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Business Models in the Information Systems Literature: State of the Art and Research Perspectives

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ABSTRACT

Large-scale digitization has induced profound changes in the contemporary economy. In this context, the literature on information systems (IS) is proving invaluable to understand digital business models. Based on a mixed bibliometric analysis, this essay reveals the historical contribution of the IS business model literature, identifies current research trends, and proposes a three-pronged research agenda for IS scholars working on digital business models: a design science; a user-centered; and a data-oriented perspective.

Keywords: *Business models; Digitalization; Co-citation analysis; Bibliographic coupling; Literature review.*

RÉSUMÉ

La digitalisation à grande échelle a bouleversé l'économie contemporaine et la littérature en systèmes d'information (SI) offre une perspective privilégiée pour analyser et comprendre l'évolution des business models. Construit sur une analyse bibliométrique mixte, cet article reconsidère la contribution historique de la littérature en SI sur les business models et identifie ses tendances actuelles. A partir de ce double diagnostic, nous proposons un programme de recherche à destination de la communauté scientifique en systèmes d'information décliné en trois volets : une perspective ancrée en design science; une perspective centrée sur l'utilisateur; et une perspective orientée données.

Mots-clés: *Business models, Digitalisation, Analyse de co-citation, Couplage bibliographique, Revue de littérature.*

INTRODUCTION

The increasing reliance of businesses on technologies has created a growing research interest in business models, or systems of interdependent activities centered around a focal firm (Amit & Zott, 2001; Teece, 2018a; Lanzolla & Markides, 2020). This research is useful because it connects technological issues (e.g. related to digitalization) with the business challenges of creating and capturing value in a competitive environment. Organizations and their managers need to continually make sense of the various available and emerging technologies and often creatively embed (some of) them in their operations, for instance by developing new value propositions or value delivery mechanisms for users, or alternative revenue streams for the firm. Research on business models has thus flourished in such adjacent management fields as strategic management, entrepreneurship, marketing, and to a lesser extent, information systems (Maucuer & Renaud, 2019a).

In the last two decades, a significant amount of highly cited business model research has developed in the disciplines of strategic management and entrepreneurship (Massa, Tucci, & Afuah, 2017). This research has highlighted the opportunities but also the challenges of embedding emerging technologies into innovative business models (Chesbrough & Rosenbloom, 2002; Teece, 2010; Baden-Fuller & Haefliger, 2013; Snihur, Zott, & Amit, 2020). On the one hand, new business models can enable firms to create value for users by solving their problems more efficiently, for instance through quick online delivery or on-time transportation services (Teece, 2010) and thereby outperform their competitors (Zott & Amit, 2007). Scholars have also suggested that processes such as trial-and-error learning (Sosna, Trevinyo-Rodriguez, & Velamuri, 2010), industry-spanning searching (Snihur & Zott, 2020), experimentation (Bojovic, Genet, & Sabatier, 2018), or partnerships (Maucuer & Renaud, 2019b) are important to develop new business models. Digital technologies offer opportunities to managers to cut experimentation costs, enlarge the search and test samples, obtain faster feedback from users, or leverage participation in online communities (Joachim & Laszczuk, 2020). A technologically enabled scientific approach to testing hypotheses in business modeling can lead to better outcomes for companies (Camuffo *et al.*, 2019). On the other hand, researchers also argue that a challenge for business model innovators is to gain legitimacy from the surrounding ecosystem (Bojovic *et al.*, 2018; Maucuer, Ronteau, & Lesage, 2018) while at the same time ensuring value appropriation from their innovation (Snihur, Zott, & Amit, 2020).

The information systems (IS) literature has contributed to the conceptualization of business models by proposing definitions, configurations, and taxonomies early on (Rappa, 2004; Osterwalder, Pigneur, & Tucci, 2005) and by evaluating the performance consequences of disruptive business models later on (Karimi & Walter, 2016). Although the historic engagement of the IS literature in business model research is usually acknowledged, its specific contributions are often under-appreciated. Moreover, despite the impact of technological innovation on business models (Baden-Fuller & Haefliger, 2013), some authors suggest that IS research is lagging behind in the development of this flourishing research field (Veit *et al.*, 2014). Yet, the rise of emerging technologies such as artificial intelligence, 5G, the Internet of Things (IoT), or blockchain, often incorporated into new digital business models, requires new theoretical developments for which IS intellectual capital could be of great use.

To meet this challenge, the purpose of this article is to review the business model research output in the IS literature and

propose relevant research avenues based on this legacy. Drawing on a mixed bibliometric analysis (Walsh & Renaud, 2017), combining documents co-citation analysis (CCA) and documents bibliographic coupling analysis (BCA), we bring out the historic contribution of the IS literature to business models. First, we show that the IS literature is embedded in the traditional conversations on business models mainly rooted in the strategic management legacy. Second, we specify six current research trends evenly distributed between mainstream conversations and IS-specific ones. From these results, we suggest a three-pronged research agenda for the business model researchers with an IS background: a design science; a user-centered; and a data-oriented perspective on digital business models.

