

# Trends in Business Model Research: A Bibliometric Analysis

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## Abstract

**Purpose:** The purpose of this article is to provide an overview of the evolution of the business model research while identifying the leading trends and suggesting future research directions.

**Design/Methodology/Approach:** The study consists of bibliometric analysis, and bibliographic data visualization using the Web of Science (WoS) database, and cluster analysis using the VOSViewer software.

**Findings:** The results reveal the exponential growth of the topic favored within the academic literature. The analysis identified eight clusters of co-words in the field of the business model (BM). Five relevant research trends were identified in which the topic of the business model (BM) would develop in the next years.

**Research limitations:** The analysis focuses on the field of management, business, finance, and economics literature. The paper describes the research activity concerning a bibliometric analysis. Therefore it does not take into consideration the quality of the publications and methodological issues.

**Practical Implications:** This study may serve as a model providing useful information for academic and practitioners to analyze the topic of the business model (BM) within a certain discipline, as well as to identify research areas that need more attention to come up with theoretical and practical implications.

**Originality/Value:** The analysis structures and consolidates the concept of the business model (BM) in the academic research, providing valuable insights. It identifies future themes for the development of the field and its consolidation within the academic and business literature.

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Keywords: Business model research, bibliometrics, co-word analysis, research trends, bibliographic mapping

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## Introduction

Recently, the interest in the business model research has increased significantly (Wirtz, Pistoia, Ullrich & Göttel, 2016). Scholars have studied the subject of the business model (BM) to have a better understanding of the ways that firms operate within the business environment (Magretta, 2002), which is characterized by the rise of the new technologies, the digitalization, and the interconnection between customers and markets (Teece, 2010). The topic of the business model has been analyzed from different perspectives to define, categorize and classify the field within the academic, and the business literature. However, there is still no consensus about the conceptualization of the BM (Fielt, 2013) hence producing multiple definitions, and a lack of theoretical groundings (Teece, 2010; Zott, Amit & Massa, 2011).

Renowned scholars have conducted studies trying to clarify and to get a better understanding of the concept of the BM while analyzing its evolution, its recent developments, and therefore its future research directions. For instance, Osterwalder, Pigneur & Tucci (2005) in their study "Clarifying Business Models: Origins, present, and future of the concept" found a broad diversity of understandings, usages, and places in the firm for the concept of the business model, whilst identifying multiple definitions, and describing the process of execution and its implementation. They proposed a nine business model blocks for its analysis and implementation, as well as the role of the terminology and the ontology to describe the concept of the BM. Teece (2010) argued that the business model is implicitly or explicitly used to design, to deliver value to customers, and to capture value as a profit. He explored the connections between business models with business strategy, innovation management, and economic theory to better understand the significance of business models in established firms. The concept of the business model within the economic theory, strategy and innovation, and organizational literature lack theoretical groundwork. He concluded that getting a better understanding of the topic would benefit a better appreciation of the role of the BM in entrepreneurship, innovation and business performance.

Later, Zott et al. (2011) conducted a literature review about business model literature that revealed that

there is no consensus about its definition. There is different interpretation according to the particular interest, and perspective of each researcher. However, they suggested that employing more precise concepts such as e-business model archetypes, using the BM as an activity system, and as cost/revenue architecture that would allow other researchers to get a better understanding of the meaning of the topic. They suggest taking the BM as a new unit for analysis, offering a systemic perspective to understand how the firms do business, and therefore focus on value creation to move toward a conceptual consolidation.

More recently, Wirtz et al. (2016) conducted a comprehensive qualitative and quantitative literature review through a synoptic analysis, providing an overview of the origins and development of the topic. It includes definitions, perspectives, and its components. They also surveyed twenty-one experts to identify the future focus of business models research. They found that a heterogeneous understanding of the concept by the scholars is gradually uniting into a converging understanding. There is a comprehensive perspective of the concept, and the components are well identified, especially in the areas of innovation, change and evolution, performance and control, and management-process-oriented area of design, at the most advanced current state of development regarding the topic. They stated that the field of research of the BM is at the moment in a consolidation phase. Although, there are gaps in the research, especially regarding the application and theoretical grounding of the concept. They identified future focus, and research directions of the research field, suggesting that innovation, design, and change as the most important themes. In this regard, they stated that the research methodologies for future business model research would be focusing on theoretical deduction, large-scale survey (N>100), case studies, in-depth interviews, and small-scale survey (N<100) based on the responses from the experts interviewed.

Recently, Nielsen, Lund, Montemari, Paolone, Masaro & Dumay (2019) have conducted a structured and systematic literature review to describe the trajectory of the concept of the business model. They analyse the topic in terms of definitions, classification, frameworks, and applications in different sectors and industries, describing the recent developments of the

concept, and its evolution within innovation, entrepreneurship, organizational change and strategy areas, based on the impact of the publications, using the Google Scholar citations, citations per year and citations in the last five year, computing the keywords of “business model”, “business models”, and “business modelling”. They constructed three league tables of the top 100 sources according to three criteria: Google Scholar Citations (GSC), Citations per year (CPY), and Citation in the last 5 years (CI5Y), identifying 79 publications that represent the most impactful work in the field of business model.

