvement of its business model. Instead of primarily using foreign subsidiaries to identify opportunities for developing their business models, platform firms like Tmall rely on a global knowledge-sourcing process that is centered on platform members.

While internationalization of transactional links has been studied under different theoretical models, including open innovation (e.g., Kafouros and Forsans, 2012; Shearmur et al., 2015), vertical disintegration (e.g., Buckley and Ghauri, 2004; Srai and Alinaghian, 2013), and international cooperation (e.g., Buckley et al., 2002; Lew and Sinkovics, 2013), researchers have yet to examine the consequences of economic exchanges that increasingly occur across a wide number of countries, as well as the rise of global supply chain partnerships for innovations in a firm's business model. The lack of research in this area is surprising given the importance of global supply chain management and business model innovation to firm success (e.g., Cao and Zhang, 2011; Karimi and Walter, 2016; Kastalli and Van Looy, 2013; Kim and Min, 2015; Verwaal, 2017; Zott and Amit, 2007, 2008). Consequently, the conceptual and empirical study of business model innovation in the context of increasingly globalized supply chains is an important area of inquiry.

Business model innovation and organizational learning

Whereas theoretical and empirical advancements in business models have been made, research on business model innovation is still in its infancy. This is reflected in the lack of clarity about what a business model innovation is. One element of ambiguity in the literature concerns the definition itself (see Appendix 1 for an overview). Some scholars associate business model innovation with the creation of an entirely new business model. In their study of entrepreneurial firms, Zott and Amit (2007), for example, refer to business model innovation as introducing “new ways of conducting economic exchanges among various participants” and further specify that such a novel business model design can be realized by “connecting previously unconnected parties, by linking transaction participants in new ways, or by designing new transaction mechanisms” (p. 182). Others associate business model innovation with changes in an established business model. Sorescu (2017), for instance, defines business model innovation as “a change in the value creation, value appropriation, or value delivery function of a firm that results in a significant change to the firm's value proposition” (p. 2). Summarizing these two perspectives, Massa and Tucci (2014) conclude that business model innovation may either refer to “the design of novel [business models] for newly formed organizations” or to “the reconfiguration of existing [business models]” (p. 424). An example of the former is a venturing activity of an established company that results in the formation of a new entity. In this case, the incumbent would operate (at least) two business models: its established business model and the business model of the new venture. The chemical company BASF, for instance, has established two subsidiaries – BASF New Business and BASF New Venture – that manage these kinds of activities on behalf of the parent company. An example of the latter is the modification of an established business model in response to changes in the basis of competition (Johnson et al., 2008). The tool manufacturer Hilti, for instance, has reconfigured its existing business model by switching from selling to renting tools (i.e., a significant change in the profit formula resulted in business model innovation).

In this study, we focus on the business model reconfiguration subset of business model innovation. We, hence, explore business model innovation in the context of incumbent firms where the established business model is undergoing renewal. Extending arguments developed in prior strategic renewal literature into the business model context (Agarwal and Helfat, 2009), we view business model innovation as the refreshment or replacement of an existing business model that affects the long-term prospects of the firm. Firms undertaking such strategic refreshment or replacement do so by reconfiguring the elements that constitute their business model.

A second element of ambiguity in the literature concerns the scope of business model innovation, i.e., “how much of a [business model] is affected by a [business model innovation]” (Foss and Saebi, 2017, p. 211). While scholars do not agree on the number of components of a business model that are affected by business model innovation, most concur that at least one component must change significantly (e.g., Amit and Zott, 2012; Frankenberger et al., 2013a; Sinfield et al., 2012; Sorescu et al., 2011). Grounded in literature on organizational design (e.g., Rivkin and Siggelkow, 2003; Siggelkow, 2002), these studies build on the notion that business models are complex systems or configurations of highly interdependent elements (Christensen et al., 2016; Johnson et al., 2008; Martins et al., 2015; Zott and Amit, 2007). Such systems of tightly reinforcing elements are affected by the refreshment or replacement of one element because “major changes to any of these […] elements affect the others and the whole” (Johnson et al., 2008, p. 53). This is also echoed by Amit and Zott (2012) who opine that “change one or more of these elements enough and you've changed the model” (p. 44). Following these observations, and building on Johnson et al.’s (2008) business model definition, we refer to business model innovation as a significant change in at least one of the four elements (customer value proposition, profit formula, key resources, and key processes).

The emerging literature on business model innovation suggests that adaptations to established business model require deviation from the status quo associated with exploration, discovery, and experimentation (Andries et al., 2013; Chesbrough, 2010; Sosna et al., 2010). Since business model innovations “cannot be fully anticipated in advance” (McGrath, 2010, p. 248), firms cycle through an

iterative learning process by conducting experiments that allow them to test individual elements of a new business model. For example, based on feedback received from stakeholders on the supply and demand side, the innovator may refine its business model in "a series of trial and error changes pursued along various dimensions" (Nicholls-Nixon et al., 2000, p. 496), thereby searching for elements that work given the external (e.g., customer needs) and internal (e.g., employee skills) environment (Osiyevskyy and Dewald, 2015). Thus, the purpose of experiments is to determine if a given business model innovation should be adopted rather than if it can be built (Blank, 2013).

In this paper, we provide a theoretical framework for analyzing organizational learning for business model innovation. Since the learning process associated with business model innovation takes place within as well as across firms, and – due to globalization – occurs increasingly across locations, we build on organizational learning theory to elucidate the relationship between increasingly globalized supply chains and business model innovation. For the purpose of this study, we define organizational learning as a change in the organization's knowledge base. This knowledge base is embedded in coordination mechanisms, practices, and organizational routines associated with the established business model and manifests itself in cognition and behaviors of individuals. For example, when firms abandon established margin requirements, performance demands, or brand parameters, organizational routines change and with them the profit formula of the business model. Thus, we view changes in the established business model as reflective of changes in the firm's knowledge base, and therefore indicative of organizational learning.

In order to create a business model innovation for global competition, a firm must leverage and integrate resources, determine what unique value-creating activities to perform and where, and how to connect to factor and product markets around the world. Global knowledge is a critical resource in this process. Prior literature shows that global knowledge (i.e., information, practices, and skills that organizations can apply to create business model innovations for competing in the global marketplace) is a key intangible resource leading to internationalization of activities (e.g., Carpenter et al., 2003; Reuber and Fischer, 1997) and sustainable competitive advantage (Knight and Cavusgil, 2004; Kotha et al., 2001; McEvily and Chakravarthy, 2002; Wiklund and Shepherd, 2003).

There is a long tradition of research suggesting that valuable knowledge does not only reside within firms but also externally (e.g., Chesbrough and Appleyard, 2007; Frey et al., 2011; Laursen and Salter, 2006; West and Bogers, 2014). This seems particularly relevant in the context of increasingly globalized supply chains where resources and competencies reside with various players in different locations. Accessing external knowledge sources in the supply chain is important for at least two reasons: it supports (business model) innovation by enhancing combinatory search in global markets (e.g., Fleming and Sorenson, 2001; Nelson and Winter 1982); and, it enriches the insourcing firm's knowledge base by adding distinctive new knowledge, thus offering a wider range of choices to internationalize (March 1991). Beyond the benefits of adding external knowledge to a firm's repertoire, it also has the potential to challenge a firm's internal routines, norms, and paradigms (Lei et al., 1996; Monteiro et al., 2017).

While most scholars agree on the importance of external knowledge for innovation and competitive advantage, the actual realization of such potential for business model innovation in global supply chains is, however, still an open question, both theoretically and empirically. Specifically, it remains unclear how firms access external knowledge from foreign supply chain partners, combine it with their internal knowledge stock, and use it to create innovations in their established business model. In the following, we develop specific arguments for how different organizational capabilities enable this knowledge transfer process.

Hypotheses

Global knowledge acquisition and integration: utilizing global supply chain relationships

Learning alliances with supply chain partners are primarily motivated by the aim to acquire valuable knowledge from external supply chain partners and to integrate it into internal processes (Grant and Baden-Fuller, 2004; Li et al., 2008). The practice of global knowledge acquisition underscores the importance of "distant" search and embraces collaborators such as customers, suppliers, and complementors (Teece, 2007). In addition to gaining exposure to new knowledge, firms connecting to supply chain partners can also better focus on "distinctive activities or processes where they maintain competitive advantages while taking advantage of global open resources" (Tallman et al., 2018, p. 5). Once embedded into the firm's knowledge base, the respective competitive position can eventually be improved by the creation of new open business models (Frankenberger et al., 2013b; Kortmann and Piller, 2016).

Although certain individuals in the firm may have the experience and skills required for building relationships to global supply chain partners, firms "will be vulnerable if the sensing, creative, and learning functions are left to the cognitive traits of a few individuals" (Teece, 2007, p. 1323). Thus, organizational processes and routines should be put in place to establish global supply chain linkages to leverage globally acquired knowledge. A firm's global knowledge acquisition capability reflects the set of processes and routines for accessing foreign partner's knowledge. Global knowledge acquisition capability can, therefore, be considered as the capacity of a firm to purposefully expand its knowledge base by utilizing global supply chain relationships, thus preceding the integration of new knowledge. An example of practices that undergird global knowledge acquisition capability are coordination routines aimed at allocating resources and assigning tasks to collect information from foreign partners (Li et al., 2008). YouTube, for instance, has invested in a high-tech incubator for content and channel creators to enable talented suppliers from around the world to creatively scale their businesses, while YouTube gets access to innovation resources and skills (Schrage, 2013).

However, a central concern in global knowledge acquisition pertains to determining how much to invest in different types of supply chain relationships and knowledge sourcing activities (Kristal et al., 2010). The extant organizational learning literature proposes two types of qualitatively different learning relationships and associated knowledge acquisition activities, namely exploration and exploitation (Gupta et al., 2006; Raisch et al., 2009). Exploratory knowledge acquisition implies partnerships aimed at acquiring knowledge to develop new competencies, while exploitative knowledge acquisition necessitates partnerships that would

provide knowledge to refine and extend existing skills and resources. Prior research shows that exploration and exploitation are equally important but are to some degree in conflict with each other because they require different structures, processes, and capabilities (Birkinshaw et al., 2016; He and Wong, 2004). A frequently proposed organizational response to this strategic duality is the notion of ambidexterity (e.g., Andriopoulos and Lewis, 2009; Tushman and O'Reilly, 1996).