METHODOLOGY

Following Walsh and Renaud's (2017) recommendations, we conducted a mixed bibliometric analysis combining CCA and BCA. Bibliometrics is a quantitative-based approach to "catalog, classify and quantify knowledge in a given discipline" (Ferreira, Storopoli, & Serra, 2014: 112). Conceptualized by de Solla Price (1963, 1965), it is based on the following hypothesis: scientific activities can be clustered into informal networks covering similar issues treated through similar or competing perspectives. Bibliometric techniques are increasingly mobilized in management sciences, specifically in the IS literature (Walsh & Renaud, 2017; Renaud, Walsh, & Kalika, 2016), due to the democratization of powerful computers and software.

Among available bibliographic methods (see Zupic & Čater, 2015), CCA and BCA are suited to our research project as they offer complementary perspectives on a scientific corpus. CCA helps identify the intellectual core (Noma, 1984), i.e. the most cited references in a scientific corpus, which could be anchored in different disciplinary legacies, and to bring to light the invisible colleges (Crane, 1972; Noma, 1984), i.e. the theoretical stepping stones or research traditions that influence the emergence of a research field. BCA sheds light on the "research front" (Jarvening, 2005) of this corpus, i.e. the research trends in the literature.

To perform both analyses, we followed the methodological workflow defined by Walsh and Renaud (2017). The first-order sample was collected from Scopus. We searched all the articles that cite "business model" in their title, abstract, and keywords in the 75 IS journals listed in the Harzing Journal Quality List.[1] From the 402 articles downloaded, we retained only those citing the business model literature and eliminated others using the term "business model" as an a-theoretical concept. We obtained a first-order sample composed of 199 articles including 13,921 references, of which 10,891 were unique. We cleaned the bibliographic dataset as recommended by the literature to improve results' quality and relevance.

Next, we built the second-order sample, i.e. the most cited articles in CCA, namely the intellectual core (Noma, 1984), and the most related articles in BCA (Maucuer & Renaud, 2019a), namely the research front (Jarvening, 2005). In our case, the intellectual core was composed of 30 references cited more than 14 times in the first-order sample. To set up the research front, we selected the 100 (or ≈ 50%) most related articles. As generic literature reviews tend to have a high proximity index with most of the investigated sets of articles, four of them were removed from the sample, and we finally obtained a research front

[1] www.harzing.com

Figure 1. Number of publications in the IS business model literature (1999-2020)

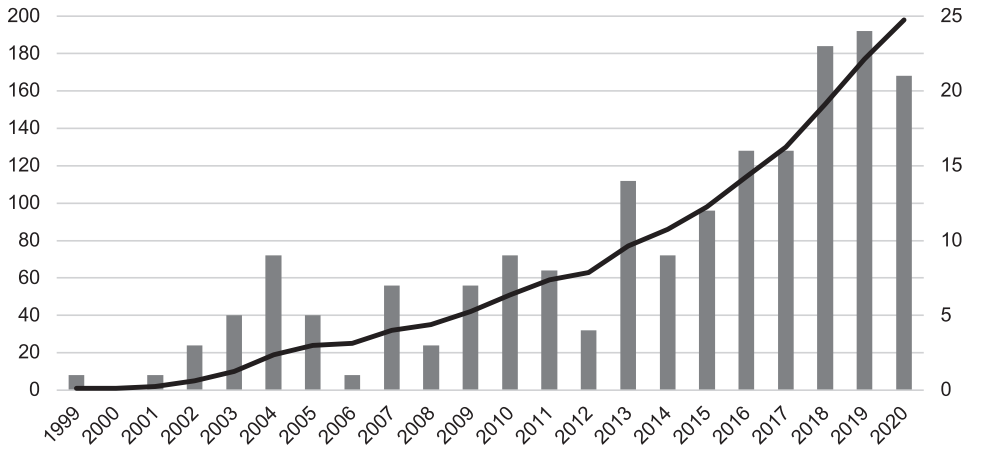

Table 1. First- and second-order samples

	CCA	BCA
First-order sample	199 articles	199 articles
Second-order sample	Intellectual core: 30 articles # min citations: 14	Research front: 96 articles % of the sample: ≈ 50%

composed of 96 articles. Table 1 details the composition of the first- and second-order samples.

Finally, we used the VosViewer 1.6.14[2] software to compute co-citation and bibliographic coupling indexes, to cluster the invisible college and the research front and to map them.

BUSINESS MODEL THEORETICAL STEPPING STONES IN THE INFORMATION SYSTEMS LITERATURE

The CCA showed that the intellectual core is made up of the 30 most cited references in the IS business model literature clustered into three research traditions (see Appendix A). To analyze them, references were classified in different disciplines according to the following criteria: 1) the Harzing's journal quality list for articles, 2) the authors' knowledge of the field for books.

The first stepping stone illustrates the legitimation of the business model concept anchored in strategic management and IS theoretical legacies. The second one refers to the conceptualization of the business model built on an interdisciplinary legacy and an IS-focused one. The third stepping stone reveals the structuration of the business model literature into several influential conversations led by the strategic management discipline.