Their study consists of five levels of analysis, which includes five dimensions “when”, “who”, “what”, “how”, and “which”. The first level, the dimension of “what” analyses the evolution of the topic, over time-based on the number of papers and citations. The second level, the “who” dimension describes the author demographics, number of publications by author, and the background of the first author, distinguishing between academics and non-academics, the objective of this level is to identify who are the most prominent author in the field. The third and fourth level includes the “what” and “how” dimensions respectively, analyse the research questions, and the research methods used. The fifth level, the “which” dimension, identifies the practical and research implications.

Additionally, they conducted a content analysis, providing valuable insights about the evolution over the time of the concept of business model based on the citations, and citation per year index, identifying the most prominent authors and most cited articles, the authors origin and publication outlets, the business model definitions inclusion over time and themes, the country of origin of the author and theme, types of research questions, and their evolution over time, research method and evolution over time, and practical and research implications within the field. Nielsen et al. (2019) suggest the following research paths for business model, definitions and redefinitions, taxonomies and archetypes for building theory of business model, and the determination of primary areas in which the firm’s key competencies should be developing, the relationship between business model components with the value creation and financial performance. This extensive analysis of provides valuable insights into the state of

the art of the field of business models, identifying that the topic has reached its maturity phase of research.

Nowadays, scholars and practitioners are getting a better understanding, and comprehension of the concept. However, the application of the field still needs to address more research for its improvement and development (Teece, 2010; Wirtz et al., 2016; Christopher Zott et al., 2011). This study attempts to outline the state of the art of the business model research, describing its evolution and development over time and to identify the relationship with other topics and sub-topics, pointing out new areas of application that have emerged within the research field as well as research areas with high potential to be developed within the business model research in the next years. The continuous development of the business environment due to the progress of new technologies, changes in customer behaviors, global markets, and a more interconnected world set a new scenario for the firms, in which the BM has a main role for its competitiveness (Mitchell and Coles, 2003). This situation demands a structured and comprehensive analysis of the current state of business model research, identifying the experts in this research area, methodologies, research questions, demographics, and areas that deserve additional attention (Nielsen *et al.*, 2019).

The applications described above have produced significant advancements, not only for the understanding, definition, and conceptualization of the topic, but also for its classification, implementation, and theory development. It is important to analyze the work done and the recent advancements on the topic. It provides useful information for researchers and practitioners to extensively study the topic within a certain discipline, as well as to identify research areas that need more attention to find theoretical and practical implications, and predict its future directions. Two questions arise based on this occurrence. First, what is the current state-of-the-art of the business model research? Second, what are the main trends and its future directions?

Bibliometrics methods are common in the social sciences literature which helps us to explain the evolution of the research fields, providing an overview of a specific topic (Bjork, Offer and Söderberg, 2014). Other authors conducted this type of studies for the analysis

of journals activity and its impact (Baier-Fuentes, Merigó, Amorós, & Gaviria-Marín, 2018). It shows the evolution of certain topic within the academic literature (Gurzki and Woisetschläger, 2017), and identify the evolution and development of research topics throughout co-citation and co-word analysis (Leung, Sun and Bai, 2017; Zhao, Zhang and Kwon, 2017). A bibliometrics study is useful to identify research trends (Benavides-Velasco, Quintana-García and Guzmán-Parra, 2013) and helps to direct future research in the field of the business model based on bibliographic data.

This study aims to describe the evolution of the BM within the academic literature, providing state-of-the-art research on the topic, and identifying leading trends in the field. In this respect, a bibliometrics analysis is conducted to identify the research activity, the most cited authors, the most productive journals, the institutions and the countries involved on the topic.

For this particular study, the data was collected from the Web of Science Core Collection Database, using the subject of "business model" within management, business, economics, business finance articles and papers published in English between 1994 and 2017. Then, it chooses the five hundred (500) most cited articles to conduct this research. The methodology section explains extensively the criteria and selection process for these articles. The paper consists of four sections. First, it explains the methodology and the data collection process. Second, it presents descriptive statistical information about the research activity of the topic within the subject areas selected. Third, a co-occurrence of keywords, graphic visualization, and cluster analysis is presented to identify the research trend in the field. Finally, the article ends with some conclusions and some practical implications used for further research.

## Methodology

To identify trends in business model research, it was carried out a bibliometric study using the Web of Science (WoS) Core Collection database. It includes the world-leading scholarly literature from 1980 to present. The articles are from the field of sciences, social sciences, arts, and humanities. It used the full citation

network, all cited references, and publications that are fully indexed and searchable. Such a database has traditionally been the main source of scientific evaluation (Baier-Fuentes *et al.*, 2018). The bibliometric analysis provides a general overview of a specific research field (Bjork *et al.*, 2014). The bibliometric methods determine the quantitative and qualitative changes in the subject of scientific research, as well as to help us to identify structural aspects and trends within a specific topic (Rey-Martí, Ribeiro-Soriano and Palacios-Marqués, 2016). For this purpose, it was used the keyword "Business Model" in titles, abstracts, and keywords within the subject areas of management, business, economics, and business finance. The articles and papers published were in English. The period selected for this analysis started in 1994, when the topic became popular and publishing activity increase, until 2017. It was found a total of 1509 articles as a result following these criteria. Out of this total, it is selected the five hundred (500) most cited articles for the analysis, which describe the current state-of-the-art of business model research.

The carried out bibliometric analysis contains two main phases. First, a general descriptive statistical information was presented based on the bibliographical data collected, describing the evolution of the publication activity, the top journals in the field, the most relevant authors, and the most productive organizations, and countries. Second, a cluster analysis was carried out using the VOSViewer software developed by van Eck & Waltman (2010), constructing and visualizing networks of the co-occurrence of keywords which examine the relatedness of items based on the number of documents in which they occur.