In the context of global supply chains, an ambidextrous supply chain strategy refers to a "firm's strategic choice (i.e., managerial emphasis) to simultaneously pursue both supply chain exploitation and exploration practices" (Kristal et al., 2010, p. 415). An illustrative example of an exploitative supply chain practice aimed at acquiring knowledge from external partners is the joint organization of workshops at the supply chain partner's location to improve current problem-solving methods with the explicit goal of enhancing supply chain efficiency. This type of knowledge is important for identifying new business model opportunities that increase transaction efficiency by reorganizing processes to reduce transaction costs (Zott and Amit, 2010). On the other hand, when the aim is to acquire exploratory knowledge from external partners, information technology (e.g., a digital portal) could be employed to gather and analyze business intelligence that supports decision-making processes and facilitates the exchange of new ideas among supply chain partners, such as understanding new trends in material usage and consumption. This type of knowledge allows identifying new business model opportunities that introduce new activities, connect transaction partners in novel ways, or change the governance of activities across the supply chain (Zott and Amit, 2010).

Building on these arguments, we propose that a combination of global knowledge acquisition and ambidextrous supply chain strategy allows firms to capture a broader, yet also more balanced, range of valuable external knowledge that can purposefully be integrated into internal operations. We therefore suggest that this combination has a positive impact on a firm's ability to coordinate and integrate internal and external, globally dispersed knowledge. The stronger the synergetic effect, the more advanced are a firm's activities to access, coordinate, and integrate knowledge pertaining to global market opportunities (i.e., global knowledge integration). Therefore, we suggest:

Hypothesis 1. The interaction between global knowledge acquisition and ambidextrous supply chain strategy is positively related to global knowledge integration.

Global knowledge integration and transformation: using an enhanced knowledge base for experimentation

Firms with a global knowledge integration capability can connect external and internal knowledge (Grant, 1996; Kleinschmidt et al., 2007). The more advanced this capability, the better firms are at coordinating and integrating knowledge from global sources into their business operations (Kraaijenbrink, 2012; Subramaniam, 2006). An illustrative example for sharing external knowledge internally is the creation of business model innovation teams that link different parts of the firm. Such teams could bring together mid-level, future leaders from different functions and geographic areas with senior executives to evaluate emerging market trends acquired from external partners in the supply chain. By involving mid-level managers in the strategic decision-making process, firms can reach out to the organization for internal managerial insights, while simultaneously exposing the "operational heart" of the firm to new, external insights (e.g., alternative ways of delivering value or new approaches to product/service design). These teams may also invite external experts, customers, and suppliers from different countries to discuss market developments, emerging technology trends, and new business models that potentially disrupt the established one – an approach practiced by firms such as BASF, IBM, and Intel.

Organizational learning theory suggests that the extent to which external knowledge can be harnessed, shared, and integrated within an organization is critical for creating competitive advantage (e.g., Kogut and Zander, 1992; Tsai, 2002). In the context of business model innovation, enhancing a firm's knowledge base by combining internal with external knowledge allows supporting strategic experiments with alternative business models. Arguments put forth in the business model literature suggest that companies should experiment with a range of business models to manage risks and avoid preliminary commitment to an inappropriate business model (Andries et al., 2013; Berends et al., 2016; Chesbrough, 2010; Gelhard et al., 2016; Morris et al., 2005). By experimenting with different business model "prototypes" based on both external and internal knowledge, and incorporating feedback from the supply chain to validate these prototypes, firms "adopt an active stance to learning about the environment" (Andries et al., 2013, p. 290). This is instrumental in addressing uncertainty related to innovations in a firm's business model (McGrath, 2010). At the organizational-level, this ability is defined as strategic learning capability, referring to a firm's "proficiency at deriving knowledge from past strategic actions and subsequently leveraging that knowledge to adjust firm strategy" (Anderson et al., 2009, p. 219). Strategic learning capability elevates the enriched knowledge base to the strategic level by helping managers to create a more holistic and consistent picture of strategies employed when selecting business models as well as internal and external contingencies. It improves decision making at a strategic level with the aim of improving validation and selection of business models. Strategic learning capability benefits from global knowledge integration because an enhanced knowledge base allows firms to create a broader portfolio of business model prototypes that can be tested and compared. It also increases testing accuracy due to the ability to integrate the "voice of the environment". We, therefore, hypothesize:

Hypothesis 2. Global knowledge integration is positively related to strategic learning capability.

Global knowledge transformation and application: delivering business model innovation

Winter and Szulanski (2001) characterize a business model as a "complex set of interdependent routines that is discovered,

adjusted, and fine-tuned by 'doing'" (p. 731). The importance of testing different variations deliberately as firms go along with a set of business model prototypes is further accentuated by Govindarajan and Trimble (2005), who argue that "the fundamental uncertainties in the business model itself will make or break the business" (p. 66). Experimentation is defined as "deliberate and purposeful actions to gain knowledge about the environment or to validate existing knowledge through small tests in relatively controlled situations" (Bojovic et al., 2018, p. 142). In the business model context, experimentation entails developing and testing hypotheses associated with new business models to validate and legitimize them both internally and externally (Bojovic et al., 2018; Doz and Kosonen, 2010; Teece, 2010). Thus, experimentation allows firms to learn about the design space in which business models evolve. Internally, firms may have to support and assist managers in engaging in structural recombination of the established business model. This may entail visualizing choices, analyzing business models from other actors in the supply chain, and "playing" with new combinations of business model elements, allowing managers to systematically explore and thus better understand potential variations. Moreover, testing new structures and logics generates information managers may use to assess the value of business model innovations (Martins et al., 2015; Sinfield et al., 2012). Externally, firms may have to consult key stakeholders in the supply chain when the business model innovation of a focal firm has consequences for how other firms in the supply chain operate, such as in the case of circular business models (Bocken et al., 2014; Linder and Williander, 2017). Since no firm operates in isolation, considering interactions between business models on the supply and demand side plays an important role in taking a new model to market (Casadesus-Masanell and Ricart, 2011). Therefore, experimentation may help convince customers and distributors around the world to embrace a particular business model innovation.

An illustrative example of conducting strategic experiments based on different business models is the use of a strategic space for business model innovations. An interactive learning space supports teams in selecting and validating new business models by allowing them to visualize work in progress, extend their memory, and sketch business model stories. Such a dedicated space also enables teams to keep track of several elements and decisions that are subject to dynamic change (e.g., adjustment of business model elements following feedback from foreign partners) as well as multiple interactions and complex relationships (e.g., information and resource flows between different business models). Here, firms may also actively involve supply chain partners to validate business models (i.e., co-create solutions with partners). The outcome of the learning process, and therefore the application of global knowledge in the market, is business model innovation. We thus hypothesize:

Hypothesis 3. Strategic learning capability is positively related to business model innovation.

Methodology

Data collection, sample, and key informant check

This study is part of a larger cross-industry research project on global sourcing and innovation capabilities, in which we specifically targeted senior executives located in Canada. For the sample selection process, we used the Canadian Company Capabilities database of the Canadian Government that allows for a distinction between exporting and non-exporting companies. Since "export" represents a firm's international sales and distribution activities, we used the distinction between exporting and non-exporting companies as a proxy to identify those companies with international supply chains in the broadest sense. We randomly selected a set of 2000 firms that undertake international supply chain activities. In the second step, we excluded all firms for which we could not identify a top manager and/or a corresponding email address. For about 730 Canadian companies, we could identify top managers (as our targeted key respondents) and their email addresses. We included companies from different industries to enhance both sample diversity and generalizability of findings, while also ensuring that each company is represented by one senior executive only. In total, 97 respondents agreed to participate by signing the participant consent form. From the initial sample, 37 participants had to be eliminated because of missing data (33) or key informant criteria that were not fulfilled (4). This results in a sample size of 60 knowledgeable senior managers (see key informant check), representing a satisfactory response rate of 61.86% based on agreements to participate. The adequacy of this sample size was further assessed by performing a post hoc power analysis as a part of the main statistical analysis of this paper.

To ensure that the key informants were knowledgeable senior executives, we employed different quality criteria, such as the respondent's job title, job experience, organizational tenure, and the involvement in strategic, operational, and innovation activities. To assess the respondents' involvement in strategic, operational, and innovation activities, we used a 7-point Likert scale ranging from "not at all involved" (1) to "highly involved" (7), excluding all respondents that scored lower than 5. Respondents' average score on the involvement in strategic activities was 6.57 (standard deviation (SD) = 0.95), while 6.05 (SD = 1.10) was calculated in operational activities, and 6.08 (SD = 1.52) for innovation activities. On average, senior executives revealed a job experience of 28 years (SD = 11.88) and had been working with their firms for 15.15 years (SD = 9.60). These quality checks prove that the remaining key informants are well qualified to report on the phenomena under investigation. The descriptive statistics are presented in Appendix 2.

Data analysis method and measures

In this study, we adopted the partial least squares approach to structural equation modeling (PLS-SEM) for several reasons. Since the associated theory (both measurement theory and structural theory) of the proposed model is insufficiently developed in pertinent literature, PLS-SEM is applied in this study to predict and explain, rather than to confirm, phenomena of interest (Hair et al., 2014).

Furthermore, we opted for PLS-SEM because it is proposed to achieve high levels of statistical power with small sample sizes (Hair et al., 2012). More specifically, we followed Peng and Lai (2012) who highlight the frequent use of PLS-SEM for sample sizes between 50 and 100. Moreover, PLS-SEM makes no assumption about data distribution and is therefore particularly suitable for complex models that include formative and reflective second-order constructs as well as mediation effects (Cassel et al., 1999). We assessed the hypothesized structural equation model by using SmartPLS 2.0 M3 (Ringle et al., 2005).

Global knowledge acquisition is a 4-item construct adopted from Li et al. (2008), which captures the firm's ability to acquire procedural knowledge from foreign partners. Ambidextrous supply chain strategy (ASCS) is a second-order construct consisting of two reflective first-order constructs, namely exploitative and exploratory supply chain practices, obtained from Kristal et al. (2010). Global knowledge integration (GKI) is adopted from Kleinschmidt et al. (2007) and comprises of four items that measure a firm's process capability that connects internal and external knowledge. Strategic learning capability (SLC) draws on a six-item scale obtained from Anderson et al. (2009). Specific items and their respective loadings are presented in Appendix 3. We applied a seven-point Likert-type scale for all items, ranging from one (completely disagree) to seven (completely agree).

