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Published version

COOMBES, Philip (2022). A review of business model research: what next for industrial marketing scholarship? *Journal of Business and Industrial Marketing*.

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A REVIEW OF BUSINESS MODEL RESEARCH: WHAT NEXT FOR INDUSTRIAL MARKETING SCHOLARSHIP?

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Abstract

Purpose - The findings of a bibliometric analysis of the evolution and structure of business model research in industrial marketing scholarship during the period between 2011 and 2020 is presented and potential directions for future empirical research are discussed.

Design/methodology/approach – Bibliometric methodologies are deployed to objectively evaluate the business model research that has made the most impact within industrial marketing scholarship as well as the prominent scholars and key topics driving the discipline at points in time.

Findings – The findings demonstrate the formative but increasing engagement that industrial marketing scholarship has had with business model literature and the limited but increasing degree that business models have influenced industrial marketing literature. Potential directions for the empirical development of business model literature are argued to lie in the areas of collaboration and co-competition by examining the notion of value within the relationships, interactions, and/or networks evidenced in European seaports business models.

Research limitations/implications – Bibliometric analysis is retrospective in nature so developments in the literature appear only after some time has elapsed. Different keyword selection when formulating search strings for sampling may have brought some deviations in the analysis.

Originality/value – Research that investigates the link between business models and industrial marketing is still scarce. This paper is among the few that analyze objectively the evolution and structure of business model literature in industrial marketing scholarship from a longitudinal perspective with a particular emphasis on the period between 2011 and 2020.

Keywords Bibliometrics, business model, industrial marketing, interaction, networks, relationships.

Paper type General review/IMP Forum.

1. Introduction

Industrial marketing literature has expanded rapidly since the mid-2000s (Vieira and Brito, 2015), however, research on the evolution and structure of this literature remains limited (see for instance Backhaus *et al.*, 2011; Valenzuela-Fernandez *et al.*, 2019). Similarities to the development of industrial marketing literature can also be drawn with business model literature which has also expanded during this period and the term *business model* is being used increasingly among both academics and practitioners (Klimanov and Tretyak, 2019; La Rocca and Snehota, 2017). One of the reasons for this rapid expansion of business model research is, arguably, due to three separate calls for papers for special editions on business model research in Industrial Marketing Management, Long Range Planning and Strategic Entrepreneurship Journal, around ten years ago. The call from Industrial Marketing Management in 2011 was seeking research to explore the drivers of value and elucidate the role of marketing in business model performance in *business-to-business* (B2B) contexts. B2B marketing is understood as the sale of one firm's product/service to another firm (Nunan *et al.*, 2018), using marketing at a firm level. A key finding at that time was there had been limited *engagement* with business model literature by the marketing discipline and the marketing discipline had limited *influence* on the body of key articles in which business models were discussed (see Coombes and Nicholson, 2013), which was not surprising given the origin of business model literature was in entrepreneurship and other related fields such as strategy (Ehret *et al.*, 2013; Wirtz *et al.*, 2016a, 2016b). More recently, this inter-disciplinary view of business models has been further evidenced by calls for papers for special editions on business models in AMS Review, Business & Society, Global Strategy Journal, Journal of Business Research, Journal of International Business Studies, and Organization & Environment. However, despite these various calls for papers, research that investigates the link between business models and industrial marketing is *still* scarce (Spieth *et al.*, 2019), this lacuna thereby indicating the potential opportunities for further empirical study.

The purpose of the paper is first to present an analysis of the evolution and structure of business model literature in industrial marketing – with a particular emphasis during the period between 2011 and 2020. The paper contributes to business model literature in industrial marketing scholarship by presenting a longitudinal bibliometric analysis and, based on the analysis, discusses where assimilation has taken place hitherto for industrial marketing scholarship going forward. Bibliometric studies are helpful for many reasons. For instance, they enable

analyses for developing an overview of a field of research as it identifies the leading trends by using different bibliometric indicators, such as the number of publications and citations (Martinez-Lopez *et al.*, 2020; Valenzuela-Fernandez *et al.*, 2019). We also take cognizance of the call from Lindgreen and Di Benedetto (2018, p. 3) who highlight the need for more cross-disciplinary “actionable, high impact reviews of key business-to-business marketing topics” as part of a research agenda. The purpose of the paper is second to offer a route map for business model research in industrial marketing scholarship that may lead to significant contributions to theory and to practice being made in the future. We argue this route map should include empirical research on seaports marketing which is hitherto *scarce* with very few studies published in marketing journals (Lavissiere *et al.*, 2020; Mandjak *et al.*, 2019). Hence, this route map should lie in the areas of collaboration and cooptation by examining the notion of value cocreation (see for instance Lindgreen *et al.*, 2012) within the relationships, interactions, and/or networks (Hakansson, 1982; Hakansson and Snehota, 1989, 1995) evidenced in European seaports business models. In particular, the following research questions are addressed in this paper:

RQ1: What extent has business model research advanced in industrial marketing scholarship during the period between 2011 and 2020?

RQ2: What are the potential directions for the empirical development of business model research in industrial marketing scholarship?

The structure of the paper is as follows: first, a review of some of the leading contributions to the business model literature in industrial marketing scholarship are presented. Second, the methodology utilized and particularly the deployment of bibliometric analysis techniques is presented. Third, the results from the various analyses are presented which expose the journals, articles and their authors with the following: (1) visualizations of the cooccurrence of author keywords by using the VOS viewer application, (2) the research that has made the most impact on business model literature in industrial marketing scholarship according to their respective h-indices; and (3) the prominent scholars and key topics driving business model research in industrial marketing scholarship at particular points in time. Next, based on the results, the theoretical and managerial implications are discussed which include potential directions for the empirical development of the business model concept. Finally, the theoretical and practical contributions, as well as the methodological limitations of the study, are then presented.