The visualizations represented by a network of elements, in which the size of the circles varies according to the importance of the elements regarding the number of links and its link strengths, shows the closeness of the link between elements. The colors and placement of the circles are used to cluster the items. It also performed an in-depth analysis of the co-occurrence of keywords throughout a network, density, and overlay visualizations. Finally, a clusters analysis was carried out based on these data to identify the currently developed research areas and potential research trends that could be developed in the next years.

## Results

### Evolution of Business Model Research

This section presents the main results of the bibliometric analysis applied to the records found in WoS for the business model research between 1994 and 2017. The search process was conducted in May 2018 selecting the five hundred (500) most cited documents for the analysis.

The field of the business model (BM) within the academic literature has grown exponentially in the last years. The first appearances of the topic in an academic article dates from 1957 (Bellman, Clark, Malcolm, Craft and Ricciardi, 1957), and in an article by Jones (1960). The topic has become very popular three decades after the publications of these articles with the advent of the Internet in the business world, the rise of high-technology companies, and the “dotcom” boom (Osterwalder, Pigneur and Tucci, 2005). Figure 1 presents the number of studies published between 1994 and 2017 showing a high increase of interest on the topic by the scholars, and the increase in the number of publications. Note that during the 1990s, the publication activity was quite low, producing between 1 to 5 articles per year. However, in the following years, the number of publication started to increase. In 2010, the journal

*Long Range Planning* (LRP) published a special issue on business models. It includes business model foundations, definitions, approaches and its application in the new business era, discussed by Baden-Fuller and Morgan, Teece, Casadesus-Masanell and Ricart, Amit and Zott, Demil and Lecocq, McGrath, Gambardella, and McGrahan. Others recognized authors within the field promoted the investigation on the business model (BM) from a scientific sense, suggesting a topic of discussion for its development. The special issue of LRP provokes popularity of the topic, attracting the interest of other scholars on the research of the BM. Since that date, the number of publications increased significantly, becoming a unit of analysis within the academic and business literature.

Nowadays, the special issue on the business model of LRP includes the most cited authors and the most popular articles within this research field. They have contributed to the increase of the interest in the topic, promoting its development and understanding from a theoretical and practical perspective. Since then, the number of publications has increased with an average growth rate of 28,2% annually. The increasing of publications has been even more significant in the recent years, obtained by a total number of publications of

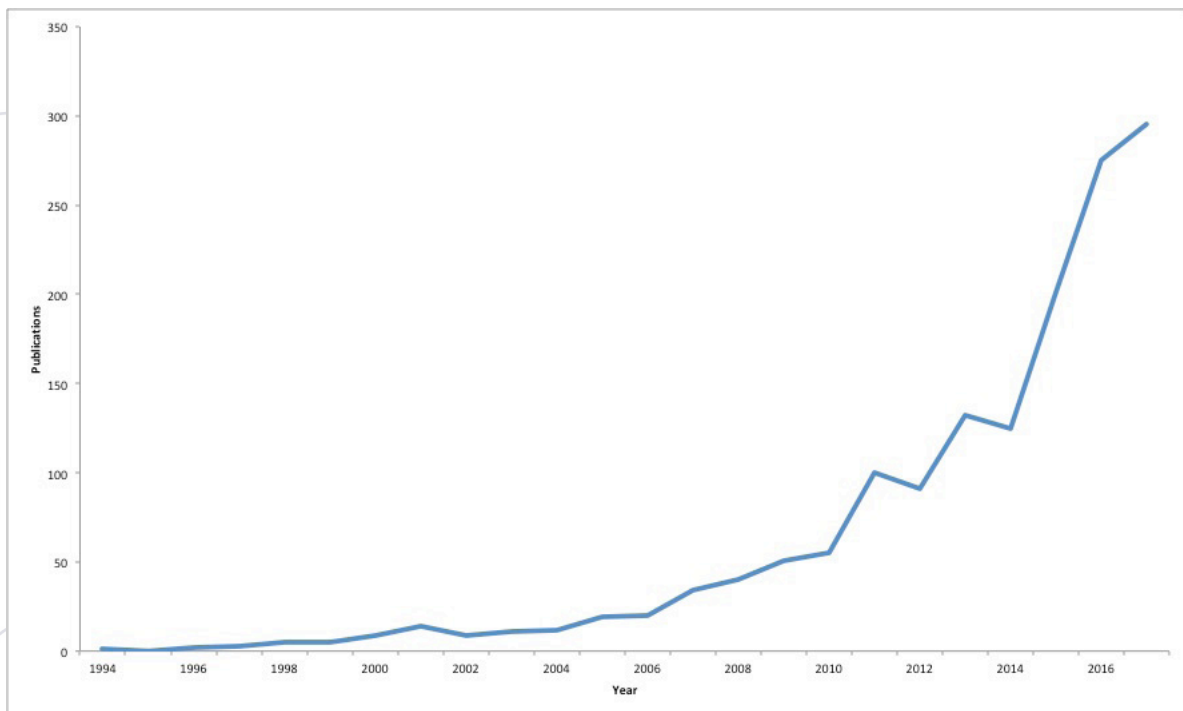


Figure 1. Publication activity documents by year, 1994 – 2017 (Web of Science Core Collection, May 2018).