A new measurement model for business model innovation

Despite the popularity of Johnson et al.'s (2008) business model framework, no business model innovation measurement based on this framework is presently available. By developing this measure, we make an important methodological contribution to the business model community that is still lacking means to empirically assess the antecedents of business model innovation (Demil et al., 2015; Foss and Saebi, 2017). In the following, we discuss why we operationalized business model innovation as a reflective-formative type of hierarchical component model (a Type II multi-dimensional second-order index). We begin with a discussion of the principal operationalization of the business model construct before we turn to business model innovation.

Johnson et al. (2008) define a business model as a set of "four interlocking elements that, taken together, create and capture value" (p. 52): customer value proposition (CVP), profit formula (PF), key resources (KR), and key processes (KP). They further identify components of these four constituting elements. Hence, Johnson et al. (2008) conceptualize a business model as a multi-dimensional entity that has to be operationalized as a multidimensional entity as well. Owing to the interdependencies between the four elements that constitute a business model (CVP, PF, KR, and KP), the design elements of a business model are not inter-changeable. The four elements are causes of the business model construct rather than its effects. Each of the four elements represents important features of a business model (e.g., the profit formula represents the value capture part); hence, eliminating one of these elements would alter the conceptual domain of the overriding business model index. In other words, the four elements jointly determine the business model construct.

In our study, we are interested in business model innovation, defined as a significant change in at least of one of the four constituent elements of an established business model. In line with the arguments developed above, the business model innovation index is a composite of its components, i.e., changes in CVP, PF, KR and KP combine to produce the business model innovation index. Consequently, omitting any of the four dimensions would lead to a change in the underlying meaning of the business model innovation construct, suggesting that it should be modelled in a formative mode. Thus, we refer to these four elements as first-order dimensions of the second-order business model innovation index.

As no readily available scale for measuring change in the four elements of an established business model exists, we determined whether the four first-order dimensions of the business model innovation index reflect a measurement mode that is reflective or formative (Diamantopoulos and Winklhofer, 2001; Jarvis et al., 2003). A formative measurement mode for the four dimensions of business model innovation "would imply that deleting one indicator may lead to the deletion of a unique part of the formative measurement models and, thus, change the meaning of the constructs" (Wilden et al., 2013, p. 80). Prior business model and business model innovation research reveals a large number of components associated with each dimension (Massa and Tucci, 2014; Wirtz et al., 2016; Zott et al., 2011). With respect to the profit formula, Wirtz et al. (2016), for instance, note that "many forms of revenue generation are possible" (p. 41). To illustrate that it is impractical to measure exhaustively all relevant aspects of the four dimensions, thus demonstrating that a reflective rather than a formative measurement mode applies, consider a change in the profit formula as an example. On a high level of abstraction, the profit formula determines how a firm captures value. The profit formula manifests itself in the cost structure of the firm as well as in the margins and velocity needed to cover them. Altering the profit formula would thus change how a firm generates a profit. Changing asset utilization, pricing strategy, economies of scale and scope, direct costs, indirect costs, key performance indicators, commercialization strategy, etc., denotes "effects" of change in the profit formula. Within the profit formula dimension, all these items share a common theme and are to some degree interchangeable. However, they are not interchangeable across the four business model elements (e.g., change in the direct costs is not a relevant indicator for change in the customer value proposition). We thus conclude that reflective measurement modes are appropriate for capturing change in the four dimensions (all items are presented in Appendix 3).

To develop the actual scale, we followed established scale development procedures (Hinkin and Tracey, 1999; MacKenzie et al., 2011). In the first step, we conceptually reviewed and cross-referenced Johnson et al.'s (2008) business model definition in the literature, asked practitioners to identify the key aspects of the construct's domain, and specified the conceptual theme of the construct. Based on the findings of this validation process, we generated ten (reflective) indicators for each first-order construct. Next, we assessed the content validity of these indicators. Then, we constructed a matrix in which definitions of different aspects of the construct's domain and the items were listed. Next, we asked practitioners to rate the extent to which each item captures each aspect of the construct domain on a 7-point Likert-scale. To evaluate whether an item's mean rating on one aspect of the construct's domain differs from its ratings on other aspects of the construct, a one-way repeated measures ANOVA was applied (MacKenzie et al., 2011).

Based on this assessment, items that have possible content validity issues, were removed. Finally, we conducted a pre-test of our survey following the procedure outlined by Churchill (1979). Based on this pre-test, we removed items with high non-response rates and poor loadings (< 0.70). As a result of all applied procedures, we obtained five valid items each for CVP and KR, and seven valid items for PF and KP, respectively (see Appendix 3). Finally, to empirically assess the formative relationship between business model innovation (BMI) and its four first-order reflective constructs, we followed the procedure outlined by Hair et al. (2014) and created the second-order construct measurement model by means of a repeated indicator method.

Control variables

Firm age, firm size, and company type (manufacturing vs. service) serve as control variables. We also controlled for environmental dynamism since dynamic environments are characterized by changes in technology standards, emergence of new value propositions, and shifts in competition, which might pressure firms to adapt their business model. We further controlled for internationalization since firms with a higher degree of internationalization might be in a better position to utilize global knowledge.

Analysis and results

Evaluation of the measurement models

In the first step, we examined the reliability and validity of construct measures. Since all first-order constructs are based on reflective measurements, internal consistency, convergent validity, and discriminant validity were used to examine the measurement model. All constructs exceed the suggested threshold of 0.70 for composite reliability (CR) (see Table 1). With respect to convergent validity, we assessed item reliability and average variance extracted (AVE). All items included in the structural model load on their intended constructs with loadings greater than the threshold of 0.7 (Hulland, 1999) and all the respective AVEs exceed the suggested threshold of 0.5 (Chin, 1998). To determine discriminant validity of the measurement models, we examined the cross-loadings of the items and applied the Fornell-Larcker criterion. As can be seen in Appendix 4, each item's outer loading on the associated construct is higher than all respective loadings on other constructs. The second test for sufficient discriminant validity, the Fornell-Larcker criterion, states that the square root of each construct's AVE should be greater than its highest correlation with any other construct (Fornell and Larcker, 1981). The value given in the matrix diagonal is always higher than the correlation coefficients with other constructs, suggesting sufficient discriminant validity (see Table 1).

Evaluation of the structural model

In the second step, we assessed the structural model by examining the significance and relevance of the path coefficients. To this end, we used bootstrap samples of 250, 500, and 5,000, generated from the original dataset. The results are consistent across all applied samples and show that all hypotheses are supported. Fig. 1 and Table 2 depict the results of the PLS-SEM analysis based on a bootstrapping procedure with 500 samples.

We also evaluated whether the hypothesized relationships of the underlying process-model are fully or partially mediated. As shown in Table 3, only the relationship between supply chain ambidexterity and strategic learning capability is partially mediated by global knowledge integration. All other relationships can be characterized by full mediation.

Then, we assessed the explanatory power of our structural model by means of the explained variance (R^2) of all endogenous variables (see Fig. 1). In case of BMI, the variance of the formative second-order construct is almost completely explained by its four reflective first-order constructs. We therefore followed prior literature (Tenenhaus et al., 2005) and applied a two-stage approach to assess the second-order construct. After creating a reflective-formative second-order-construct for BMI at stage one, we used the generated latent variable scores to create single-item measures for CVP, PF, KR, and KP in stage two. The model explains 38% of the variations in global knowledge integration, 26% of the variations in strategic learning capability, and 42% of the variations in business model innovation, which can be considered satisfactory. The corresponding Cohen's f^2 values assess the relative effect size of each exogenous variable, indicating at least small-to-medium effect size for all hypothesized relationships. The prediction ability of the structural model was evaluated by means of an in-sample prediction method. We obtained the Q^2 for GKI and SLC by using a blindfolding procedure (Tenenhaus et al., 2005) with an omission distance of seven (Hair et al., 2012). Since this measure is only available for reflective constructs, BMI as a formative endogenous construct cannot be evaluated by means of Q^2 values. Since all Q^2 values of the reflective endogenous variables are positive, we assert predictive relevance.

To further test whether sample estimations yielded satisfactory statistical power considering the present sample size, we conducted a series of post hoc power analyses. Statistical power values were calculated for each of three hypothesized relationships of the proposed research model using G*Power. As shown in Table 4, the calculated power values (Type II error, 1-β) of a two-tailed *t*-test with a sample size of 60 and a Type I error (α) of 0.10 exceed the threshold of 0.80 and, hence, indicate satisfactory statistical power for all hypothesized relationships.

Since our study is based on the single key informant approach, we also tested for a potential common method bias. To rule out the possibility that the results are biased by common method variance, ex ante measures such as the allocation of dependent and independent variables to different sections of the survey were employed. Further, we employed two post hoc procedures. First, Harman's single factor test (Harman, 1976; Podsakoff and Organ, 1986) revealed that neither a single factor nor a general factor causes most of the variance. Second, common method bias was assessed following the procedure suggested by Podsakoff et al. (2003)

Table 1
Psychometric properties of first-order measurement scales.

	ME	SD	CA	CR	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Global knowledge acquisition	4.01	1.63	0.92	0.94	0.81	0.90													
2. Supply chain exploration	4.67	1.23	0.91	0.94	0.80	0.08	0.89												
3. Supply chain exploitation	5.04	1.08	0.90	0.93	0.77	0.09	0.79	0.88											
4. Global knowledge integration	4.33	1.34	0.92	0.94	0.80	0.38	0.09	0.08	0.90										
5. Strategic learning capability	5.24	0.99	0.87	0.91	0.72	0.23	0.31	0.24	0.38	0.85									
6. Customer value proposition	4.89	1.28	0.87	0.91	0.66	−0.08	0.19	0.10	0.08	0.25	0.81								
7. Key processes	4.61	1.35	0.93	0.94	0.71	−0.07	0.07	0.18	0.16	0.30	0.65	0.84							
8. Key resources	4.78	1.22	0.76	0.85	0.58	−0.14	0.08	0.12	0.11	0.36	0.60	0.76	0.76						
9. Profit formula	4.53	1.39	0.92	0.94	0.68	0.00	0.23	0.14	0.33	0.46	0.70	0.77	0.68	0.82					
10. Environmental dynamism	4.38	1.49	0.87	0.92	0.79	−0.27	0.15	0.01	−0.20	−0.15	0.27	0.17	0.28	0.18	0.89				
11. Firm age	39.75	34.05	na	na	na	0.07	0.11	0.18	−0.07	0.15	−0.33	−0.25	−0.11	−0.19	−0.21	na			
12. Firm size	2.72	1.26	na	na	na	0.16	0.19	0.24	0.12	0.04	0.03	−0.06	−0.07	−0.06	0.00	0.35	na		
13. Internationalization	3.46	2.38	0.96	0.98	0.97	0.31	0.06	0.12	0.33	0.08	0.23	0.21	0.11	0.16	−0.14	−0.22	0.13	0.98	
14. Manufacturing	0.48	0.50	na	na	na	0.19	−0.19	−0.11	0.04	−0.01	0.04	−0.02	−0.04	−0.09	−0.15	−0.41	−0.21	0.35	na

Notes: AVE = Average variance extracted; CA = Cronbach's Alpha; CR = Composite reliability; ME = mean; na = not applicable; SD = standard deviation; Value on the diagonal is the square root of AVE.