2. Theoretical background

2.1 Business models and the notion of value

Several studies have acknowledged that the term *business model* appeared to gain increasing importance since the dot.com era in the late 1990s (see for instance Mason and Spring, 2011; Wirtz *et al.*, 2016b) and the term is increasingly being used in everyday business parlance. Since that time, many definitions of business models have been proposed and the concept is commonly used to identify how and for whom firms create, deliver, and capture value, and how firms are positioned in a value network (La Rocca and Snehota, 2017). Despite the increasing level of attention that has been paid to business models, the concept still represents “a slippery construct to study” (Casadesus-Masanell and Zhu, 2013, p. 480). Whilst the early focus of business model research had initially been limited to an inward firm-level perspective (Morris *et al.*, 2005), which assumed that the value offered to customers was embodied in products/services produced by a firm and offered to customers who would buy them when the product offering was superior to that available from competitors (Nenonen and Storbacka, 2010), there was a growing view that in industrial markets, a more outward, external perspective was needed (Mason and Spring, 2011; Palo and Tahtinen, 2011). Chesbrough and Rosenbloom (2002, p. 533) suggested that business models draw from and integrate “a variety of academic and functional disciplines, gaining prominence in none”. It would appear, therefore, that with no natural home, a case for the theoretical development of business models could be advanced in several disciplines. However, because the centrality of value exchange was identified as a point of consistency in much business model research (Priem *et al.*, 2018), we argue the influence of marketing was evidenced because of the consensus among scholars that business models were involved with the creation, delivery, and capture of value (see for instance Morris *et al.*, 2005; Zott *et al.*, 2011). However, despite several calls for papers for special editions on business models, research that investigates the link between business models and industrial marketing is *still* scarce (Spieth *et al.*, 2019) and hence this lacuna represents opportunities for industrial marketing scholarship going forward.

2.2 Business models and networks

According to Teece (2010, p. 172), a business model describes a network’s “design or architecture of value creation, delivery, and capture mechanism”. Furthermore, the *cocreation* of value was an emerging theme across the marketing discipline conceived as a means through

which value is created in conjunction with customers rather than being created entirely inside the boundaries of a single firm (Prahalad and Ramaswamy, 2004a, 2004b). Industrial marketing scholars interested in value cocreation called for “an extension of thinking beyond customer-supplier relationships, to a *network* [emphasis added] of stakeholder relationships” (Truong *et al.*, 2012, p. 198). A business network can encompass a variety of dyadic as well as indirect relationships. Such indirect relationships may include, for example, innovative and collaborative relationships, competitor relationships, or even conflicts between actors (Easton and Araujo, 1992). These stakeholder relationships exist among for-profit customers and suppliers but other non-profit actors such as governmental agencies, different types of authorities, NGOs, trade unions or political parties (Hakansson *et al.*, 2009). The acceptance of value being cocreated with its stakeholders was also reflected in intensive business services (Aarikka-Stenroos and Jaakkola, 2012), project networks (Mele, 2011) and complex solution networks (Jaakkola and Hakanen, 2013). Such network-based views of value cocreation seemed to underpin parallel discussion in industrial marketing literature examining business models. For instance, Mason and Spring (2011, p. 1033) stated that “by divulging different parts of the business model to investors, suppliers and customers, the business model (or fractions of it) becomes sited in the business models of others”. In this sense, stakeholders outside single firms become active players in open business models rather than passive receivers of closed business models. It is possible, therefore, to consider a compelling case for the potential of industrial marketing to make distinctive contributions to the broader business model debate. According to Coombes and Nicholson (2013), that distinctiveness was argued to lie in the development of *open* business models, cocreated with multiple stakeholders in a supply chain, and the end users of a value proposition and suggested the Industrial Marketing and Purchasing Group’s (IMP) *relationships, interactions, and/or networks* perspectives (see for instance Ford, 1990; Hakansson, 1982; Hakansson and Snehota, 1989, 1995), which contains several models and theories that could be deployed, i.e. the Actor-Resource-Activity (ARA) model, to grasp the ontological complexity of business networks in order to further develop such distinctiveness. The key motivation of open business models is the notion that value creation activities are performed by actors outside of the boundaries of a single firm (Coombes and Nicholson, 2021). The focus within the IMP’s perspective on the embeddedness of action and relationships across time also offers the potential to develop dynamic open business models that evolve over time, and which are not fixed and static entities (Coombes and Nicholson, 2013). The value that industrial marketing scholarship appears to offer to the development of business model literature seems to be grounded in the potential to develop the

concept of value cocreation between multiple stakeholders. Therefore, open business models hold the potential to offer clarity and transparency in reciprocal value exchanges between multiple stakeholders (Coombes and Nicholson, 2013). Whilst further business model research has continued to be published in industrial marketing literature (see for instance Klimanov and Tretyak, 2019; La Rocca and Snehota, 2017), several of which have taken a relationships, interactions, and/or networks perspective¹, there are still few studies that have examined networked or *open* business models within this literature (for a rare exception see Frankenberger *et al.*, 2013). We argue this lack of research could be because it seems more appropriate in contemporary discourse to consider business models as a continuum which, in contrast to closed business models, most models contain some form of openness.