201 in 2015, 275 in 2016, and 295 at the end of 2017 as shown in table 1. From 2014 to 2017 the number of publications has increased by 136%, and it tends to continue growing in the next years.

Year	Documents	Year	Documents
1994	1	2006	20
1995	0	2007	34
1996	2	2008	40
1997	3	2009	51
1998	5	2010	55
1999	5	2011	100
2000	9	2012	91
2001	14	2013	132
2002	9	2014	125
2003	11	2015	201
2004	12	2016	275
2005	19	2017	295

**Table 1: Publication Activity documents by the year 1994 - 2017**

This increasing interest in the field has caused that many recognized journals now include the topic in their regular and special editions. Table 2 shows the most productive journals on the subject of the BM based on the number of publications and citations received. The *Journal of Cleaner Production* (31 documents), *Long Range Planning* (21 documents), *Industrial Marketing Management* (19 documents), and *R&D Management* (13 documents) are the most productive. Regarding the number of citations, the most influential journals are the *Long Range Planning* (4361 citations), *Strategic Management Journal* (2434), *Harvard Business Review* (1692), *Journal of Cleaner Production* (1174), and *Industrial Marketing Management* (1019) respectively. Note that the journals include diverse disciplines such as production, marketing, strategy, and management.

Regarding the most relevant authors, Table 3 shows the most productive authors based on the number of publications, as well as the degree of influence that they have within the BM community. The number of citations and citation analysis determined the times that they cited each other. Regarding productivity, Zott, C. (10 publications), Amit, R. (9 publications), Chesbrough, H. (6) Bocken, NMP (6), Ricart, J.

JOURNAL	DOCUMENTS	CITATIONS
Long Range Planning	21	4361
Strategic Management Journal	7	2434
Harvard Business Review	12	1692
Journal of Cleaner Production	31	1174
Industrial Marketing Management	19	1019
Research Policy	10	703
California Management Review	10	609
Journal of Business Research	12	575
Technovation	12	453
MIT Sloan Management Review	7	410
International Journal of Information Management	10	322
Organization & Environment	6	299
Entrepreneurship Theory and Practice	5	272
Management Decision	6	270
European Management Journal	6	234
R&D Management	13	213
Technological Forecasting and Social Change	12	203
Strategic Organization	5	194
Strategic Entrepreneurship Journal	9	158
Business Strategy and the Environment	7	143
Journal of Management Information Systems	6	119
International Journal of Technology Management	7	95

**Table 2: The most productive journals in the field of business model research from the 500 more cited articles**

E.; Casadesus-Masanell, R. (5) and Christensen, C. M. (5) are the most productive authors. Some of them are also the most cited authors within the field of business model research. The authors Zott, C. (3264 citations), Amit, R. (3235), Chesbrough, H. (1934), Ricart, J.E. (544), Casadesus-Masanell, R. (525), Christensen, C. M. (502) have received more than five hundred (500) citations. Note that some of them are co-authors of their studies.

AUTHORS	DOCUMENTS	CITATIONS
Zott, C.	10	3264
Amit, R.	9	3235
Chesbrough, H.	6	1934
Bocken, NMP	6	342
Ricart, JE	5	544
Casadesus-Masanell, R.	5	525
Christensen, CM	5	502
George, G.	4	374
Ludeke-Freund, F.	4	323
Xu, X.	3	487
Lecocq, X.	3	321
Evans, S.	3	273
Spring, M.	3	212
Mangematin, V.	3	179
Haefliger, S.	3	156

**Table 3: The most relevant authors in the field of business model research from the 500 most cited articles**

Institutions also focused on the development of the topic. Table 4 presents the most productive institutions (20) according to the number of publications. The institutions with the highest number of documents published in the bibliographic data sample are the University of Cambridge (19), Harvard University (16), the University of Pennsylvania (14), Delft University of Technology (12), the University of California Berkeley (11), and Aalto University (11 publications). Moreover, the most influential institutions on the topic of the business model (BM) based on their number of citations are the University of Pennsylvania (3843 citations), the University of California Berkeley (2400), Harvard University (2304), INSEAD (2257), and the IESE Business School (1619). Other influential institutions with a significant amount of citations are the University of Cambridge (795), Cranfield University (690), the University of London Imperial College of Science, Technology, and Medicine (589), and Erasmus University (474).

Regarding the countries and regions, Table 5 shows the most productive countries according to their number

INSTITUTIONS	DOCUMENTS	CITATIONS
University of Cambridge	19	795
Harvard University	16	2304
University of Pennsylvania	14	3843
Delft University of Technology	12	280
University of California Berkeley	11	2400
Aalto University	11	202
INSEAD	9	2257
IESE Business School	8	1619
Lappeenranta University of Technology	8	157
Politecnico di Milano	7	375
Aarhus University	7	72
University of London Imperial College of Science, Technology, and Medicine	6	589
Cranfield University	6	690
Erasmus University	5	474
Bocconi University	5	111
Grenoble Ecole de Management	5	269
The University of St. Gallen	5	116
Lund University	5	321
Hanken School of Economics	5	320
National University of Singapore	5	56

**Table 4: The most productive institutions within the field of business model research from the 500 most cited articles.**

of publications, and citations. In this regard, the USA and England are the most productive countries with 145 and 80 documents published respectively, followed by Germany (55), China (41), Netherlands (37), France (36), and Finland (33). Regarding influence based on the number of citations, the most influential countries in the topic of business model are the USA (14363), France (4693), England (3853), Spain (2354), and Germany (2194).