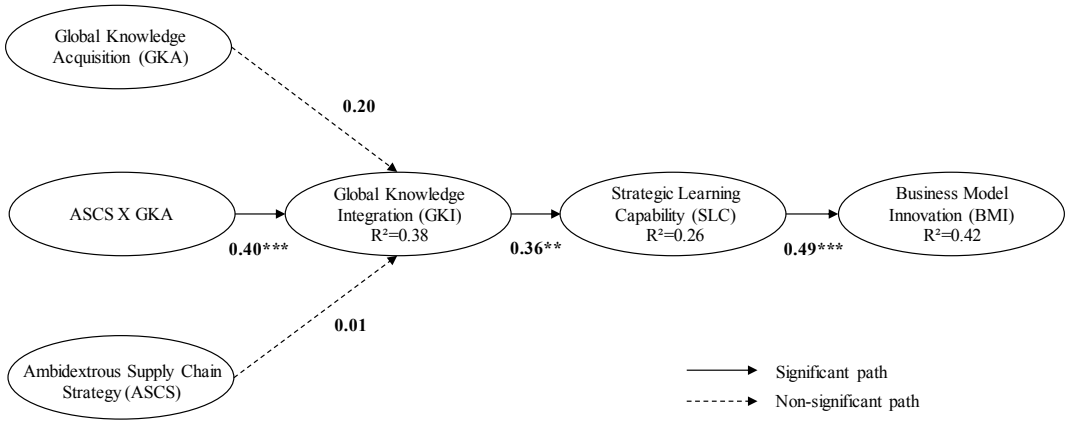

Fig. 1. Results of structural equation modeling. **Notes:** *p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.01. All tests are two-tailed.

Table 2
Results of structural equation modeling.

Path		β-coefficient	p-value
H1	GKA x ASCS – GKI	0.40	< 0.001
H2	GKI – SLC	0.36	0.026
H3	SLC – BMI	0.49	0.034
CV	Firm age – GKI	−0.18	0.054
CV	Firm age – SLC	0.17	0.325
CV	Firm age – BMI	−0.18	0.565
CV	Firm size – GKI	0.05	0.619
CV	Firm size – SLC	−0.12	0.381
CV	Firm size – BMI	−0.08	0.698
CV	Manufacturing – GKI	−0.18	0.173
CV	Manufacturing – SLC	0.07	0.600
CV	Manufacturing – BMI	−0.17	0.316
CV	Environmental dynamism – GKI	−0.14	0.325
CV	Environmental dynamism – SLC	−0.04	0.794
CV	Environmental dynamism – BMI	0.25	0.209
CV	Internationalization – GKI	0.22	0.084
CV	Internationalization – SLC	−0.07	0.593
CV	Internationalization – BMI	0.16	0.358
CV	GKA – GKI	0.20	0.123
CV	GKA – SLC	0.09	0.569
CV	GKA – BMI	−0.13	0.507
CV	ASCS – supply chain exploration	0.95	< 0.001
CV	ASCS – supply chain exploitation	0.94	< 0.001
CV	ASCS – GKI	0.01	0.908
CV	ASCS – SLC	0.28	0.087
CV	ASCS – BMI	0.03	0.876
CV	GKI – BMI	0.17	0.523

Table 3
Mediation analysis.

Mediated relationship	p-value direct path	Type of mediation
GKA – GKI – SLC	0.57	Full
ASCS – GKI – SLC	0.09	Partial
GKA – SLC – BMI	0.51	Full
ASCS – SLC – BMI	0.88	Full
GKI – SLC – BMI	0.52	Full

and Liang et al. (2007). Specifically, a common method variance factor containing all indicators of principal constructs of the research model was implemented and the variances caused by the principal construct, i.e., substantive variance, were compared with those caused by the common method factor, i.e., method-based variance (see Appendix 5). The ratio of average substantive variance to average method-based variance is about 78:1, suggesting absence of common method bias.

To further establish whether our results are potentially affected by common method bias, we employed a PLS marker variable

Table 4
Power analysis.

	Effect size	Power
ASCS x GKA – GKI	0.24	0.98
GKI – SLC	0.12	0.84
SLC – BMI	0.27	0.99

approach proposed by Rönkkö and Ylitalo (2011). The marker variable comprises of seven items obtained from constructs, such as market orientation, supplier orientation, and top management team involvement. We selected items with the lowest and most consistent correlation with the focal constructs. The marker items form a method construct as an exogenous variable that explains each of the focal constructs of the proposed research model. A comparison with the baseline model shows that parameter estimates remain stable and none of the significant path coefficients of the baseline model becomes insignificant. Based on both tests we infer that our findings are not impacted by endogeneity resulting from common method effects.

Discussion and implications

Prior research considers business models as configurations of interlocking elements that explain how a firm connects to factor and product markets (Johnson et al., 2008; Zott and Amit, 2008), and most authors are of view that business models are difficult to change (e.g., Christensen et al., 2016). We contribute to the current understanding of business model innovation by theorizing and empirically examining how business models of established firms can be innovated in global supply chains through knowledge transfer across national and firm boundaries. In line with recent developments in the international business and strategy literature (e.g., Tallman et al., 2018), we have argued for a more globally oriented approach to business model innovation that explicitly synthesizes external and internal strategies. To ensure that new business models connect appropriately to the supply and demand side, and to enable new models to be better aligned with international considerations, it seems likely that foreign partners can provide valuable knowledge that enriches the firm's internal knowledge base. Global knowledge sourced outside a firm's boundaries can help in attaining critical market knowledge, acquiring new ideas, learning about alternative ways of creating and capturing value in foreign markets, and identifying innovative ways to collaborate across the supply chain. Furthermore, external knowledge sources may also compensate for a limited internal knowledge base. From the business model perspective, sourcing knowledge globally matters since business models are increasingly implemented across national borders (e.g., because they connect users irrespective of their location) and have become more integrated and interdependent within global ecosystems (e.g., offshore outsourcing partnerships, circular economy).

Drawing on organizational learning theory, we proposed a four-step, firm-level knowledge transfer process connecting globalized supply chains and business model innovation. Our conceptual model builds on the notion that “externally acquired knowledge undergoes multiple iterative processes before the recipient firm can successfully exploit it to achieve competitive advantage” (Zahra and George, 2002, p. 197). For this process, we defined different organizational capabilities that enable firms to acquire external knowledge from foreign supply chain partners, integrate it with internal knowledge, transform the blended knowledge through experimentation, and finally apply it to business model innovation.

Our results suggest that external knowledge of global sources is positively associated with business model innovation. First, we found that the combined effect of global knowledge acquisition and an ambidextrous supply chain strategy supports global knowledge integration. While the firm-level ability to access external knowledge facilitates connection to foreign partners (e.g., customers, distributors, vendors), exploratory and exploitative supply chain practices allow for a broad spectrum of acquired knowledge to be transported into the firm. An ambidextrous supply chain strategy is a strategic choice of a business model innovator to leverage sources of external knowledge in the supply chain to simultaneously explore and exploit. Firms aiming to innovate their business model may, for instance, work with one of their foreign suppliers to uncover new supply chain practices for business model innovation (i.e., an exploration activity), while acquiring knowledge from another supplier to augment existing skills and resources for business model innovation (i.e., an exploitation activity).

Second, our findings indicate that the ability to integrate global knowledge provides a focal firm with a richer knowledge base, which is beneficial for conducting strategic experiments based on alternative business models. The more global knowledge is integrated within the firm, the better the firm is at creating a broader set of business model variations on which to base strategic experiments. This experimentation helps identify business models that work within a specific external and internal environment.

Third, we found a positive relationship between strategic learning capability and business model innovation. Leveraging global knowledge can help firms to discover viable business model innovations and enable them to gain both internal and external legitimacy by validating new business models prior to taking a selected business model innovation to market.

The novel theoretical ideas about leveraging global knowledge sources for business model innovation respond to calls by Zott et al. (2011) as well as Foss and Saebi (2017) for further studies on the business model innovation process. Specifically, the global knowledge sourcing and integration process we advanced in this work fills an important gap in the literature regarding the relevance of global supply chain partners in reconfiguring an incumbent's business model. As noted in the introduction, the ever-increasing fragmentation of global value chains and the associated dispersion of knowledge sources provides enormous opportunities for business model innovation. However, prior theorizing in the business model literature remained relatively silent on how to seize such

opportunities. Our study identifies a set of organizational capabilities that enable knowledge transfer from external partners to the business model innovator, as well as the internal dissemination and transformation of knowledge through routines and procedures relating to knowledge sharing and experimentation.

The process outlined in this article can help in translating supply chain partners' expertise, skills and capabilities into business model innovation, provided that firms invest in the organizational capabilities identified in our study. The Chinese electronics company Xiaomi is an example of a company that has invested in global learning for business model innovation. Instead of exporting its established business model to enter the Indian smartphone market, Xiaomi re-designed its business model by entering into a partnership with the Indian e-commerce company Flipkart. Following initial meetings between the executives of both companies, the two firms established processes to exploit expertise in smartphone design (Xiaomi) and online sales (Flipkart), while simultaneously engaging in mutual knowledge exchange to explore new value propositions. For example, when Flipkart began to focus on the smartphone market, it had to learn about specs, hardware, and user interface, while Xiaomi relied on Flipkart to learn about Indian customers' preferences and market structure. Acquiring and integrating global knowledge enabled the two firms to consider different approaches to create, deliver, and capture value, while learning exercises allowed the business model to evolve by testing essential assumptions and adjusting as they learned. For example, when the new online platform for selling smartphones launched in 2014, over 500,000 users logged onto the site. This massive influx of visitors overwhelmed Flipkart's servers and crashed the site, forcing the partners to reconsider key assumptions about the demand side of the business model. Following initial adjustments, this business model innovation became highly successful: it enabled Xiaomi to become the second largest player in India's competitive smartphone market within just two years.