2.3 Business models, collaboration, competition, and cooperation

According to Dreyer *et al.* (2017), collaboration is crucial as the creation, delivery, and capture of value by a firm is related to the collaborative ties with its stakeholders. Despite several recent studies on public-private sector collaboration in industrial marketing literature (see for instance Hakansson and Axelsson, 2020; Waluszewski *et al.*, 2019), what appears absent in studies of collaborative business models are firms that are dependent on the collaboration between multiple actors, such as customers, suppliers, governmental agencies, and NGOs, namely cross-sectoral (public-private) collaboration. For instance, in public-private sector partnerships, business model design becomes extremely important to understanding the key elements underlying collaboration and joint value creation (Battisti and Brem, 2020; Zott *et al.*, 2011). Furthermore, collaboration between competing firms is a phenomenon that has recently captured much attention due to its increasing relevance to business practice. The term *coopetition* (Crick and Crick, 2020; Lundgren-Henriksson and Kock, 2016) is a portmanteau of cooperation and competition and has gained significant attention from researchers in recent years (see Gernsheimer *et al.*, 2021 for a detailed review). However, research on coopetition is still lacking when explaining how the potential advantages of coopetition can be realized when firms engage in coopetition to innovate their business models (Ritala *et al.*, 2014; Velu, 2016). We contend further investigation of this literature, therefore, seems appropriate and timely.

[¹] We note the term *business model* and the words *relationships*, *interactions*, and/or *networks* appeared in the articles' titles, thereby indicating their centrality to the article.

However, we argue more can be learned from a longitudinal bibliometric analysis of the body of work discussing business models in industrial marketing scholarship. Before presenting the findings of our analysis and a discussion of the potential directions for industrial marketing scholarship, the methodology through which this analysis was achieved is outlined next.

3. Research methods

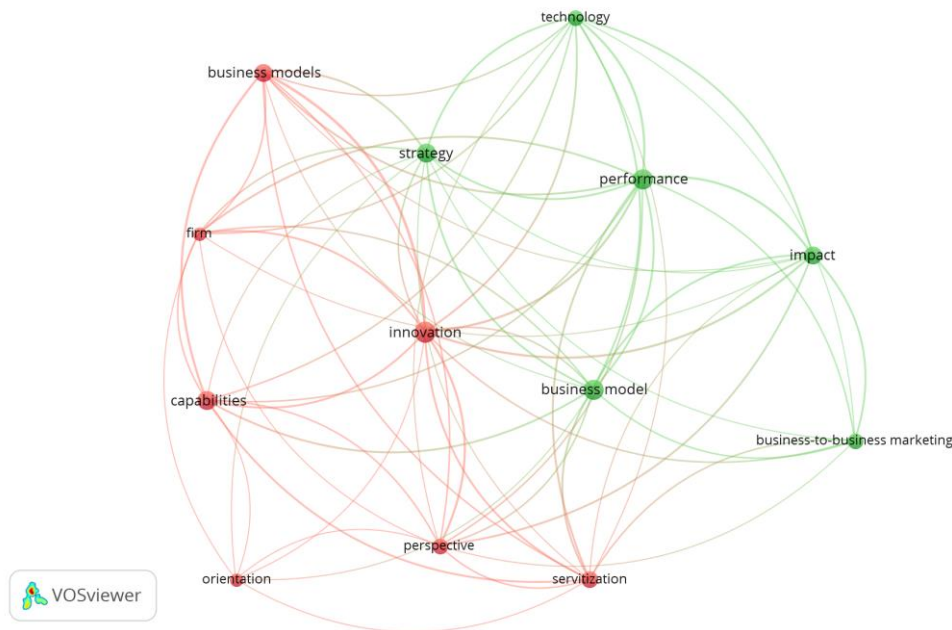
The methods adopted in this paper are rooted in bibliometrics (Garfield, 1972) which consist of a set of methods that can be deployed to evaluate research through statistical analysis of bibliographic data, commonly focusing on citation analysis of research publications. In contrast to narrative-based literature review methods, bibliometric reviews and the alternative meta-analysis are increasingly being adopted in marketing literature (see Donthu *et al.*, 2021; Paul *et al.*, 2021 for a more detailed discussion of different bibliometric approaches). Citation analysis is a commonly used method to support empirical investigations of the evolution and structure of various disciplines (Garfield, 1972; Smith, 1981). Research disciplines are characterized by patterns of communication between scholars. These patterns of communication manifest themselves in various ways, but foremost among these are citations from one author's work to another. A citation is the acknowledgement that one article receives from another and generally implies a relationship between parts or the whole of the cited article and parts or the whole of the citing article (Smith, 1981). Citation analysis may focus on either or both articles and their scholars (Osareh, 1996). The basic assumption underlying citation analysis is that scholars cite their influences, so that citations act as surrogates for the influence of the cited work (Acedo and Casillas, 2005). Therefore, the total citations to a certain article, author or journal offers an acceptable surrogate of that paper's, author's, or journal's impact on a corresponding research field (Culnan, 1986). For our bibliometric analysis, we ensured rigor by taking cognizance of the four steps of the bibliometric analysis procedure and best practice guidelines (see Donthu *et al.*, 2021 for a more detailed explanation of the guidelines), namely (1) define the aims and scope of the bibliometric study, (2) choose the techniques for bibliometric analysis, (3) collect the data for bibliometric analysis, and (4) run the bibliometric analysis and report the findings. The findings and discussion from our analysis are presented next.