COUNTRIES	DOCUMENTS	CITATIONS
USA	145	14363
England	80	3853
Germany	55	2194
China	41	894
Netherlands	37	1318
France	36	4693
Finland	33	1048
Italy	30	914
Spain	29	2354
Sweden	28	939
Canada	23	840
Switzerland	18	584
Denmark	16	351
Australia	16	478
South Korea	15	578
Belgium	11	634
Brazil	11	230
Norway	9	145
Austria	9	234
Taiwan	5	384

**Table 5: The most productive countries within the field of business model research from the 500 most cited articles.**

## Mapping Business Model Research

To identify the trends of business model research, it is conducted a co-word analysis, using the VOSviewer software to create network visualization maps. First, the co-occurrence of keywords allowed us to identify the current state-of-art of the topic, identifying the most relevant research themes within the field. Then throughout density and overlay visualizations, it identified the most developed keywords within the field and others that might need more attention and development. Second, a cluster analysis was carried out based on the co-occurrence of keywords, which helps us to identify research trends.

The co-occurrence of keywords map determines the number of documents in which they occurred together in titles, abstracts, and keywords. Figure 2 shows this network relation according to the number of links and total link strength. The graphic represents the keywords with circles and their connections with curved lines, clustering the items in different colors. The size

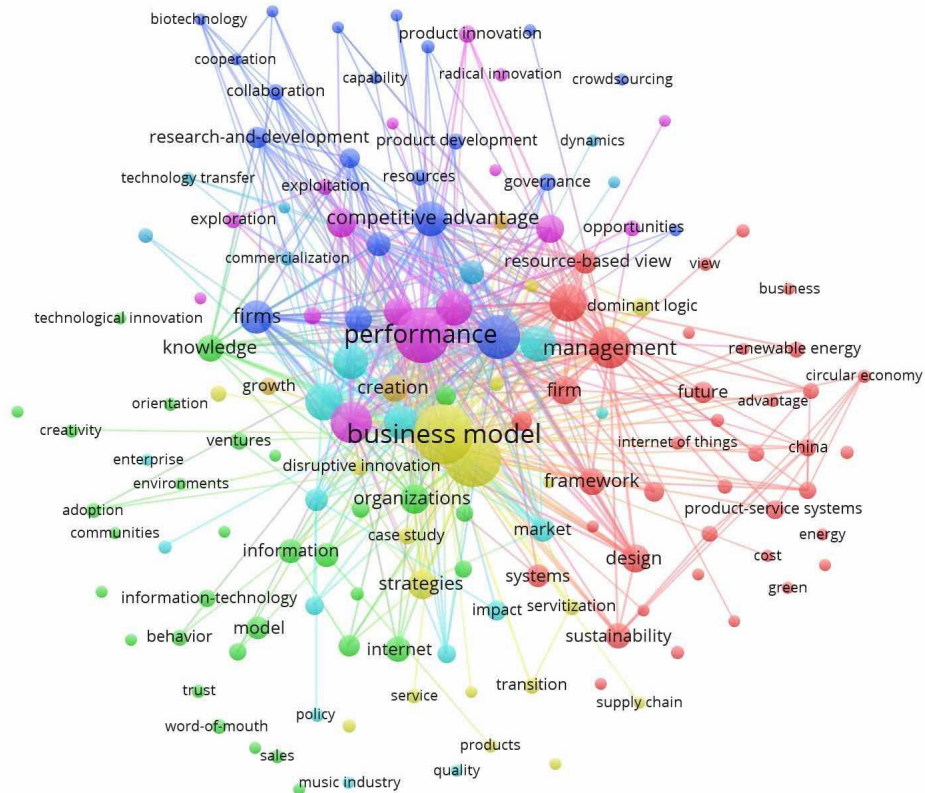
of the circles represents the total link strength of the keyword. Figure 2 shows the most relevant topics within the business model research and their influence on other topics. According to this first map, the keywords of innovation, performance, strategy, management, perspective, value creation, industry, and business model innovation are the keywords with the most occurrences, and with high link strength.

Table 7 shows the list of the most linked keywords within the business model research. It shows the

Keywords	Cluster	Links	Total Links	
			Strength	Occurrences
Business Model	4	135	725	127
Performance	5	126	690	108
Innovation	4	136	655	118
Strategy	3	109	422	69
Management	1	115	386	62
Perspective	5	102	377	61
Value creation	5	106	350	48
Industry	6	105	304	51
Business Model Innovation	1	108	302	50
Competitive advantage	3	86	286	42
Technology	6	89	280	42
Entrepreneurship	6	93	275	45
Firms	3	88	269	41
Firm	5	74	225	32
Performance				
Business Models	6	85	214	41
Dynamic capabilities	5	79	183	28
Organizations	2	84	180	31
Design	1	65	178	29
Capabilities	5	70	176	28
Knowledge	2	74	172	27
Firm	1	73	169	29
Strategies	4	74	168	32
Creation	8	73	168	25
Resources-based view	1	64	142	22
Framework	1	73	141	26