The learning process we articulated in this article provides a general framework for such business model innovations in global markets. In addition to this theoretical advancement, we offered a contribution to the business model literature that is methodological in nature: we introduced a new, survey-based measurement model for business model innovation, thus responding to a call by Demil et al. (2015) for “empirical research beyond single-case studies” (p. 2). While there is a growing body of empirical research on business model innovation, quantitative studies are still rare, leaving many important questions about how business model innovation can be formally conceptualized and measured unanswered. By developing a theory-based, multi-dimensional model of our focal construct business model innovation, we address this gap in a rigorous and structured way.

To the best of our knowledge, this is the first attempt to integrate global supply chain, organizational learning, and business model literature. As such, our study is not without limitations, one of which pertains to sample size. Although small sample sizes are not uncommon in exploratory management research, and while we did confirm satisfactory statistical power, future studies should utilize a larger sample to permit more powerful statistical tests and replicate our findings. Another limitation relates to the key informant approach for data collection that we employed to gather high quality information on the proposed relationships from highly knowledgeable respondents. Although tests for common method bias did not reveal significant effects, and we employed several measures to reduce common method bias ex ante, it is not possible to completely rule out common method bias. Therefore, in future studies this limitation should be addressed by using multiple respondents from a same company when conducting data collection. Other limitations are associated with topics we did not or could not include in this article because of the nascent stage of the idea to leverage global knowledge for business model innovation. These limitations open avenues for future research, which we will address in the following section.

Future research

Type, origin, and role of supply chain partners

In our study, we intentionally limited our model to external knowledge acquisition from supply chain partners, i.e., entities that are essential to value creation. Since global knowledge sourcing for business model innovation is a nascent concept, our aim was to capture a variety of supply chain partners as well as relationships in the broadest sense to provide *first* insights into this concept and explore organizational capabilities enabling the proposed learning process. While this narrow scope allowed us to answer the question of how to leverage external knowledge from supply chain partners for business model innovation, it generates a couple of new questions. For example, to what degree do firms acquire knowledge from different supply chain partners? When and why is it beneficial to focus on a particular supply chain partner, or should firms always consider several supply chain partners simultaneously? Moreover, there might be situations in which a firm can learn from external stakeholders not considered in our model. For example, to advance the global knowledge sourcing perspective on business model innovation, future research could consider competitors as an external source of global knowledge. This would allow coopetition (i.e., simultaneous cooperation and competition between rivals) to be integrated into our model as a prevalent facet of global competition (see Dagnino, 2009; Luo, 2007; Ritala and Hurmelinna-Laukkanen, 2013). Is such a paradoxical relationship between firms beneficial for business model innovation? If so, what organizational capabilities support a coopetition strategy for business model innovation in global markets?

Additionally, when firms turn to foreign partners for business model innovation, questions arise regarding their country of origin, including cultural distance (e.g., Berry, 2014; Chua et al., 2015). For example, how does the origin of a supply chain partner influence the integration and recombination of knowledge across borders? How are inter-organizational knowledge exchanges for business model innovation managed between a knowledge insourcing firm in a developed country and a knowledge provider in a developing country?

Future studies could also explore the role of supply chain partners in the knowledge-insourcing firm's new business model. In some cases, the supply chain partner might be merely a provider of global knowledge (like in the examples of Niaga or Tmall); while

in others, firms may seek to integrate a partner in the business model, one that would take an active role in value creation and capture (like in the example of Xiaomi and Flipkart). Here, it would be beneficial to explore how different roles of the partner influence the learning process, and how knowledge exchange practices of both partners may co-evolve to yield business model innovation.

Micro-foundations of global learning

Following prior strategic management research (e.g., Kogut and Zander, 1992; Nelson and Winter 1982), we have conceptualized firms as repositories of routines and capabilities that cause an outcome, namely business model innovation. While this approach has enabled us to theorize and empirically test a new relationship between a set of organizational capabilities and business model innovation, our emphasis on the routines and capabilities that support firms in translating global knowledge into business model innovation does not explain how these organizational capabilities emerge, nor the explanatory mechanisms that link these organizational capabilities to business model innovation (see Felin et al., 2012; Helfat and Peteraf, 2015).

Since we have not been able to delve deeply enough into the learning process with our (macro-level) study to consider managers' individual actions and interactions (i.e., the micro-level), going forward, it would be beneficial to examine the underlying micro-foundations of the knowledge development path suggested here. For example, how do managers learn from strategic experiments based on different business model prototypes? How do they challenge established rules, norms, and metrics associated with the established business model? What cognitive rules or reasoning do they use to update their mental schemas about how to create and capture value? With a few exceptions (Martins et al., 2015; Tikkanen et al., 2005), research on cognition and behavior in business model innovation is still sparse. The organizational capabilities identified in our study are a valuable starting point, but further research is needed to fully understand and unpack the learning process behind business model innovation.

Dark side of global knowledge sourcing

The idea that firms rely on external resources to gain a competitive edge has a long tradition in strategy and innovation research (e.g., Chesbrough and Appleyard, 2007; Frey et al., 2011; Laursen and Salter, 2006; West and Bogers, 2014). Grounded in this logic, we suggested that a firm's ability to integrate external knowledge plays an important role in business model innovation. But what about risks and potential negative consequences associated with utilizing external knowledge sources for business model innovation?

For example, it is possible that not only the business model innovator learns from supply chain partners, but also supply chain partners might gain access to valuable technological and market knowledge. When supply chain partners are exposed to competitively significant knowledge of the innovator, they might take advantage through, for instance, vertical integration. If so, how do organizational and management decisions of the business model innovator influence the extent of knowledge transfer to a supply chain partner, and what are competitive consequences? In this context, future studies could explore how closely firms should collaborate with their supply chain partners and what distinct pathways to learning exist to prevent supply chain partners from taking advantage of the knowledge exchange relationship.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lrp.2018.08.003.

Appendices

Appendix 1
Representative definitions of business model innovation.

Article	Definition
Abdelkafi et al. (2013)	"A business model innovation happens when the company modifies or improves at least one of the value dimensions" (p. 13)
Amit and Zott (2012)	"Business model innovation can occur in a number of ways: By adding novel activities […], by linking activities in novel ways, […], by changing one or more parties that perform any of the activities" (p. 44)
Casadesus-Masanell and Zhu (2013)	"Business model innovation refers to the search for new logics of the firm, new ways to create and capture value for its stakeholders, and focuses primarily on finding new ways to generate revenues and define value propositions for customers, suppliers, and partners" (p. 464)
Gambardella and McGahan (2010)	"Business-model innovation occurs when a firm adopts a novel approach to commercializing its underlying assets" (p. 263)
Kim and Min (2015)	"An incumbent firm may commit to original business model innovation by creating a new business model derived from its own technological breakthrough or endogenous reconfiguration of ways of doing business" (p. 36)

(*continued on next page*)

Appendix 1 (*continued*)

Article	Definition
Markides (2006)	"Business model innovation is the discovery of a fundamentally different business model in an existing business" (p. 20)
Sorescu (2017)	Business model innovation refers to "a change in the value creation, value appropriation, or value delivery function of a firm that results in a significant change to the firm's value proposition" (p. 2).
Yunus et al. (2010)	"Business model innovation is about generating new sources of profit by finding novel value propositions/value constellation combinations" (p. 312)
Zott and Amit (2007)	Business model innovation, i.e. novelty-centered business model design, refers to "new ways of conducting economic exchanges among various participants" (p. 182)

Appendix 2
Descriptive statistics

Key informant descriptive statistics		
Job title		
CEO	27	45.00%
COO	4	6.67%
CTO	1	1.67%
President	7	11.67%
Chairman	1	1.67%
Director	5	8.33%
Executive vice president	1	1.67%
Vice president	5	8.33%
Senior consultant	1	1.67%
President & CEO	2	3.33%
General manager	6	10.00%
Firm descriptive statistics		
Industry affiliation (SIC)		
Division A: Agriculture, Forestry, Fishing (code 01–09)	5	8.33%
Division B: Mining (code 10–14)	5	8.33%
Division C: Construction (code 15–17)	6	10.00%
Division D: Manufacturing (code 20–39)	28	46.67%
Division E: Transportation & Public Utilities (code 40–49)	7	11.67%
Division G: Retail Trade (code 52–59)	2	3.33%
Division H: Finance, Insurance and Real Estate (code 60–67)	1	1.67%
Division I: Services (code 70–89)	6	10.00%
Firm size (number of full time employees)		
1–10	9	15.00%
11–50	22	36.67%
51–250	14	23.33%
251-1000	8	13.33%
1001–50,000	6	10.00%
> 50,000	1	1.67%
	ME	**SD**
Firm age	39.75	34.05

Appendix 3
Measurement instruments.

GKA: Global knowledge acquisition (Li et al., 2008)		Loading
GKA1	We often acquire market development knowledge from foreign partners.	0.90
GKA2	We often learn operations management skills from foreign partners.	0.87
GKA3	We learn new product development knowledge from foreign partners.	0.92
GKA4	We obtain new and important information from foreign partners.	0.89

ASCS: Ambidextrous supply chain strategy (Kristal et al., 2010)		Loading
EXOI1	In order to stay competitive, our supply chain managers focus on reducing operational redundancies in our existing processes.	0.84
EXOI2	Leveraging of our current supply chain competencies and processes is important to our firm's strategy.	0.91
EXOI3	In order to stay competitive, our supply chain managers focus on improving our existing competencies and processes.	0.93
EXOI4	Our managers focus on developing stronger competencies in our existing supply chain processes.	0.84
EXOR1	We constantly look for new supply chain solutions.	0.90
EXOR2	We continually experiment to find new solutions for our supply chain.	0.91
EXOR3	To improve our supply chain, we continually explore for new opportunities.	0.90
EXOR4	We are constantly seeking novel approaches in order to solve supply chain problems.	0.85

GKI: Global knowledge integration (Kleinschmidt et al., 2007)		Loading
Our new product/service development process is effective in …		
GKI1	… facilitating the incorporation of internationally dispersed information.	0.89
GKI2	… facilitating the coordination for internationally dispersed new product/service development activities.	0.89
Gathering input from worldwide locations is highly coordinated …		
GKI3	… during early stages of the new product/service development process (e.g., concept development, idea screening).	0.90
GKI4	… during later stages (e.g., development, testing and launch).	0.90