4. Findings and discussion

4.1 Results from the bibliometric analysis

To present our analysis of the evolution and structure of business model literature in industrial marketing scholarship, in early January 2021, an initial search using the Clarivate Analytics Web of Science Core Collection (WoS) – a leading database for academic research (Martinez-Lopez *et al.*, 2020) – was undertaken for the period between 1970 and 2020 inclusive. This initial search was undertaken using the search string ‘business model*’ AND ‘marketing*’ in the TOPIC of the publication. By selecting the TOPIC, WoS searches the document titles, abstracts, and keywords. This initial search revealed 1,079 documents which included interdisciplinary journal articles, conference papers and editorial material. This initial search was then refined to include only intradisciplinary journal articles published in Business and Management category literature in WoS as journal articles amount to the frontiers of research (Coombes and Nicholson, 2013). This search revealed 284 journal articles published between 1970 and 2020. The period between 1970 and 2020 covered a wide range of years because bibliometric ‘snapshots’ for analysis are inadequate, even periods of five years are not long enough (Van Raan, 1996). From these 284 articles only 38 articles were published in industrial marketing journals – which we contend are the Journal of Business-to-Business Marketing (2 articles), Journal of Business & Industrial Marketing (13 articles), Industrial Marketing Management (22 articles), and IMP Journal (1 article). From this first sample of 38 articles, we deployed the VOS viewer application (Van Eck and Waltman, 2010) to conduct a bibliometric analysis of the cooccurrence of author keywords. The cooccurrence of author keywords identifies those keywords that appear more frequently in the same documents (Merigo *et al.*, 2018). The resultant cooccurrence of keywords map determines the number of articles in which they occurred together in titles, abstracts, and keywords. Figure 1 illustrates this network relationship according to the number of links and total link strength.

Figure 1 Cooccurrence of keywords network map of business model research in industrial marketing



The size of the circles represents the frequency of the keywords. The line between two points represents that both keywords occurred in one article.

In particular, the illustration depicts the keywords with nodes (circles) and their links with curved lines, clustering the items in different shades of color. The size of the node indicates the number of times that the keyword occurs. The links between the nodes represent the keywords that occur together with the thickness of the links representing the number of times that the keywords occur together. Each color represents a thematic cluster, whereby the nodes and links in that cluster can be used to explain the theme's coverage of topics within business model research and industrial marketing, and the relationships between the topics manifesting under that theme (see Waltman *et al.*, 2010). According to this map, two separate clusters of keywords have been identified. In Cluster 1, colored in red, the links between the keywords of business models, innovation and capabilities are particularly evident. In Cluster 2, colored in green, the links between the keywords of business model, performance, strategy, and technology are particularly evident.

Following this initial search, to create more rigorous analysis, next we adopted the IMP's *relationships, interactions, and/or networks* perspectives and the following three search strings were used to create our second sample:

- ‘business model*’ AND ‘relationship*’ in the TITLE of the publication OR
- ‘business model*’ AND ‘interaction*’ in the TITLE of the publication OR
- ‘business model*’ AND ‘network*’ in the TITLE of the publication.

By selecting the TITLE, WoS searches the document titles. This search revealed 236 documents which included interdisciplinary journal articles, conference papers and editorial material published between 1970 and 2020. This search was then refined to include only intradisciplinary journal articles published in Business and Management category literature in WoS. This search revealed 47 journal articles published between 1970 and 2020. To analyze the most *recent* business model literature, a further search was undertaken for the period between 2011 and 2020. This search revealed 182 documents which included interdisciplinary published articles, conference papers and editorial material. Again, this search was then refined to include only intradisciplinary journal articles published in Business and Management category literature in WoS. This search revealed just 45 journal articles published between 2011 and 2020, thereby indicating the formative but increasing engagement with business model literature in industrial marketing scholarship. This further search, therefore, formed our sample for the forthcoming analysis. These 45 journal articles are summarized in Table I.

Table I Business model articles adopting a relationships, interactions, and/or networks perspective

Author(s)	Year of Publication	Article Title	Publishing Journal	Principal Themes
Micheli, Maria Rita; Berchicci, Luca; Jansen, Justin J. P.	2020	Leveraging diverse knowledge sources through proactive behavior: how companies can use inter-organizational networks for business model innovation	Creativity and Innovation Management	Business model innovation, networks
Monios, Jason; Bergqvist, Rickard	2020	Logistics and the networked society: a conceptual framework for smart network business models using electric autonomous vehicles (EAVs)	Technological Forecasting and Social Change	Logistics, networks, technology
Witek-Hajduk, Marzanna Katarzyna; Zaborek, Piotr	2020	Cooperation and competition in manufacturer-key retailer relationships: a business model perspective	E and M Ekonomie a Management	Cooperation, competition, relationships
Ma usson, Lars-Gunnar; Andersson, Per	2019	Private-public interaction in public service innovation processes- business model challenges for a start-up EdTech firm	Journal of Business & Industrial Marketing	Business model innovation, interaction, public-private sector, technology
Asemokha, Agnes; Musona, Jackson; Torkkeli, Lasse; Saarenketo, Sami	2019	Business model innovation and entrepreneurial orientation relationships in SMEs: implications for international performance	Journal of International Entrepreneurship	Business model innovation, entrepreneurship, relationships, SMEs
Laasch, Oliver	2019	An actor-network perspective on business models: how ‘being responsible’ led to incremental but pervasive change	Long Range Planning	Networks
Siggelkow, Nicola; Terwiesch, Christian	2019	The age of continuous connection new technologies have made 24/7 customer relationships possible. It’s time to change your business model accordingly	Harvard Business Review	Relationships, technology
Klimanov, Denis; Tretyak, Olga	2019	Linking business model research and marketing: new network-based approach to business model analysis	Journal of Business & Industrial Marketing	Networks
Spieth, Patrick; Roeth, Tobias; Meissner, Svenja	2019	Reinventing a business model in industrial networks: implications for customers’ brand perceptions	Industrial Marketing Management	Networks
Chatterjee, Sayan; Matzler, Kurt	2019	Simple rules for a network efficiency business model: the case of Vizio	California Management Review	Networks
Lofsten, Hans	2019	The business performance of new technology-based firms: the importance of the business model’s value proposition and customer relationships	International Review of Entrepreneurship	Relationships, technology, value
Yoo, Byungjoon; Jang, Moonkyoung	2019	A bibliographic survey of business models, service relationships, and technology in electronic commerce	Electronic Commerce Research and Applications	Bibliometrics, relationships, technology
Brennan, Geraldine; Tennant, Mike	2018	Sustainable value and trade-offs: exploring situational logics and power relations in a UK brewery’s malt supply network business model	Business Strategy and the Environment	Networks, value
Pati, Rakesh Kumar; Nandakumar, M. K.; Ghobadian, Abby; Ireland, R. Duane; O’Regan, Nicholas	2018	Business model design-performance relationship under external and internal contingencies: evidence from SMEs in an emerging economy	Long Range Planning	Relationships, SMEs
Laya, Andres; Markendahl, Jan; Lundberg, Stefan	2018	Network-centric business models for health, social care and wellbeing solutions in the internet of things	Scandinavian Journal of Management	Networks, technology