**Table 7: The most used keywords in business model research.**





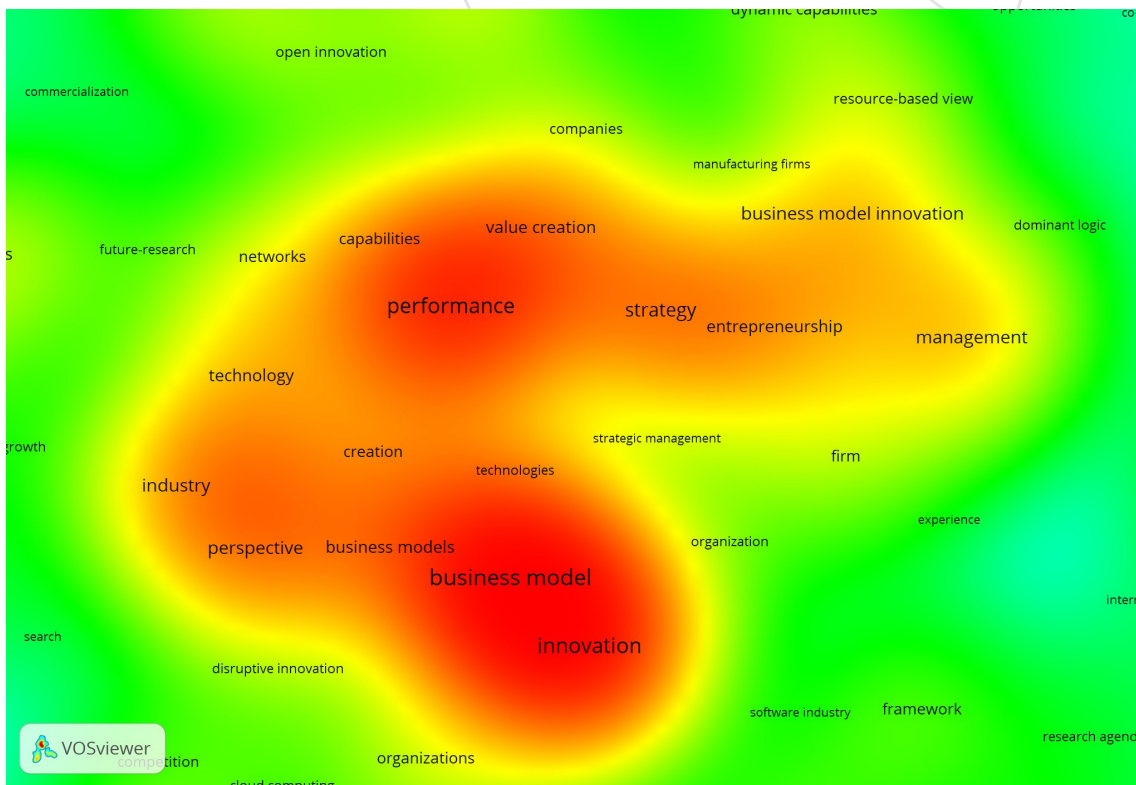
**Figure 2: Co-occurrence of keywords network visualization of business model research.**

number of links, occurrences, and their total links strength. Keywords such as performance, innovation, strategy, management, perspective and value creation are the top themes in research field. A high number of occurrences of the keyword of the BM, and also a higher total link strength developed in the last years, means that they have a high influence on other topics related to this research field. Other relevant keywords are business model innovation, competitive advantage, technology, entrepreneurship, and firm performance. Note that, resource-based view and dynamic capabilities are the main theories linked with the topic.

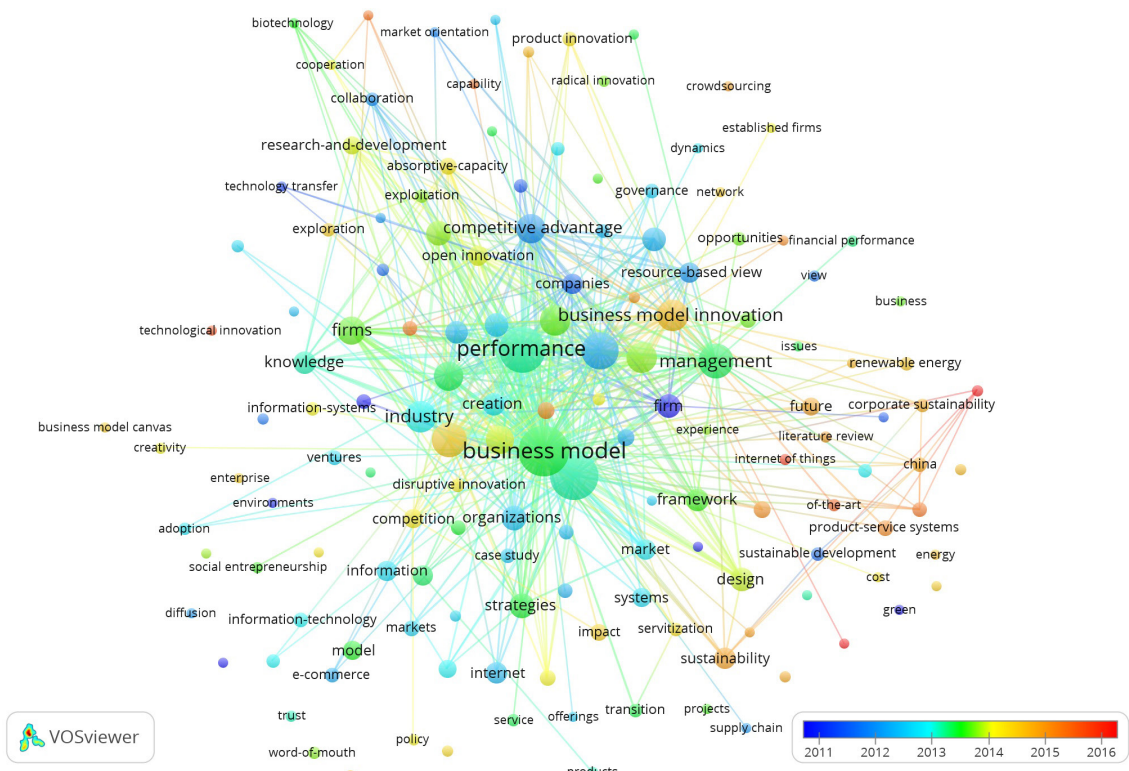
Figure 3 shows the density visualization of the co-occurrence of keywords. The development of the topic has been related to innovation and performance themes. Although it expanded to other topics such as entrepreneurship, strategy, value creation, technology, and business model innovation. However, some