[2] www.vosviewer.com

Stepping stone 1. Legitimation of the concept: The impact of the Internet on strategy (13 articles)

The strategy of organizations has been strongly impacted by Internet technologies (Afuah & Tucci, 2001; Porter, 2001), marking the advent of e-business (Osterwalder & Pigneur, 2002) through a variety of e-business models such as e-shops, e-procurement, virtual business communities, collaboration platforms, third-party marketplaces, or value-chain integrators (Timmers, 1998). In a changing and turbulent context (Hamel, 2002), both entrepreneurs and investors need new frameworks to design their e-business models or evaluate them in the short term to make investment decisions (Gordijn & Akkermans, 2001). The senior managers of established firms also need to assess the opportunities raised by the development of e-business models (Weill & Vitale, 2001) to ensure the competitiveness of their company (Porter, 1985). However, strategic management theories cannot fully explain the value creation potential of e-business, and the different perspectives must be integrated into a new concept: the business model (Amit & Zott, 2001). Thus, academic[3] literature and practitioner-oriented literature (e.g. Linder & Cantrell, 2001) propose several frameworks to analyze the business model content and dynamics.

Stepping stone 2. Business model conceptualization (12 articles)

Strategic management scholars offer an important contribution, such as Magretta's (2002) "Why Business Models Matter?" explaining the theoretical and practical advantages of the concept. Innovation researchers explore the intellectual roots of the concept and provide one of its first normative definitions (Chesbrough & Rosenbloom, 2002). IS and marketing authors also contribute, defining respectively the ontology of the concept (Osterwalder, 2004) and proposing a unified framework (Morris *et al.*, 2005). These contributions develop mostly in silos and are integrated for the first time in a systematic literature review published in the Journal of Management (Zott *et al.*, 2011). In a more practical contribution, Osterwalder and Pigneur (2010) develop an IS-anchored method for designing business models that has quickly become very popular with businesses, entrepreneurs, and professors.

The IS literature strengthens the conceptualization. It explores the multiple functions and capacity of the concept to connect IS and strategic management issues. The business model is considered as a powerful concept (Shafer *et al.*, 2005) allowing the assessment of the information technology (IT) contribution to business strategy and performance (Hedman & Kalling, 2003), which is a highly disputed issue in the IS literature (see the productivity paradox – Brynjolfsson, 1993; Shin, 2001; and the essay "IT doesn't matter" – Carr, 2003). Authors argue that the concept overcomes the IS/strategy duality since it provides a shared vision to the internal and external actors of organizations (Osterwalder *et al.*, 2005). Two kinds of propositions emerge from this perspective. The first is an integrative framework including the IS management perspective (Al-Debei & Avison, 2010). The second considers the business model as an intermediary concept linking the two domains (IS and strategy) and opens a specific business model research agenda focused on the impact of IT/IS (Veit *et al.*, 2014). The reference to the design science paradigm (Hevner *et al.*, 2004) offers a methodological option for developing business models as artefacts.

[3] Mostly based on empirical case studies (Yin, 1984; Eisenhardt, 1989; Miles & Huberman, 1994).

Stepping stone 3. Structuration of the business model conversation: The leadership of the strategic management literature (5 articles)

Once the concept of business model became legitimate and theoretically stabilized, the business model literature entered a structuration phase. The special issue published in Long Range Planning in 2010 played a central role in anchoring the concept in the strategic management literature (Casadesus-Masanell & Ricart, 2010) and structuring the field around three main conversations on business model dynamics (Teece, 2010): business model design (Zott & Amit, 2010), business model innovation (Chesbrough, 2010), and business model evolution (Sosna *et al.*, 2010).

To conclude, the CCA suggests that the IS literature has largely contributed to the emergence and conceptualization of the business model but has not played a determining role in the development and the structuration of the field. Yet, the increasing speed of digitalization and the arrival of emerging technologies and their impact on new business models call for an enhanced contribution of the IS literature to ongoing business model research. What are the current trends in the IS business model literature? What is the gap between the existing conversations and those needed to be developed or expanded?

BUSINESS MODEL RESEARCH TRENDS IN THE INFORMATION SYSTEMS LITERATURE

The BCA shows that the IS business model literature can be structured around six research trends (see Appendix B) divided into two categories. The first one focuses on the content and the dynamics of business models: business model design, business model innovation, and business model tools. The second one focuses on different types of business models: open business models, user-centric business models, and business models integrating emerging technologies.