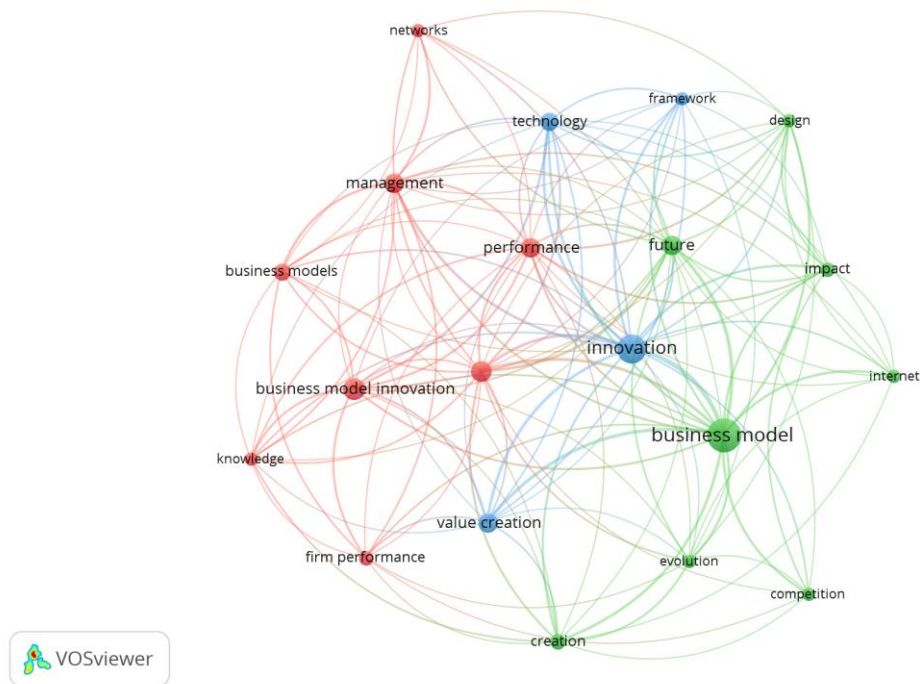
Nardelli, Giulia; Rajala, Risto	2018	The evolution of facility management business models in supplier-client relationships	Journal of Facilities Management	Relationships
Sola imani, Sam; Heikkila, Marikka; Bouwman, Harry	2018	Business model implementation within networked enterprises: a case study on a Finnish pharmaceutical project	European Management Review	Networks, technology
Mazurek, Szymon	2018	Strategic orientations of the network business models	Transformations in Business and Economics	Networks
Dellyana, Dina; Simatupang, Togar M.; Dhewanto, Wawan	2018	Managing the actor's network, business model and business model innovation to increase value of the multidimensional value networks	International Journal of Business and Society	Business model innovation, networks, value
Bellos, Ioannis; Ferguson, Mark; Toktay, L. Beril	2017	The car sharing economy: interaction of business model choice and product line design	MS&OM Manufacturing and Service Operations Management	Interaction
Dreyer, Betine; Ludeke-Freund, Florian; Hamann, Ralph; Faccar, Kristy	2017	Upsides and downsides of the sharing economy: collaborative consumption business models' stakeholder value impacts and their relationship to context	Technological Forecasting and Social Change	Collaboration, relationships, value
Breuer, Henning; Luedeke-Freund, Florian	2017	Values-based network and business model innovation	International Journal of Innovation Management	Business model innovation, networks, value
Bankvall, Lars; Dubois, Anna; Lind, Frida	2017	Conceptualizing business models in industrial networks	Industrial Marketing Management	Networks
Suherman, Angga G.; Simatupang, Togar M.	2017	The network business model of cloud computing for end-to-end supply chain visibility	International Journal of Value Chain Management	Networks, technology
Rajakalio, Karoliina; Ristimazki, Miro; Andelin, Mia; Junila, Seppo	2017	Business model renewal in context of integrated solutions delivery: a network perspective	International Journal of Strategic Property Management	Networks, solutions
La Rocca, Antonella; Snehota, Ivan	2017	Business models in business networks – how do they emerge?	IMP Journal	Networks
Oborin, Matvey S.; Sheresheva, Marina Yu	2017	The specificity of network-based business models in the tourist-recreational sphere	Upravlenets-the Manager	Networks
Yderfalt, Asa; Roxenhall, Tommy	2017	Real estate business model innovation and the impact of ego network structure	Management Research Review	Business model innovation, networks
Velu, Chandar	2016	Evolutionary or revolutionary business model innovation through coopetition? The role of dominance in network markets	Industrial Marketing Management	Business model innovation, coopetition, networks
Kortmann, Sebastian; Piller, Frank	2016	Open business models and closed-loop value chains: redefining the firm - consumer relationship	California Management Review	Open business models, relationships, value
Dellyana, Dina; Simatupang, Togar M.; Dhewanto, Wawan	2016	Business model innovation in different strategic networks	International Journal of Business	Business model innovation, networks
Spacek, Miroslav; Vacik, Emil	2016	Design of an innovative business model for mobile virtual network operators	Quality Innovation Prosperity-Kvalita Inovacia Prosperita	Business model innovation, networks, technology