developed topics within the field will need more attention for its development and research. For instance, the development of the topic into theoretical groundings such as resource-based theory, dynamic capabilities, knowledge-based view, system theory, open innovation, and service dominant-logic. Appendix A shows the zoom out of the map and hypothetical research direction. Based on the density visualization, the business model research focused on the development of information-systems, sustainability, renewable energy, social entrepreneurship, e-commerce, and technology.

The overlay visualization classified the network connections based from 2011 to 2016. Figure 4 (a) shows the co-occurrence of the keywords over this period and the most recent developments of the BM within other topics. As it can be observed, the keywords associated with the topic in the last years have been in business model innovation, sustainability, renewable energy,



**Figure 3: Business model research co-occurrence of keywords density visualization**



**Figure 4: Co-occurrence of keywords overlay visualization of BM research**

and innovation. However, if zooms in the graph, it is possible to identify the most recent themes associated with business model research such as circular economy, sustainable business models, and the Internet of things (IoT) as the most recent topics associated within the field. Appendix B shows the detailed zoom in maps.

These visualizations provide an overview of BM research development, identifying the most relevant keywords that co-occurred within the field in recent years. This information allows us to detect research trends of the topic, and research themes that would need more attention.

## **Trends and future directions of Business Model Research**

Based on the co-occurrence of keywords data, it was carried out a cluster analysis. Eight clusters were identified and classified according to the number of links, and its link strength. To identify the research trends, it focused on the high potential topics/items to be developed (as an emerging topic) instead of those with a higher number of links, and link strength developed within the BM literature. Table 6 summaries these clusters and their items. Based on the cluster analysis, and the visualization networks, five main research trends were identified on the topic: Business Model Innovation and Sustainability, Emerging Digital Technologies, Manufacturing and Industry 4.0, Social Entrepreneurship, and Theory development.

### **Business Model Innovation (BMI) and Sustainability**

Business model innovation (BMI) is one of the most co-occurrence keywords within the topic of the BM. The topic of BMI has become very popular within the BM community researchers. One of the first and most relevant studies on this topic is by Chesbrough (2010), who suggest that BMI is a new type of innovation besides the technological process product and organizational innovation. Mitchell & Coles, (2003, 2004) defined and described BMI as the process of changes, improvements, and replacements in more than one business model elements. Another relevant study made by Zott and Amit (2010) describes that the BMI is the process

to add novelties, link activities, and change one or more parties to the BM. The development of the topic also included conceptual frameworks (Bucherer, Eisert & Gassmann, 2012; Wirtz & Daiser, 2017), case studies for its application (Cortimiglia, Ghezzi & Frank, 2016; Sivertsson & Tell, 2015), research agendas (Schneider and Spieth, 2013), and theoretical foundations researches (Fu, Qiu and Quyang, 2006).

It has to consider the issue of BMI as an extension of the BM literature. However, the sustainability issue has emerged from this analytical perspective of the BM, and business model innovation (BMI). The research topic consists not only exploring the sustainability itself, but also the sustainable business models analysis (Schaltegger, Freund & Hansen, 2012; Schaltegger, Hansen & Lüdeke-Freund, 2016), sustainable development (Schaltegger, Freund and Hansen, 2012), and sustainable innovation (Boons and Lüdeke-Freund, 2013). It suggests more attention on the green business models and renewable energies as shown in the co-occurrence of keywords findings. Scholars should continue focusing on this issue, due to the need for more efficient usage of the resources, and an impact reduction on the environment.

Themes such as circular economy will appear more frequently in the business model research, due to the need of shifting to more sustainable and responsible production processes. Based on the establishment of closed production systems, reusing resources and keeping in a loop of production and usage. The companies need to adapt to their existing BM or to create a new one, which will allow reducing the waste, and being environmentally friendly (Urbinati, Chiaroni and Chiesa, 2017). Business models will link to this discussion as a mechanism to adopt a circular economy and other types of sustainability modes.