SLC: Strategic learning capability (Anderson et al., 2009)		Loading
SLC1	My firm is good at identifying strategies that haven't worked.[a]	–
SLC2	My firm is good at pinpointing why failed strategies haven't worked.[a]	–
SLC3	My firm is good at learning from its strategic/competitive mistakes.	0.76
SLC4	My firm regularly modifies its choice of business practices and competitive tactics as we see what works and what doesn't.	0.83
SLC5	My firm is good at changing its business strategy midstream as we get a sense of the likely effectiveness of our actions.	0.92
SLC6	We are good at recognizing alternative approaches to achieving our firm's objectives when it becomes clear that the initial approach won't work.	0.88

BMI: Business model innovation		Loading
Over the last five years we have significantly changed …		
CVP1	… our target customers and/or customer segments.	0.77
CVP2	… our way of satisfying important customer needs.	0.82
CVP3	… our product/service offering.	0.83
CVP4	… the design of our product/service offering.	0.88
CVP5	… the price of our product/service offering.	0.77
PF1	… our pricing and sales strategy.	0.78
PF2	… our commercialization strategy (e.g., subscription fees, leasing, licensing).	0.75
PF3	… the cost structure of our product/service offering.	0.84
PF4	… the calculation of strategically important costs.	0.86
PF5	… our manufacturing/operations strategy (e.g., operational excellence projects).	0.76
PF6	… the cost structure of our operational processes.	0.90
PF7	… our key performance indicators (e.g., ROI, ROA, inventory turns, or lead times).	0.85

(*continued on next page*)

Appendix 3 (*continued*)

GKA: Global knowledge acquisition (Li et al., 2008)		Loading
KR1	… the assets required to create and deliver our product/service offering.	0.74
KR2	… the key resources that allow us to reach targeted markets.[a]	–
KR3	… technologies, components and parts of our product/service offering.	0.72
KR4	… our brand.	0.81
KR5	… our network of suppliers and partners.	0.77
KP1	… our distribution and sales processes.	0.82
KP2	… the processes related to designing, making, and delivering our offering.	0.84
KP3	… the process of product or service development.	0.84
KP4	… the way we communicate and interact with our customer.	0.74
KP5	… financial metrics (e.g., gross margins, unit margin, time to breakeven, credit items).	0.88
KP6	… operational metrics (e.g., end product quality, supplier quality, lead times).	0.87
KP7	… other metrics (e.g., performance demands, product development life cycles, brand parameters).	0.87

[a] Item dropped due to measurement concerns.

Appendix 4
Cross loadings (item-to-construct correlations).

	GKA	EXOR	EXOI	GKI	SLC	CVP	PF	KR	KP
GKA1	**0.90**	0.04	0.06	0.33	0.21	−0.01	0.03	−0.05	−0.03
GKA2	**0.87**	0.18	0.15	0.32	0.17	−0.10	−0.05	−0.20	−0.17
GKA3	**0.92**	0.09	0.12	0.26	0.08	−0.14	−0.09	−0.20	−0.07
GKA4	**0.89**	−0.01	0.01	0.41	0.33	−0.05	0.08	−0.07	0.01
EXOR1	0.03	**0.90**	0.73	0.12	0.38	0.21	0.33	0.14	0.15
EXOR2	0.12	**0.91**	0.68	0.14	0.40	0.26	0.34	0.10	0.10
EXOR3	0.09	**0.90**	0.73	0.07	0.25	0.00	0.04	−0.06	−0.03
EXOR4	0.04	**0.85**	0.68	−0.03	0.09	0.21	0.12	0.10	0.04
EXOI1	−0.04	0.65	**0.84**	0.15	0.28	0.24	0.29	0.29	0.28
EXOI2	0.08	0.66	**0.91**	0.03	0.12	0.02	0.11	0.12	0.23
EXOI3	0.06	0.75	**0.93**	0.00	0.15	0.06	0.03	0.02	0.14
EXOI4	0.20	0.71	**0.84**	0.11	0.30	0.04	0.07	0.00	0.00
GKI1	0.34	0.03	0.07	**0.89**	0.32	0.01	0.20	−0.03	0.08
GKI2	0.38	0.11	0.10	**0.89**	0.34	−0.02	0.23	−0.01	0.11
GKI3	0.35	0.05	0.03	**0.90**	0.35	0.14	0.40	0.24	0.22
GKI4	0.29	0.12	0.10	**0.90**	0.36	0.14	0.34	0.17	0.15
SLC3	0.06	0.21	0.15	0.30	**0.76**	0.23	0.34	0.33	0.23
SLC4	0.30	0.24	0.16	0.33	**0.83**	0.18	0.41	0.26	0.21
SLC5	0.21	0.35	0.30	0.29	**0.92**	0.27	0.46	0.35	0.34
SLC6	0.22	0.25	0.17	0.39	**0.88**	0.17	0.36	0.26	0.22
CVP1	0.00	0.13	−0.02	0.06	0.20	**0.77**	0.56	0.43	0.50
CVP2	−0.11	0.13	0.00	0.20	0.29	**0.82**	0.74	0.61	0.58
CVP3	−0.15	0.07	0.06	−0.01	0.18	**0.83**	0.46	0.49	0.55
CVP4	0.00	0.11	0.09	0.10	0.20	**0.88**	0.54	0.57	0.61
CVP5	−0.05	0.32	0.27	−0.04	0.14	**0.77**	0.53	0.32	0.40
PF1	−0.10	0.31	0.15	0.14	0.24	0.68	**0.78**	0.39	0.54
PF2	−0.04	0.19	0.01	0.15	0.32	0.57	**0.75**	0.55	0.57
PF3	0.10	0.23	0.20	0.47	0.40	0.64	**0.84**	0.53	0.57
PF4	0.05	0.28	0.17	0.30	0.41	0.46	**0.86**	0.58	0.61
PF5	−0.10	−0.10	−0.17	0.21	0.37	0.56	**0.76**	0.55	0.61
PF6	0.05	0.22	0.20	0.31	0.49	0.61	**0.90**	0.67	0.75
PF7	−0.01	0.22	0.23	0.28	0.40	0.52	**0.85**	0.62	0.76
KR1	−0.10	0.16	0.23	0.07	0.23	0.61	0.56	**0.74**	0.63
KR3	−0.12	0.12	0.17	0.12	0.24	0.47	0.45	**0.72**	0.50
KR4	−0.10	−0.10	−0.05	0.06	0.25	0.46	0.56	**0.81**	0.67
KR5	−0.11	0.08	0.05	0.09	0.35	0.32	0.50	**0.77**	0.51

(*continued on next page*)

Appendix 4 (*continued*)

	GKA	EXOR	EXOI	GKI	SLC	CVP	PF	KR	KP
KP1	−0.03	0.06	0.12	0.03	0.24	0.51	0.67	0.64	**0.82**
KP2	−0.24	0.06	0.10	0.01	0.13	0.60	0.58	0.68	**0.84**
KP3	−0.17	0.06	0.12	0.08	0.17	0.66	0.62	0.67	**0.84**
KP4	−0.18	0.07	0.17	0.03	0.13	0.49	0.49	0.56	**0.74**
KP5	0.07	0.06	0.16	0.27	0.38	0.59	0.74	0.74	**0.88**
KP6	0.06	0.01	0.16	0.23	0.29	0.49	0.69	0.57	**0.87**
KP7	0.03	0.10	0.23	0.25	0.36	0.53	0.68	0.60	**0.87**

Appendix 5
Common method variance analysis.

Item	Cross loading (CL)	CL^2	Method-factor loading (MFL)	MFL^2
GKA1	0.91	0.83	−0.01	0.00
GKA2	0.86	0.74	0.05	0.00
GKA3	0.95	0.91	−0.06	0.00
GKA4	0.86	0.75	0.03	0.00
EXOR1	0.79	0.63	0.14	0.02
EXOR2	0.79	0.62	0.16	0.03
EXOR3	0.98	0.96	−0.10	0.01
EXOR4	1.02	1.04	−0.21	0.05
EXOI1	0.75	0.56	0.12	0.02
EXOI2	1.01	1.02	−0.13	0.02
EXOI3	1.01	1.03	−0.12	0.01
EXOI4	0.73	0.53	0.15	0.02
GKI1	0.94	0.88	−0.07	0.00
GKI2	0.90	0.81	0.01	0.00
GKI3	0.89	0.79	0.01	0.00
GKI4	0.86	0.75	0.05	0.00
SLC3	0.81	0.66	−0.07	0.01
SLC4	0.83	0.68	0.00	0.00
SLC5	0.84	0.71	0.10	0.01
SLC6	0.92	0.84	−0.04	0.00
CVP	0.87	0.75	−0.05	0.00
KP	0.92	0.85	−0.05	0.00
KR	0.89	0.80	−0.07	0.01
PF	0.84	0.71	0.14	0.02
Average	**0.88**	**0.78**	**0.00**	**0.01**

References

Abdelkafi, N., Makhotin, S., Posselt, T, T., 2013. Business model innovations for electric mobility—what can be learned from existing business model patterns? Int. J. Innovat. Manag. 17 (1), 1–42.
Agarwal, R., Helfat, C.E., 2009. Strategic renewal of organizations. Organ. Sci. 20 (2), 281–293.
Alcacer, J., Oxley, J., 2014. Learning by supplying. Strat. Manag. J. 35 (2), 204–223.
Amit, R., Zott, C., 2001. Value creation in e-business. Strat. Manag. J. 22 (6-7), 493–520.
Amit, R., Zott, C., 2012. Creating value through business model innovation. MIT Sloan Manag. Rev. 53 (3), 41–49.
Amit, R., Zott, C., 2015. Crafting business architecture: the antecedents of business model design. Strategic Entrepreneurship Journal 9 (4), 331–350.
Anderson, B.S., Covin, J.G., Slevin, D.P., 2009. Understanding the relationship between entrepreneurial orientation and strategic learning capability: an empirical investigation. Strategic Entrepreneurship Journal 3 (3), 218–240.
Andries, P., Debackere, K., Van Looy, B., 2013. Simultaneous experimentation as a learning strategy: business model development under uncertainty. Strategic Entrepreneurship Journal 7 (4), 288–310.
Andriopoulos, C., Lewis, M.W., 2009. Exploitation-exploration tensions and organizational ambidexterity: managing paradoxes of innovation. Organ. Sci. 20 (4), 696–717.
Berends, H., Smits, A., Reymen, I., Podoynitsyna, K., 2016. Learning while (re)configuring: business model innovation processes in established firms. Strat. Organ. 14 (3), 181–219.
Berry, H., 2014. Global integration and innovation: multicountry knowledge generation within MNC s. Strat. Manag. J. 35 (6), 869–890.
Birkinshaw, J., Crilly, D., Bouquet, C., Lee, S.Y., 2016. How do firms manage strategic dualities? A process perspective. Acad. Manag. Discov. 2 (1), 51–78.