Lorange, Peter; Thomas, Howard	2016	Pedagogical advances in business models at business schools – in the age of networks	Journal of Management Development	Networks
Ghezzi, Antonio; Cortimiglia, Marcelo Nogueira; Frank, Alejandro German	2015	Strategy and business model design in dynamic telecommunications industries: a study on Italian mobile network operators	Technological Forecasting and Social Change	Networks, technology
Cantu, Chiara	2015	A service incubator business model: external networking orientation	IMP Journal	Networks
Mahdjour, Sarah	2015	Set up for growth? – an exploratory analysis of the relationship of growth intention and business models	International Journal of Innovation Management	Relationships
Al-Debei, Mutaz M.; Al-Lozi, Enas; Al-Hujran, Omar	2015	Critical design and evaluation factors of mobile business models roadblock eradicators for mobile networks operators	Journal of Enterprise Information Management	Networks, technology
Falencikowski, Tadeusz Marek	2015	Network of enterprise business model – the basic assumptions	Problemy Zarzadzania-Management Issues	Networks
Cautela, Cabirio; Pisano, Paola; Pironti, Marco	2014	The emergence of new networked business models from technology innovation: an analysis of 3-D printing design enterprises	International Entrepreneurship and Management Journal	Networks, technology
Frankenberger, Karolin; Weiblen, Tobias; Gassmann, Oliver	2013	Network configuration, customer centricity, and performance of open business models: a solution provider perspective	Industrial Marketing Management	Networks, open business models, solutions
Palo, Teea; Tahtinen, Jaana	2013	Networked business model development for emerging technology-based services	Industrial Marketing Management	Networks, technology
Brettel, Malte; Strese, Steffen; Flatten, Tessa C.	2012	Improving the performance of business models with relationship marketing efforts – an entrepreneurial perspective	European Management Journal	Entrepreneurship, relationships
Casani, Fernando; Rodriguez-Pomeda, Jesus; Sanchez, Flor	2012	New business models in the creative economy: emotions and social networks	Universia Business Review	Networks
Palo, Teea; Tahtinen, Jaana	2011	A network perspective on business models for emerging technology-based services	Journal of Business & Industrial Marketing	Networks, technology
Chiou, Chi-Ho	2011	Dynamic capabilities, collaborative network, and business model: an empirical analysis of Taiwan HTC corporation	African Journal of Business Management	Collaboration, dynamic capabilities, networks

Within this table, only 10 out of the 45 articles adopting a relationships, interactions, and/or networks perspective are published in industrial marketing journals. The studies published in industrial marketing journals are shaded in grey. In addition to the relationships, interactions, and/or networks perspectives, the influence of business model innovation, collaboration, competition, cooperation, solutions, technology, and value is particularly evidenced.

From our sample in Table I, the resultant cooccurrence of keywords map is illustrated in Figure 2. According to this map, three separate clusters of keywords have been identified. In Cluster 1, colored in red, the links between the keywords of business models, business model innovation, firm performance, knowledge, management, networks, performance, and strategy are evident. In Cluster 2, colored in green, the links between the keywords of business model, competition, creation, design, evolution, future, impact, and internet are evident. Finally, in Cluster 3, colored in blue, the links between the keywords of framework, innovation, technology, and value creation are evident. However, despite the inclusion of the keywords management, strategy, and value creation among the keywords, we note there is no reference to marketing in this analysis.

Figure 2 Cooccurrence of keywords network map of business model research adopting an IMP perspective



The size of the circles represents the frequency of the keywords. The line between two points represents that both keywords occurred in one article.