Trend 1. Business model design (26 articles)

The first trend encompasses articles rooted in the traditional topic in the field, namely business model design (see stepping stone 3). Articles grouped in this trend propose a varied set of frameworks for designing business models in the digital age. Our results show that it is the first consistent issue that emerged in the IS business model literature in 2004. Over the last 16 years, the publication rate growth has remained relatively constant, even though it seems to have declined in the last two years. We identify two types of research on business model design. The first is dedicated to the production of generic frameworks (Pateli & Giaglis, 2004; Al-Debei & Avison, 2010; Im & Cho, 2013; Daas & al., 2013; Beynon-Davies, 2018), while the second focuses on business model design in IS-specific contexts: shared automotive service systems (Grieger & Ludwig, 2018), cloud platforms (Labes *et al.*, 2017; Giessmann & Legner, 2016), the e-business model of application service providers (Currie, 2004), e-commerce platforms of SMEs (Jeansson *et al.*, 2017), complex services (Peters & al., 2015), and mobile network operators (Pousttchi & Hufenbach, 2011). For instance, the critical design factors of mobile business models are analyzed in detail (Al-Debei *et al.*, 2015; De Reuver *et al.*, 2009). The cluster also deals with the alignment of business processes with the business model (Im *et al.*, 2020; Abdelkafi & Pero, 2018; Al-Debei *et al.*, 2013; Solaimani & Bouwman, 2012).

Trend 2. Business model innovation (25 articles)

The second trend is also long-established even though its publication rate has boomed in the last four years. It brings together contributions on business model innovation pushed by digitization (Loebbecke & Picot, 2015; Gupta & Bose, 2019; Wiener *et al.*, 2020), information technologies (Singh *et al.*, 2011; Ujwary-Gil & Potoczek, 2020, Wiesböck & Hess, 2020), or green technologies (Hanelt *et al.*, 2016). This cluster focuses on the multiple tensions implied by business model innovation: traditional vs. new business models (Wiener *et al.*, 2018; Deodhar *et al.*, 2012), external vs. internal organization (Abdulkader *et al.*, 2020; Ingram Bogusz, & Morisse, 2018), exploration vs. exploitation (Chen *et al.*, 2020; Kranz *et al.*, 2016), and value creation vs. value capture (Wu *et al.*, 2010). The cluster also offers reflections on architectural knowledge (Andersson *et al.*, 2008) and intellectual capital (Elia *et al.*, 2017; Burton *et al.*, 2013) in business model innovation.

Trend 3. Business model tools (15 articles)

The third trend is recent but on a steep growth curve as more than 70% of the production comes from the last two years. It proposes various tools to facilitate collaboration regarding business model analysis, (re-)design, adoption, implementation, and exploitation (Bouwman *et al.*, 2020). This toolbox may be divided into two compartments. The first develops business model tools as boundary objects (Schwarz & Legner, 2020) that guide reflection and action to explore (Athanasopoulou & De Reuver, 2020; Haggège & Vernay, 2019) and produce (Ebel *et al.*, 2016) new business models. The second proposes business-related tools, i.e., tools applicable in the context of business models. This perspective is anchored in various legacies, such as design theory (Avdiji *et al.*, 2020; Dellermann *et al.*, 2018), agility (Bouwman *et al.*, 2018), or lean management (Balocco *et al.*, 2019). Although business model creation (Ojala, 2016; Sitoh *et al.*, 2014) is the cluster's primary concern, it is also developing reflections on business model continuity (Niemimaa *et al.*, 2019; Simmert *et al.*, 2019).

Trend 4. Open business models (7 articles)

The fourth trend, although relatively small, deals with a central theme in the business model literature, that is to say, openness. The cluster tackles traditional discussions about the impact of collaboration on business value, the positive outcomes of openness on innovation, or the role of entrepreneurs' networks in highly competitive environments such as the mobile and the software industries. It raises specific issues such as the form of partnership that a legacy software vendor should create to compete in the cloud software industry (Basole & Park, 2018), the impact of the mobile industry dynamics on the ecosystem (Basole, 2009), or the ability of a platform to dominate the market (Basole & Karla, 2011). The cluster also provides insights on start-up success in the intensely selective Internet sector (Spiegel *et al.*, 2015) and transformational innovations in e-government situations (Feller *et al.*, 2011; Kuk & Janssen, 2012).

Trend 5. User-centric business models (12 articles)

The fifth trend is a well-established cluster that pursues stable development and is strongly related to acknowledged issues in the IS literature. It focuses on digital business model performance from a user perspective and deals with key features related to perceived value (Baird & Raghu,

2015) such as the intention-to-use (Dörr *et al.*, 2013), the intention-to-purchase (Hamari *et al.*, 2017; Mäntymäki & Salo, 2015), satisfaction (Trenz *et al.*, 2019; Albers & Clement, 2007), user assessment (Benlian, 2015), or trust (Kim *et al.*, 2009; Kim & Ahn, 2007). The importance of these features depends on the type of digital business model that is analyzed. For instance, the intention-to-purchase is a key indicator in the context of Freemium business models (Hamari *et al.*, 2020) as it determines the firm's capacity to capture value from its users. The intention-to-use is crucial in social networks (Busalim & Hussin, 2016) as it activates the network effects, i.e., the value of a service increases according to the number of users. Trust is a key performance criterion in the context of e-marketplaces (Kim & Ahn, 2007) or in the banking sector (Kim *et al.*, 2009), where the transactions must be secure. These features and their links with the firm's activities need to be well understood to improve the management of the business model as a whole.