Blank, S., 2013. Why the lean start-up changes everything. Harv. Bus. Rev. 91 (5), 63–72.
Bocken, N.M., 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.
Bojovic, N., Genet, C., Sabatier, V., 2018. Learning, signaling, and convincing: the role of experimentation in the business modeling process. Long. Range Plan. 51 (1), 141–157.
Buckley, P.J., Ghauri, P.N., 2004. Globalisation, economic geography and the strategy of multinational enterprises. J. Int. Bus. Stud. 35 (2), 81–98.
Buckley, P.J., Strange, R., 2015. The governance of the global factory: location and control of world economic activity. Acad. Manag. Perspect. 29 (2), 237–249.
Buckley, P.J., Glaister, K.W., Husan, R., 2002. International joint ventures: partnering skills and cross-cultural issues. Long. Range Plan. 35 (2), 113–134.
Cano-Kollmann, M., Cantwell, J., Hannigan, T.J., Mudambi, R., Song, J., 2016. Knowledge connectivity: an agenda for innovation research in international business. J. Int. Bus. Stud. 47 (3), 255–262.
Cao, M., Zhang, Q., 2011. Supply chain collaboration: impact on collaborative advantage and firm performance. J. Oper. Manag. 29 (3), 163–180.
Carpenter, M.A., Pollock, T.G., Leary, M.M., 2003. Testing a model of reasoned risk-taking: governance, the experience of principals and agents, and global strategy in high-technology IPO firms. Strat. Manag. J. 24 (9), 803–820.
Casadesus-Masanell, R., Ricart, J.E., 2011. How to design a winning business model. Harv. Bus. Rev. 89 (1/2), 100–107.
Casadesus-Masanell, R., Zhu, F., 2013. Business model innovation and competitive imitation: the case of sponsor-based business models. Strat. Manag. J. 34 (4), 464–482.
Cassel, C., Hackl, P., Westlund, A.H., 1999. Robustness of partial least-squares method for estimating latent variable quality structures. J. Appl. Stat. 26 (4), 435–446.
Chesbrough, H., 2010. Business model innovation: opportunities and barriers. Long. Range Plan. 43 (2–3), 354–363.
Chesbrough, H., Appleyard, M.M., 2007. Open innovation and strategy. Calif. Manag. Rev. 50 (1), 57–76.
Chin, W.W., 1998. The partial least squares approach to structural equation modelling. In: Marcoulides, G.A. (Ed.), Modern Methods for Business Research. Psychology Press, New York, pp. 295–358.
Christensen, C.M., Bartman, T., van Bever, D., 2016. The hard truth about business model innovation. MIT Sloan Manag. Rev. 58 (1), 30–40.
Chua, R.Y., Roth, Y., Lemoine, J.F., 2015. The impact of culture on creativity: how cultural tightness and cultural distance affect global innovation crowdsourcing work. Adm. Sci. Q. 60 (2), 189–227.
Churchill, G.A., 1979. A paradigm for developing better measures of marketing constructs. J. Market. Res. 16 (1), 64–73.
Contractor, F.J., Kumar, V., Kundu, S.K., Pedersen, T., 2010. Reconceptualizing the firm in a world of outsourcing and offshoring: the organizational and geographical relocation of high-value company functions. J. Manag. Stud. 47 (8), 1417–1433.
Dagnino, G.B., 2009. Coopetition strategy: a new kind of interfirm dynamics for value creation. In: Dagnino, G.B., Rocco, E. (Eds.), Coopetition Strategy. Routledge, pp. 45–63.
Demil, B., Lecocq, X., Ricart, J.E., Zott, C., 2015. Introduction to the SEJ special issue on business models: business models within the domain of strategic entrepreneurship. Strategic Entrepreneurship Journal 9 (1), 1–11.
Diamantopoulos, A., Winklhofer, H.M., 2001. Index construction with formative indicators: an alternative to scale development. J. Market. Res. 38 (2), 269–277.
Doz, Y.L., Kosonen, M., 2010. Embedding strategic agility: a leadership agenda for accelerating business model renewal. Long. Range Plan. 43 (2–3), 370–382.
Felin, T., Foss, N.J., Heimeriks, K.H., Madsen, T.L., 2012. Microfoundations of routines and capabilities: individuals, processes, and structure. J. Manag. Stud. 49 (8), 1351–1374.
Fleming, L., Sorenson, O., 2001. Technology as a complex adaptive system: evidence from patent data. Res. Pol. 30 (7), 1019–1039.
Fornell, C., Larcker, D.F., 1981. Structural equation models with unobservable variables and measurement error: algebra and statistics. J. Market. Res. 18 (3), 382–388.
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.
Frankenberger, K., Weiblen, T., Csik, M., Gassmann, O., 2013a. The 4I-framework of business model innovation: a structured view on process phases and challenges. Int. J. Prod. Dev. 18 (3–4), 249–273.
Frankenberger, K., Weiblen, T., Gassmann, O., 2013b. Network configuration, customer centricity, and performance of open business models: a solution provider perspective. Ind. Market. Manag. 42 (5), 671–682.
Frey, K., Lüthje, C., Haag, S., 2011. Whom should firms attract to open innovation platforms? The role of knowledge diversity and motivation. Long. Range Plan. 44 (5–6), 397–420.
Gambardella, A., McGahan, A.M., 2010. Business-model innovation: general purpose technologies and their implications for industry structure. Long. Range Plan. 43 (2), 262–271.
Gelhard, C., von Delft, S., Gudergan, S.P., 2016. Heterogeneity in dynamic capability configurations: equifinality and strategic performance. J. Bus. Res. 69 (11), 5272–5279.
Govindarajan, V., Trimble, C., 2005. Building breakthrough businesses within established organizations. Harv. Bus. Rev. 83 (5), 58–68.
Grant, R.M., 1996. Toward a knowledge-based theory of the firm. Strat. Manag. J. 17 (S2), 109–122.
Grant, R.M., Baden-Fuller, C., 2004. A knowledge accessing theory of strategic alliances. J. Manag. Stud. 41 (1), 61–84.
Gupta, A.K., Smith, K.G., Shalley, C.E., 2006. The interplay between exploration and exploitation. Acad. Manag. J. 49 (4), 693–706.
Hair, J.F., Sarstedt, M., Ringle, C.M., Mena, J.A., 2012. An assessment of the use of partial least squares structural equation modeling in marketing research. J. Acad. Market. Sci. 40 (3), 414–433.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2014. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage Publications, Inc.
Harman, H.H., 1976. Modern Factor Analysis. University of Chicago Press, Chicago.
He, Z.L., Wong, P.K., 2004. Exploration vs. exploitation: an empirical test of the ambidexterity hypothesis. Organ. Sci. 15 (4), 481–494.
Helfat, C.E., Peteraf, M.A., 2015. Managerial cognitive capabilities and the microfoundations of dynamic capabilities. Strat. Manag. J. 36 (6), 831–850.
Hinkin, T.R., Tracey, J.B., 1999. An analysis of variance approach to content validation. Organ. Res. Meth. 2 (2), 175–186.
Hulland, J., 1999. Use of partial least squares (PLS) in strategic management research: a review of four recent studies. Strat. Manag. J. 20 (2), 195–204.
Jarvis, C.B., MacKenzie, S.B., Podsakoff, P.M., 2003. A critical review of construct indicators and measurement model misspecification in marketing and consumer research. J. Consum. Res. 30 (2), 199–218.
Johnson, M.W., Christensen, C.M., Kagermann, H., 2008. Reinventing your business model. Harv. Bus. Rev. 86 (12), 57–68.
Kafouros, M.I., Forsans, N., 2012. The role of open innovation in emerging economies: do companies profit from the scientific knowledge of others? J. World Bus. 47 (3), 362–370.
Karimi, J., Walter, Z., 2016. Corporate entrepreneurship, disruptive business model innovation adoption, and its performance: the case of the newspaper industry. Long. Range Plan. 49 (3), 342–360.
Kastalli, I.V., Van Looy, B., 2013. Servitization: disentangling the impact of service business model innovation on manufacturing firm performance. J. Oper. Manag. 31 (4), 169–180.
Kim, S.K., Min, S., 2015. Business model innovation performance: when does adding a new business model benefit an incumbent? Strategic Entrepreneurship Journal 9 (1), 34–57.
Kleinschmidt, E.J., De Brentani, U., Salomo, S., 2007. Performance of global new product development programs: a resource-based view. J. Prod. Innovat. Manag. 24 (5), 419–441.
Knight, G.A., Cavusgil, S.T., 2004. Innovation, organizational capabilities, and the born-global firm. J. Int. Bus. Stud. 35 (2), 124–141.
Kogut, B., Zander, U., 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. Organ. Sci. 3 (3), 383–397.
Kortmann, S., Piller, F., 2016. Open business models and closed-loop value chains: redefining the firm-consumer relationship. Calif. Manag. Rev. 58 (3), 88–108.
Kotha, S., Rindova, V.P., Rothaermel, F.T., 2001. Assets and actions: firm-specific factors in the internationalization of US Internet firms. J. Int. Bus. Stud. 32 (4), 769–791.
Kraaijenbrink, J., 2012. Integrating knowledge and knowledge processes: a critical incident study of product development projects. J. Prod. Innovat. Manag. 29 (6),