To identify the research that had made most impact on our sample, a citation analysis was performed next to calculate the frequency of citation of the bibliometric references used in the articles published during the period between 2011 and 2020. A citation is the acknowledgement that one article receives from another and generally implies a relationship between parts or the whole of the cited article and a part or the whole of the citing article (Smith, 1981). The basic assumption underlying citation analysis is that researchers cite their influences, so that citations act as surrogates for the influence of the cited work (Acedo and Casillas, 2005). Therefore, the total citations to a certain journal offer an acceptable surrogate of that journal's influence on a corresponding research field (Culnan, 1986). A rigorous approach for ranking the impact of journals is the h-index (Hirsch, 2005) which reflects both the number of publications and the number of citations per publication. The h-index is designed to improve upon simpler measures such as the total number of citations or publications and can, therefore, be a particularly powerful tool to rank the *impact* of a body of work (Martinez-Lopez *et al.*, 2020). The top-twenty Business and Management category journals ranked according to the h-index of their published articles during the period between 2011 and 2020 is presented in Table II. Industrial Marketing Management leads the table with 136 citations and an h-index of 4. Journal of Business & Industrial Marketing is ranked third with 35 citations and an h-index of 2 and the IMP Journal is ranked fourth with 11 citations and an h-index of 2. The dominance of industrial marketing journals is evidenced therefore with three journals appearing within the top-five journals. The leading non-industrial marketing journals within the top five are Technological Forecasting and Social Change ranked second with 83 citations and an h-index of 2 and International Journal of Innovation Management ranked fifth with 31 citations and an h-index of 1.

Finally, the characteristics of the key references, including the identification of the ten-year period's most cited publications, revealed the prominent scholars and key subjects driving the business model discipline during this period (Backhaus *et al.*, 2011). Table IIIa presents the top-ten most cited articles in Business and Management category journals during the period between 2011 and 2020 whilst Table IIIb presents the top-ten most cited articles in *industrial marketing journals only* during the period between 2011 and 2020. A citation value (CV), calculated as the ratio of individual citations to the total citations, has been applied to each published article in each period.

Table II Distribution of journals' citation impact between 2011 and 2020

Rank	Journal	Articles	Citations	h-index
1	Industrial Marketing Management+	5	136	4
2	Technological Forecasting and Social Change	3	83	2
3	Journal of Business & Industrial Marketing+	3	35	2
4	IMP Journal+	2	11	2
5	International Journal of Innovation Management	2	31	1
6	California Management Review	2	29	1
7	Long Range Planning	2	8	1
8	Technovation	1	116	1
9	Journal of Management Studies	1	64	1
10	M&SOM Manufacturing and Service Operations Management	1	39	1
11	International Entrepreneurship and Management Journal	1	19	1
12	Business Strategy and the Environment	1	9	1
13	Universia Business Review	1	7	1
14	International Journal of Value Chain Management	1	6	1
15	Scandinavian Journal of Management	1	6	1
16	African Journal of Business Management	1	5	1
17	International Journal of Strategic Property Management	1	5	1
18	International Journal of Business	1	3	1
19	Journal of Facilities Management	1	3	1
20	European Management Review	1	2	1

+ Industrial marketing journal

In Table IIIa, the scholars who have made the highest citation impact in Business and Management category journals is a study entitled 'Innovation networks: From technological development to business model reconfiguration' by Calia *et al.* (2007). In second place is a study by Mason and Leek (2008) with a study entitled 'Learning to build a supply network: An exploration of dynamic business models'. The highest ranked studies published in industrial marketing literature are by Frankenberger *et al.* (2013) in fifth place with a study entitled 'Network configuration, customer centricity, and performance of open business models: A solution provider perspective', followed by Velu (2016) in eighth place with a study entitled 'Evolutionary or revolutionary business model innovation through coopetition? The role of dominance in network markets', and Palo and Tahtinen (2011) in ninth place with a study entitled 'A network perspective on business models for emerging technology-based services'. In contrast, in Table IIIb, the scholars who have made the highest citation impact in *industrial marketing* journals in addition to the studies by Frankenberger *et al.* (2013), Velu (2016), and Palo and Tahtinen (2011), are Palo and Tahtinen (2013) with a study entitled 'Networked business model development for emerging technology-based services', and Bankvall *et al.* (2017) with a study entitled 'Conceptualizing business models in industrial networks'.

Table IIIa Key references analysis in Business and Management category journals**Table IIIb** Key references analysis in industrial marketing journals

2011-2020			2011-2020		
Rank	Author(s)	CV	Rank	Author(s)	CV
1	Calia <i>et al.</i> (2007)	13.76%	1	Frankenberger <i>et al.</i> (2013)	5.95%
2	Mason and Leek (2008)	7.94%	2	Palo and Tahtinen (2013)	5.56%
3	Ghezzi <i>et al.</i> (2015)	6.61%	3	Velu (2016)	4.23%
4	Brettel <i>et al.</i> (2012)	6.08%	4	Palo and Tahtinen (2011)	4.10%
5	Frankenberger <i>et al.</i> (2013)+	5.95%	5	Bankvall <i>et al.</i> (2017)	2.25%
6	Palo and Tahtinen (2013)	5.56%	6	Cantu (2015)	0.93%
7	Dreyer <i>et al.</i> (2017)	4.37%	7	La Rocca and Snehota (2017)	0.53%
8	Velu (2016)+	4.23%	8	Mattsson and Andersson (2019)	0.40%
9	Palo and Tahtinen (2011)+	4.10%	9	Klimanov and Tretyak (2019)	0.13%
10	Breuer and Luedeke-Freund (2017)	3.97%	10	Spieth <i>et al.</i> (2019)	0.00%
+ Industrial marketing journal					

The results from the preceding longitudinal bibliometric analysis have addressed the first research question: What extent has business model research advanced in industrial marketing scholarship during the period between 2011 and 2020? The next section discusses the theoretical and managerial implications arising from the study and addresses the second research question: What are the potential directions for the empirical development of business model research in industrial marketing scholarship?

4.2 Theoretical implications

From a theoretical perspective, the findings contribute to both business model and industrial marketing literature by assimilating a sample of studies that have examined business models in various industrial marketing contexts. Overall, the findings have highlighted the paucity of business model research adopting a relationships, interactions, and/or networks perspective in industrial marketing scholarship. To address these gaps, we offer *two* broad areas for the empirical development of the business model concept in industrial marketing scholarship.