Trend 6. Emerging technologies and business models (11 articles)

This trend introduces a topical theme, namely the impact of emerging technologies, particularly blockchain and fintech, on business models. It is a very recent and fast-growing cluster, although we can find ancient roots in the roles and relationships of online intermediaries in the context of supply chain management (Barnes & Hinton, 2007). Since its emergence in 2009, blockchain technology has profoundly impacted supply chain management and requires new explanatory models (Tönnissen & Teuteberg, 2018). More broadly, the cluster analyzes the impact of the blockchain on business model innovation (Chong *et al.*, 2019; Weking *et al.*, 2019; Tönnissen *et al.*, 2020) and traditional organizational forms such as cooperatives (Kollmann *et al.*, 2019). The cluster also analyzes the impacts of fintech on financial services (Gomber *et al.*, 2018), asset management, loans, and insurance (Gimpel & Röglinger, 2017), covering the internal and external dynamics of business models (Gozman *et al.*, 2018).

To conclude, the BCA reveals that the IS literature is a relatively conformist yet specific contributor to business model research. It takes part in the mainstream conversations (i.e. business model design, business model innovation, and open business models), and offers at the same time new potential to the field deeply anchored in IS legacy (i.e. business model tools, user-centric business models, and business models integrating emerging technologies).

Figure 2 synthetizes the results and shows that IS business model research is deeply grounded in the seminal business model literature, and more specifically in the strategic management tradition. Despite this legacy, IS business model research gradually emancipates itself from mainstream conversations and opens promising IS-specific research avenues.

DISCUSSION

Through a mixed bibliometric analysis (Walsh & Renaud, 2017), we have identified three theoretical stepping stones of the IS literature on business models: research focused on legitimation, conceptualization, and structuration of the literature. We have also discussed the development of subsequent research trends building on these original stepping stones. We provide a thorough explanation of how and to what extent the IS literature holds a privileged place in the emergence and consolidation of the business model concept in the context of the rise of the Internet and the growing impact of information technologies on strategic and entrepreneurial projects and