1082–1096.
Kristal, M.M., Huang, X., Roth, A.V., 2010. The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance. J. Oper. Manag. 28 (5), 415–429.
Laursen, K., Salter, A., 2006. Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. Strat. Manag. J. 27 (2), 131–150.
Lei, D., Hitt, M.A., Bettis, R., 1996. Dynamic core competences through meta-learning and strategic context. J. Manag. 22 (4), 549–569.
Lew, Y.K., Sinkovics, R.R., 2013. Crossing borders and industry sectors: behavioral governance in strategic alliances and product innovation for competitive advantage. Long. Range Plan. 46 (1–2), 13–38.
Lewin, A.Y., Massini, S., Peeters, C., 2009. Why are firms offshoring innovation? The emerging global race for talent. J. Int. Bus. Stud. 40 (6), 901–925.
Li, Y., Liu, Y., Li, M., Wu, H., 2008. Transformational offshore outsourcing: empirical evidence from alliances in China. J. Oper. Manag. 26 (2), 257–274.
Liang, H., Saraf, N., Hu, Q., Xue, Y., 2007. Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management. MIS Q. 31 (1), 59–87.
Linder, M., Williander, M., 2017. Circular business model innovation: inherent uncertainties. Bus. Strat. Environ. 26 (2), 182–196.
Luo, Y., 2007. A coopetition perspective of global competition. J. World Bus. 42 (2), 129–144.
MacKenzie, S.B., Podsakoff, P.M., Podsakoff, N.P., 2011. Construct measurement and validation procedures in MIS and behavioral research: integrating new and existing techniques. MIS Q. 35 (2), 293–334.
March, J.G., 1991. Exploration and exploitation in organizational learning. Organ. Sci. 2 (1), 71–87.
Markides, C., 2006. Disruptive innovation: in need of better theory. J. Prod. Innovat. Manag. 23 (1), 19–25.
Martins, L.L., Rindova, V.P., Greenbaum, B.E., 2015. Unlocking the hidden value of concepts: a cognitive approach to business model innovation. Strategic Entrepreneurship Journal 9 (1), 99–117.
Massa, L., Tucci, C., 2014. Business model innovation. In: Dodgson, D., Gann, M., Phillips, N. (Eds.), The Oxford Handbook of Innovation Management, New York, pp. 420–441.
McEvily, S.K., Chakravarthy, B., 2002. The persistence of knowledge-based advantage: an empirical test for product performance and technological knowledge. Strat. Manag. J. 23 (4), 285–305.
McGrath, R.G., 2010. Business models: a discovery driven approach. Long. Range Plan. 43 (2–3), 247–261.
Monteiro, F., Mol, M., Birkinshaw, J., 2017. Ready to be open? Explaining the firm level barriers to benefiting from openness to external knowledge. Long. Range Plan. 50 (2), 282–295.
Morris, M., Schindehutte, M., Allen, J., 2005. The entrepreneur's business model: toward a unified perspective. J. Bus. Res. 58 (6), 726–735.
Nelson, R.R., Winter, S.G., 1982. An Evolutionary Theory of Economic Change. Harvard University Press, Cambridge, MA.
Nicholls-Nixon, C.L., Cooper, A.C., Woo, C.Y., 2000. Strategic experimentation: understanding change and performance in new ventures. J. Bus. Ventur. 15 (5–6), 493–521.
Osiyevskyy, O., Dewald, J., 2015. Explorative versus exploitative business model change: the cognitive antecedents of firm-level responses to disruptive innovation. Strategic Entrepreneurship Journal 9 (1), 58–78.
Osterwalder, A., Pigneur, Y., 2010. Business Model Generation: a Handbook for Visionaries, Game Changers, and Challengers. John Wiley & Sons.
Parker, G.G., Van Alstyne, M.W., Choudary, S.P., 2016. Platform Revolution: How Networked Markets Are Transforming the Economy and How to Make Them Work for You. WW Norton & Company, New York.
Peng, D.X., Lai, F., 2012. Using partial least squares in operations management research: a practical guideline and summary of past research. J. Oper. Manag. 30 (6), 467–480.
Podsakoff, P.M., Organ, D.W., 1986. Self-reports in organizational research: problems and prospects. J. Manag. 12 (4), 531–544.
Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J. Appl. Psychol. 88 (5), 879–903.
Raisch, S., Birkinshaw, J., Probst, G., Tushman, M.L., 2009. Organizational ambidexterity: balancing exploitation and exploration for sustained performance. Organ. Sci. 20 (4), 685–695.
Reuber, A.R., Fischer, E., 1997. The influence of the management team's international experience on the internationalization behaviors of SMEs. J. Int. Bus. Stud. 28 (4), 807–825.
Ringle, C.M., Wende, S., Will, S., 2005. SmartPLS 2.0 M3 beta, hamburg, Germany. http://www.smartpls.de.
Ritala, P., Hurmelinna-Laukkanen, P., 2013. Incremental and radical innovation in coopetition - the role of absorptive capacity and appropriability. J. Prod. Innovat. Manag. 30 (1), 154–169.
Rivkin, J.W., Siggelkow, N., 2003. Balancing search and stability: interdependencies among elements of organizational design. Manag. Sci. 49 (3), 290–311.
Rönkkö, M., Ylitalo, J., 2011. PLS marker variable approach to diagnosing and controlling for method variance. In: Paper Presented at the Thirty Second International Conference on Information Systems, Shanghai.
Sanchez, P., Ricart, J.E., 2010. Business model innovation and sources of value creation in low-income markets. Eur. Manag. Rev. 7 (3), 138–154.
Schrage, M., 2013. Innovating the toyota, and YouTube, way. https://hbr.org/2013/01/what-youtube-and-toyota-know-t.
Shearmur, R., Doloreux, D., Laperrière, A., 2015. Is the degree of internationalization associated with the use of knowledge intensive services or with innovation? Int. Bus. Rev. 24 (3), 457–465.
Siggelkow, N., 2002. Evolution toward fit. Adm. Sci. Q. 47 (1), 125–159.
Sinfield, J.V., Calder, E., McConnell, B., Colson, S., 2012. How to identify new business models. MIT Sloan Manag. Rev. 53 (2), 85–90.
Sorescu, A., 2017. Data-driven business model innovation. J. Prod. Innovat. Manag. 34 (5), 691–696.
Sorescu, A., Frambach, R.T., Singh, J., Rangaswamy, A., Bridges, C., 2011. Innovations in retail business models. J. Retailing 87, S3–S16.
Sosna, M., Trevinyo-Rodríguez, R.N., Velamuri, S.R., 2010. Business model innovation through trial-and-error learning: the Naturhouse case. Long. Range Plan. 43 (2–3), 383–407.
Srai, J.S., Alinaghian, L.S., 2013. Value chain reconfiguration in highly disaggregated industrial systems: examining the emergence of health care diagnostics. Global Strategy Journal 3 (1), 88–108.
Subramaniam, M., 2006. Integrating cross-border knowledge for transnational new product development. J. Prod. Innovat. Manag. 23 (6), 541–555.
Tallman, S., Luo, Y., Buckley, P.J., 2018. Business models in global competition. Global Strategy Journal. https://doi.org/10.1002/gsj.1165.
Teece, D.J., 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strat. Manag. J. 28 (13), 1319–1350.
Teece, D.J., 2010. Business models, business strategy and innovation. Long. Range Plan. 43 (2), 172–194.
Tenenhaus, M., Vinzi, V.E., Chatelin, Y.M., Lauro, C., 2005. PLS path modeling. Comput. Stat. Data Anal. 48 (1), 159–205.
Tikkanen, H., Lamberg, J.A., Parvinen, P., Kallunki, J.P., 2005. Managerial cognition, action and the business model of the firm. Manag. Decis. 43 (6), 789–809.
Tsai, W., 2002. Social structure of “coopetition” within a multiunit organization: coordination, competition, and intraorganizational knowledge sharing. Organ. Sci. 13 (2), 179–190.
Tushman, M.L., O'Reilly, C.A., 1996. Ambidextrous organizations: managing evolutionary and revolutionary change. Calif. Manag. Rev. 38 (4), 8–29.
Verwaal, E., 2017. Global outsourcing, explorative innovation and firm financial performance: a knowledge-exchange based perspective. J. World Bus. 52 (1), 17–27.
West, J., Bogers, M., 2014. Leveraging external sources of innovation: a review of research on open innovation. J. Prod. Innovat. Manag. 31 (4), 814–831.
Wiklund, J., Shepherd, D., 2003. Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. Strat. Manag. J. 24 (13), 1307–1314.
Wilden, R., Gudergan, S.P., Nielsen, B.B., Lings, I., 2013. Dynamic capabilities and performance: strategy, structure and environment. Long. Range Plan. 46 (1–2), 72–96.
Winter, S.G., Szulanski, G., 2001. Replication as strategy. Organ. Sci. 12 (6), 730–743.

Wirtz, B.W., Pistoia, A., Ullrich, S., Göttel, V., 2016. Business models: origin, development and future research perspectives. Long. Range Plan. 49 (1), 36–54.
Yunus, M., Moingeon, B., Lehmann-Ortega, L., 2010. Building social business models: lessons from the Grameen experience. Long. Range Plan. 43 (2–3), 308–325.
Zahra, S.A., George, G., 2002. Absorptive capacity: a review, reconceptualization, and extension. Acad. Manag. Rev. 27 (2), 185–203.
Zott, C., Amit, R., 2007. Business model design and the performance of entrepreneurial firms. Organ. Sci. 18 (2), 181–199.
Zott, C., Amit, R., 2008. The fit between product market strategy and business model: implications for firm performance. Strat. Manag. J. 29 (1), 1–26.
Zott, C., Amit, R., 2010. Business model design: an activity system perspective. Long. Range Plan. 43 (2–3), 216–226.
Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. J. Manag. 37 (4), 1019–1042.

Dr. Stephan von Delft is a Lecturer in Strategy at the University of Glasgow's Adam Smith Business School, United Kingdom. Previously, he was a Postdoctoral Researcher at the Amsterdam Business School, the Netherlands, a Visiting Researcher at the University of San Diego, USA, and a Research Assistant and PhD Student at the University of Muenster, Germany. His current research focuses on the strategic and organizational implications of business model innovation.

Dr. Sebastian Kortmann is an Associate Professor of Strategy and Innovation at Amsterdam Business School and Director of the Amsterdam MBA. He holds a PhD in management and diploma in business engineering. Sebastian's areas of expertise are in the fields of strategy execution, innovation management and digital business. Due to his engineering background, Sebastian is particularly interested in technology- and growth-oriented businesses.

Dr. Carsten Gelhard is an Assistant Professor of Product-market Relations in the Department of Design, Production, and Management at the University of Twente, The Netherlands. He holds a PhD (Dr. rer. nat.) and Master of Science in Business Chemistry. Carsten's areas of expertise are in the fields of marketing and innovation management. Due to his background in business and chemistry, Carsten is particularly interested in projects that are interdisciplinary and technology-related.

Dr. Niccolò Pisani is an Assistant Professor of International Management at Amsterdam Business School, University of Amsterdam, the Netherlands. He holds a PhD in Management (Honors Degree) from IESE Business School, Barcelona, Spain. Niccolò's area of expertise is in the fields of international management, globalization and strategy, and business process offshoring.