First, what appears absent in studies of business models is the notion of value evidenced within firms that are dependent on the collaboration between multiple stakeholders. To showcase the importance to explore these dimensions in industrial marketing scholarship, we turn to the transportation literature and particularly the seaports sector, which potentially could provide promising case study research (see for instance Golzarjannat *et al.*, 2021) of such collaborations in business models. Research on seaports marketing is hitherto scarce with very *few* studies published in marketing journals (Mandjak *et al.*, 2019), which was corroborated by a search of

WoS (for a rare exception see Lavissiere *et al.*, 2020). However, the relevance of seaports and their interconnectedness is evidenced by the fact that more than seventy per cent of worldwide trade by value is handled by seaports (Shi and Li, 2017) with global supply chains heavily centered on such seaports. Within continental Europe, port authorities are generally incorporated as public entities committed to both the for-profit development and promotion of the seaport and non-profit regulatory functions. In addition to publicly owned port authorities, who tend to be landowners assuming a landlord/tenant governance business model, the most prevalent actors comprising port communities are privately-owned terminal operators, cargo-handling and logistics operators, shipping firms and their agents, and service operators such as pilotage, towage, and moorage firms, as well as related port-centric industries who often operate adjacent to these terminals. These port authorities commonly award concessions to terminal operators, which involves the transfer of service provision from public bodies to private enterprises, and typically involves some form of public-private sector partnership between the public (in the form of a government agency) and the private sector in providing a specific public service. Such partnerships require that risks, responsibilities, and returns are shared between the public and private sectors.

Second, what also appears absent in studies of business models are firms that are increasingly cooperating and competing at the same time to create, deliver and capture value, and another potential direction for future research could include an examination into firms that both collaborate and compete in business networks. Even though network theories are grounded in social exchange, scholars in the IMP tradition have approached strategizing in networks (Hakansson and Snehota, 1989) and the existence of both cooperation and competition in networks has been acknowledged (Gadde *et al.*, 2003). The notion of coopetition (Crick and Crick, 2020; Lundgren-Henriksson and Kock, 2016) appears to have roots in two opposing paradigms. The IMP tradition captures the relational dimension of coopetition whereby firms are interconnected through social interaction and exchange in relationships, forming dynamic networks (Hakansson and Ford, 2002; Hakansson and Snehota, 1989; Johansson, 2012), whilst the competitive paradigm, drawing on the resource-based view (Barney, 1991, Wernerfelt, 1984), captures the strategic dimension assuming that competitive advantage is generated based on a firm's ability to optimize resources based on its position in the market. Most coopetition research focuses on horizontal relationships, that is, cooperation between competitors (Dahl *et al.*, 2016). The creation of value, therefore, takes place through inter-competitor cooperation and the delivery and capture of value through individual competition

(Bengtsson and Kock, 2000; Ritala and Tidstrom, 2014). However, research has not yet explored when and how firms might decide with their competitors to adopt a cooperation strategy to innovate their business models (Velu, 2016). Collaboration and competition are the most common types of interaction among market players at both the inter- and intra-port levels (Kavirathna *et al.*, 2019; Song, 2003). To showcase the importance of cooperation in industrial marketing scholarship, again, we contend seaports could provide interesting case study research of such simultaneous collaboration and competition in business models where few studies currently exist, and which appear to be presently confined to transportation literature. Such studies could potentially conceptualize the notion of value cocreation in a multi-level business model which simultaneously characterizes both collaboration and competition among terminal operators within a seaport when competing with operators from external seaports. Considering the complexity of this interconnectedness among these various port actors, we contend one of the central IMP frameworks, the ARA model (Hakansson and Gadde, 2017), would be an appropriate tool to further explore these various relationships, interactions, and/or networks, in terms of the various activities undertaken by the various port actors using various resources, within port communities.

The research areas suggested here would potentially provide valuable theoretical contributions to the business model concept in industrial marketing scholarship, both in general and especially to the nascent seaports marketing literature.

4.3 Managerial implications

From a managerial perspective, the value that the business model concept offers to the development of industrial marketing literature would appear to lie in the areas of collaboration and cooperation by developing the notion of value cocreation within the relationships, interactions, and/or networks evidenced in European seaports business models. Here lies the potential value of the business model concept to industrial marketing practitioners. We do not offer a contribution to practice in this paper, but we do offer a route map for research that may lead to significant contributions to practice being made in the future.

4.4 Limitations

The findings from the analysis also have some limitations due to the methodological constraints that resulted from the research design and from our sample. As WoS is constantly being updated with new literature, the data collected for this study represents a ‘snapshot’ of journal

articles in the database during the period of data collection (Valenzuela-Fernandez *et al.*, 2020). Further additional works, such as conference papers and book chapters, may have provided further evidence of knowledge structure, but were not considered in this paper. Therefore, the first constraint related to the formulation of the search strings. The selection of different keywords when formulating the search strings could well have altered the results. However, we argue that the journal articles analyzed in our sample represent the main research efforts in business model literature published during the period between 2011 and 2020. The second constraint related to the citation analysis of our sample. Citation analysis is retrospective in nature so developments in the business model discipline (as with any discipline) appear in the citation data only after some time has elapsed. However, we suggest that the findings presented in this paper will be very helpful for both academics and practitioners interested in obtaining an insight into the leading trends of business model literature in industrial marketing scholarship.

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