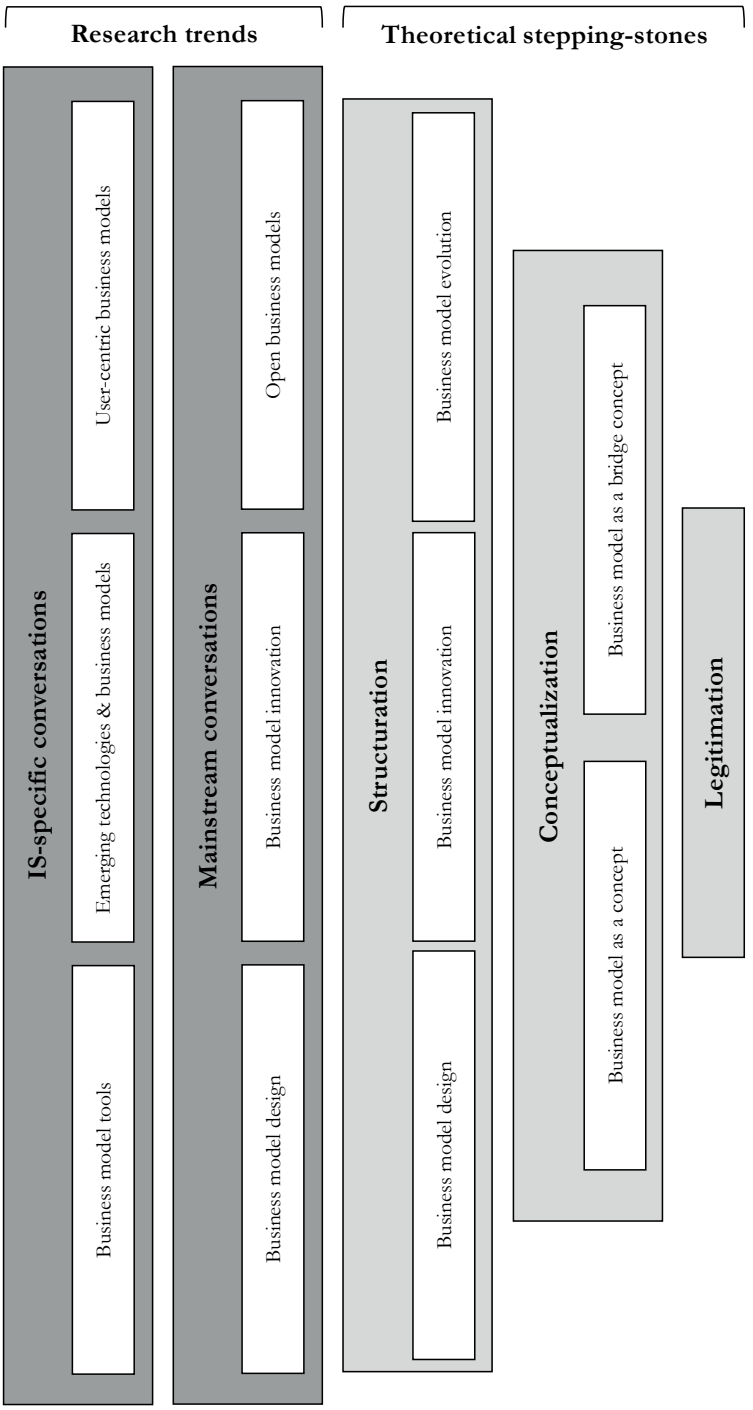

Figure 2. Business model research in the information systems literature

processes. Despite its pioneering involvement in the business model field, our CCA suggests that the IS influence has waned in the further developments and structuration of business model research in favor of the strategic management discipline. The latter discipline has originated and actively developed three structuring theoretical conversations on business model dynamics (Baden-Fuller, Demil, Lecocq, & MacMillan, 2010), namely business model innovation (Chesbrough, 2010), evolution (Sosna *et al.*, 2010), and design (Zott & Amit, 2010).

Nevertheless, our BCA analysis also suggests that IS business model research has seized on these conversations opened in other disciplines and joined these research trends leveraging its own perspectives. This evolution positively echoes the call of the strategic management literature for a more careful design of business models (Zott & Amit, 2007; Martins, Rindova, & Greenbaum, 2015) to ensure value creation for the surrounding ecosystem (Ricart, Snihur, Carrasco, & Berrone, 2020) and to appropriate value from emerging technologies (Snihur, Zott, & Amit, 2020; Tidhar & Eisenhardt, 2020). The IS literature might improve business model research outputs to help companies to carry out decisions about how to design interdependent activities within the company undergoing digitalization in established firms, or how to design a purely digital business model in new firms.

Our results enable us to identify three avenues of research to enrich the contribution of the IS literature to business model research: a design science; a user-centered; and a data-oriented perspective on digital business models.

A design science perspective on digital business models

Beyond its contribution to the general discussion on business models, the IS business model literature adopts a specific perspective on business model design and innovation. It proposes a rich and inspiring reflection on a diversified set of tools that both researchers and practitioners could mobilize to enhance business model creation, reconfiguration, implementation, and economic and social sustainability. This tooling perspective is topical in IS research and relies on the IS Design Research method (ISDSR - Hevner *et al.*, 2004) that has become a widespread methodological positioning over the last 15 years (Pascal & Renaud, 2020). Anchored in the technological engineering legacy of the discipline, the ISDSR aims at providing "more effective information systems" (Walls, Widmeyer, & El Sawy, 1992). The design process is made up by iterative "build-and-evaluate loops" (Hevner *et al.* 2004) that provide feedback information to improve both the quality of the product and the design process. This explains why we identified two kinds of tools, namely the *business model tools* and the *business model-related tools*. The latter are dedicated to improving the overall process of designing business models, whereas the former aim at guiding business model design *per se*.

The ISDSR paradigm (Gregor & Hevner, 2013) has not been widely diffused and adopted in other business model disciplines such as strategic management, innovation, entrepreneurship, or marketing. Consequently, it constitutes a distinctive contribution of the IS discipline that is aligned with the initial stepping stones of the business model literature development since Osterwalder (2004) anchored the business model ontology in a design science approach (see also Zott & Amit, 2007).

Thus, we suggest that IS scholars pursue research in this vein, specifically in the context of digital platforms. Digital platforms have emerged as one increasingly important type of a business model in the

digital world, where two or more sides are brought together through a digital interface (Baden-Fuller & Mangematin, 2013; Massa *et al.*, 2017). Iconic examples of such platforms are Uber, which brings together drivers and passengers in need of transportation (Teece, 2018a), Airbnb, which connects apartment owners (hosts) with travelers (Ritter & Lettl, 2018), and Ornikar, which links driving license applicants and driving instructors (Maucuer, Ronteau, & Lesage, 2018).

Platforms enable quick scaling due to network effects (Gawer & Cusumano, 2014), but can also strongly impact local contexts where firms operate in a positive but also a negative way (Ricart *et al.*, 2020). For example, when Uber entered the transportation industry with its platform business model, it facilitated access for more people to become providers of driving services than was ever possible within the highly regulated taxi industry (Baron, 2018). On the negative side, Uber has also generated precarity for its drivers, and platform entry by Airbnb has brought about apartment scarcity for local residents in cities around the world (Ricart *et al.*, 2020). How to design platforms that maximize benefits for the involved stakeholders remains an open question where contribution from IS researchers could be valuable.

Digital platforms are connected to ecosystems that align different actors around forming a unique value proposition (Adner, 2017). While technology can facilitate interfaces and interactions with stakeholders, taking into consideration different stakeholders, such as users and providers on platforms, online communities, or broader ecosystems requires the design of careful governance arrangements. The existing literature thus suggests that the process of business model design and development is important, notably in the key roles of decision timing, pace, and experimentation, particularly in the COVID-19 affected world. Further, the design perspective can help to overcome some of the "digitalization traps" related to managing human-machine interactions, ensuring data security and privacy, and seamlessly spanning multiple applications in the increasingly more open and interconnected world of technology platforms.

A user-centered perspective on digital business models

Drawing on its traditional intellectual capital on a user perspective, the IS literature can also contribute to the conversation dedicated to user-centric business models. Value creation and a demand-side strategy have received growing interest due to the increasing understanding that users and consumers of products deeply matter for the strategy of the firm, and it is important to analyze the user side of the value creation process (Priem, 2007; Priem, *et al.*, 2018; Adner, 2017). The emerging phenomena of platforms and ecosystems require more analysis of users and usage, as the value creation for one set of users often can depend on usage by another set of users (Adner, 2017; Gawer & Cusumano, 2014; Teece, 2018b).

Recent advancements in demand-side strategy research (Priem, 2007; Priem *et al.*, 2018) emphasize that a user perspective on value creation is needed to understand such value propositions. This is where business model and IS research can benefit from a joint perspective on users including lead users, evangelizers, and mainstream users, and their role in the value creation and capture processes. The development of user-centric business models (Hienerth, Keinz, & Lettl, 2011) entails both developing value propositions attractive to users and involving users actively in the value creation process. Further, business models are often improved and developed through

experimentation and stakeholder feedback (Andries, Debackere, & van Looy, 2013; Bojovic *et al.*, 2018; Snihur, Thomas, & Burgelman, 2018), further impacted by digitalization. For example, Salesforce increased the customization and openness of its software platform business model by continuously adjusting its business model to user and partner feedback during its early years (Snihur *et al.*, 2018). More inquiries about the impact of digitalization on these processes are much needed.

Digital technologies can help further facilitate this development. A well-known example includes the LEGO digital user community and platform that enables users to participate in the idea development and production of LEGO play materials. User communities are a source of innovation but can also help in other parts of the value chain, such as providing after-sale services as in the case of Freebox (Parmentier & Mangematin, 2014). Nevertheless, co-creating value with users brings challenges, and it is important to address the processes beyond the technological organization of the interaction, such as in the case of pivots, where users can rebel against companies deciding to change directions (Hampel, Tracey, & Weber, 2020).

A data-oriented perspective on digital business models

The rapid growth of emerging technologies has given rise to unprecedented organizational challenges calling for new theoretical responses (Bailey *et al.*, 2019). The Organization for Economic Co-operation and Development (OECD, 2018) argues that three emerging technologies have superior innovation potential as they rely on large datasets: the blockchain, artificial intelligence, and IoT. Among them, the IS business model literature is primarily engaged in the blockchain analysis, leading to the development of a dedicated theoretical conversation. This conversation is rooted in the notable transformations that have affected the financial industry (Nofer *et al.*, 2017) and the subsequent emergence of fintech (Gomber *et al.*, 2018). Rossi *et al.* (2019) consider that the IS literature could bring a meaningful contribution to blockchain socio-materiality by examining the interaction between the protocol and the application levels. We assume that the business model approach could help develop such a perspective since it encompasses all the dimensions affected by the blockchain, as shown by the blockchain-inspired business model typologies (Chong *et al.*, 2019).

Big data represents one of the key opportunities but also challenges raised by emerging technologies (Nofer *et al.*, 2017; Ranjan & Foropon, 2021). Big data is considered to be an essential resource (Abbasi, Sharker, & Chiang, 2016; Struijs, Braaksma, & Daas, 2014), playing a central role in the process of creating and capturing value, in particular in the so-called data-driven business models (Hartmann *et al.*, 2016; Sorescu, 2017). This research area is maturing in the IS literature, but to date, it is still not structured into a dedicated conversation. New theoretical frameworks need to be developed, especially to grasp how to extract value from big datasets (Elgendy & Elragal, 2014). Günther *et al.* (2017) have paved the path by conducting an in-depth systematic review of the IS literature on the topic. They identify six debates central to how organizations realize value from big data at different levels of analysis and argue that value results from continuous interaction between work practices, organizational models, and stakeholder interests. As an intermediary concept (Veit *et al.*, 2014), the business model represents a relevant unit of analysis to integrate these levels and analyze fundamental revenue generation interactions and value appropriation dilemmas from big data.

If practitioner-oriented contributions have highlighted the transformational potential of artificial intelligence (Garbuio & Lin, 2019; Ransbotham *et al.*, 2017), only one article in our sample suggests that practitioners and researchers should view artificial intelligence as a driver for designing new business models (Wamba-Taguimdje *et al.*, 2020). In the same vein, while IoT is a well-developed issue in the marketing literature, it remains poorly explored in the IS business model literature, which focuses on general principles rather than data-driven or governance-related challenges. We assume that IS scholars should pursue research on IoT-based business models (Shoukry, Khader, & Gani, 2019) as they are intimately entwined with new technological contexts, such as e-health (Ologeanu-Taddei & Paré, 2017), e-government (Bélanger & Carter, 2008), or smart cities (Hashem *et al.*, 2016; Zeng *et al.*, 2020).

Finally, the rapid development of emerging technologies raises ethical and legal issues as their application can have significant environmental and social impacts. While the strategic management literature tackles ethical issues through the concepts of social (Yunus, Moingeon, & Lehmann-Ortega, 2010), philanthropic (Maucuer & Renaud, 2019b), or sustainable business models (Bocken & Geradts, 2020), the impacts of technologies or data-driven business models such as increasing surveillance and social inequality (Brayne, 2017; Zuboff, 2019) are relatively ignored. Yet, the use of artificial intelligence and Big data raises many ethical questions, such as the scope of individual privacy (Sun, Strang, & Pambel, 2018; Chanson *et al.* 2019; Hajli *et al.*, 2020) or the proper role of intellectual property protection (Ekbia *et al.*, 2015). It also poses political problems in terms of data ownership, labor laws and tax regulations (see Casilli, 2019). Increased understanding of the potential of emerging technologies is needed to anticipate their impact and thus formulate policies for acting in new kinds of situations (Moor, 2005).

CONCLUSION

Arising from the increasing number of emerging technologies, such as blockchain, artificial intelligence, or IoT, we are likely to see an increasing number of new business models in various industries in the coming years. Such new business models, often characterized by quick growth through network effects, generate many open and interesting questions to researchers, relating to their design, scaling, but also negative externalities. Considering the historical role of IS research in the emergence of the business model concept and its natural anchoring in new technologies, we invite IS researchers to federate a community around the transformations associated with emerging technologies and to structure theoretical conversations. In a cross-fertilization logic, researchers should link the existing literature on business models with that on IS to develop original and relevant reflections in the increasingly more complex and digitalized world.

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APPENDICES

APPENDIX A: BUSINESS MODEL THEORETICAL STEPPING STONES IN THE IS LITERATURE

Stepping stone 1. *Legitimation*	Afuah &Tucci (2001)	Strategy
	Amit & Zott (2001)	Strategy
	Hamel (2002)	Strategy
	Linder & Cantrell (2001)	Strategy
	Porter (1985)	Strategy
	Porter (2001)	Strategy
	Weill & Vitale (2001)	Strategy
	Gordijn & Akkermans (2001)	IS
	Osterwalder & Pigneur (2002)	IS
	Timmers (1998)	IS
	Eisenhardt (1989)	Methodology
	Miles & Huberman (1994)	Methodology
	Yin (1984)	Methodology
Stepping stone 2. *Conceptualization*	Al-Debei & Avison (2010)	IS
	Hedman & Kalling (2003)	IS
	Hevner, March, Park, & Ram (2004)	IS
	Osterwalder (2004)	IS
	Osterwalder, Pigneur, & Tucci (2005)	IS
	Osterwalder & Pigneur (2010)	IS
	Veit, Clemons, & Benlian (2014)	IS
	Magretta (2002)	Strategy
	Shafer, Smith, & Linder (2005)	Strategy
	Zott, Amit, & Massa (2011)	Strategy
	Chesbrough & Rosenbloom (2002)	Economics
	Morris, Schindehutte, & Allen (2005)	Marketing
Stepping stone 3. *Structuration*	Casadesus-Masanell & Ricart (2010)	Strategy
	Chesbrough (2010)	Strategy
	Sosna, Trevinyo-Rodriguez, & Velamuri (2010)	Strategy
	Teece (2010)	Strategy
	Zott & Amit (2010)	Strategy

APPENDIX B: BUSINESS MODEL TRENDS IN THE IS LITERATURE

Trend 1. Business model design (26 articles)

Abdelkafi, N., & Pero, M. (2018). Supply chain innovation-driven business models: Exploratory analysis and implications for management. *Business Process Management Journal*, *24*(2), 589608. https://doi.org/10.1108/BPMJ-05-2016-0109

Al-Debei, M.M., Al-Lozi, E., & Al-Hujran, O. (2015). Critical design and evaluation factors of mobile business models: "Road block" eradicators for mobile networks operators. *Journal of Enterprise Information Management*, *28*(5), 698-717. https://doi.org/10.1108/JEIM-05-2014-0050

Al-Debei, M.M., Al-Lozi, E., & Fitzgerald, G. (2013). Engineering innovative mobile data services: Developing a model for value network analysis and design. *Business Process Management Journal*, *19*(2), 336-363. https://doi.org/10.1108/14637151311308349

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Grieger, M., & Ludwig, A. (2019). On the move towards customer-centric business models in the automotive industry—A conceptual reference framework of shared automotive service systems. *Electronic Markets*, *29*(3), 473500. https://doi.org/10.1007/s12525-018-0321-6

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Sharma, S., & Gutiérrez, J.A. (2010). An evaluation framework for viable business models for m-commerce in the information technology sector. *Electronic Markets*, *20*(1), 3352. https://doi.org/10.1007/s12525-010-0028-9

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Trend 2. Business model innovation (25 articles)

Abdulkader, B., Magni, D., Cillo, V., Papa, A., & Micera, R. (2020). Aligning firm's value system and open innovation: A new framework of business process management beyond the business model innovation. *Business Process Management Journal*, *26*(5), 9991020. https://doi.org/10.1108/BPMJ-05-2020-0231

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