### **Business Model and Emerging Digital Technologies**

The technological advancements, especially on Information and Communication Technology ICT and Information Systems, have produced new business models. Recently, the interest of research on this phenomenon has increased, and it will continue in the next years. Topics such as e-service, e-commerce, internet-based business models, social commerce (s-commerce), and

Clusters	Keywords
Cluster 1	Advantage, business, <i>business model innovation</i> , challenges, China, circular economy, corporate social responsibility, corporate social responsibility, corporate sustainability, cost, <i>design</i> , economics, energy, financial performance, <i>firm</i> , framework, future, green, internet of things, issues, literature review, <i>management</i> , of-the-art, operations management, organization, product-service systems, projects, renewable energy, research agenda, resource-based view, stakeholders, supply chain management, sustainability, sustainable business model, sustainable business models, sustainable development, sustainable innovation, systems, view
Cluster 2	Adoption, behaviour, business model canvas, cloud computing, communities, creativity, decision-making, determinants, diffusion, e-commerce, entrepreneurs, environments, information, information technology, information-technology, integration, internet, <i>knowledge</i> , model, online, <i>organizations</i> , orientation, product, sales, search, services, software, technological innovation, technologies, trust, ventures, word-of-mouth
Cluster 3	Absorptive-capacity, ambidexterity, biotechnology, capability, co-creation, collaboration, <i>competitive advantage</i> , cooperation, competition, crowdsourcing, <i>firms</i> , governance, market orientation, networks, open innovation, product development, research-and-development, resources, strategic flexibility, <i>strategy</i> , value appropriation
Cluster 4	<i>The business model</i> , case study, consumers, disruptive innovation, dominant logic, information-systems, <i>innovation</i> , manufacturing firms, offerings, products, service, servitization, social media, software industry, strategic management, <i>strategies</i> , supply chain, transition
Cluster 5	<i>Capabilities</i> , complementary assets, <i>dynamic capabilities</i> , established firms, exploitation, exploration, <i>firm performance</i> , future-research, opportunities, organizational learning, organizational change, <i>performance</i> , <i>perspective</i> , product innovation, radical innovation, <i>value creation</i>
Cluster 6	<i>Business models</i> , competition, enterprise, <i>entrepreneurship</i> , evolution, experience, impact, <i>industry</i> , market, markets, music industry, policy, quality, social entrepreneurship, <i>technology</i>
Cluster 7	<i>Commercialization</i> , <i>companies</i> , dynamics, intellectual property, network, start-ups, technology transfer
Cluster 8	<i>Creation</i> , fit, growth

Source: VOS Viewer co-occurrence of keywords analysis made by the author. The italicised keywords are those that have the highest total link strength and number of links.

**Table 6: Clusters of the keywords co-occurrence using association strength method**

software as a service (SaaS) started to being linked within the business model research to get a better understanding of those new e-businesses (Koh and Kim, 2004). The emerging technologies and new customer behaviors demand new ways of operating, and successful business models are needed to provide services to the trustworthy customer (Kim and Park, 2012). In the context of a new digital era and the widespread of digitization of businesses and society, the BM has become critical for business success, and a focus for academic inquiries (Veit, 2014).

The emerging technologies such as cloud computing in the online information services have changed the traditional online web services. In cloud computing, the data or software are in the cloud, producing new

e-services and products that need a successful BM. Future research on cloud-based services should continue to make out their characteristics, understanding, applications, improvements, and development (Lian, 2015; Gangwar and Date, 2016).

Besides the new way of the firms operations, also new ways of consumption have appeared to take advantage of this new technological context. Services such as transportation, music, accommodation, have developed into online platform-based business models supported by advertisement (Yun, Won, Park, Yang and Zhao, 2017). For instance, regarding the music consumption, in the past, free and illegally was nearly synonymous. The new streaming, free and paid options, which are advertising-supported, has broken this dichotomy, and



there is a transition from free-illegally to paid-legal. However, this also implies changes in the way of operations and collaboration, such as the artists revenues, platform attributes, quality of the sounds, copyright of use, etc. (Weijters, Goedertier and Verstreken, 2014). Further research will be needed to identify the characteristics, applications, and implications of these new business models in different context and industries, and how companies should adapt their operations and strategies to new digital consumers, and exploit their business opportunities.

### **Business model and Manufacturing (Industry 4.0)**

The emerging technologies and its implementation in the manufacturing processes lead to changes in the companies BM, modifying the way that the companies produce and commercialize their products and services (Chesbrough, 2007; Gerlitz, 2016; Schwab, 2016). Internet of things (IoT), robotics, big data, artificial intelligence (AI), virtual reality (VR), and so on, changed the way that companies structure their operations, and hence, their business models. The business model research and scholars started to examine how the new technologies in the context of Industry 4.0 impact on the companies BM. For instance, a study by Arnold, Kiel & Voigt, (2016) explore the influence of Industrial Internet of things (IoT) in different industries and sectors in Germany, finding that companies are facing different changes in their BM, such as workforce qualifications. Within the new business context, as well as the importance of novel key partners networks, due that the way of collaboration has changed in smart manufacturing processes environment.

Technologies such as Big Data and digitalization also enabled an innovative business model (Boyd and Crawford, 2012; Brynjolfsson and McAfee, 2014), or reshaped the current one. Manufacturing is continuing to automate and uses robots for its efficiency and productivity, which have a direct impact on employment and labor structures. In the next years, the BM should focus on this matter, especially in how the introduction of these new technologies will transform the current business models and workforce in term of cognitive tasks, and its impact on business and society (Loebbecke and Picot, 2015).

### **Business model and Social Entrepreneurship**

The topics of entrepreneurship and start-ups are linked with the BM, providing tools, frameworks and guidance for its design (Osterwalder and Pigneur, 2010; Gronum, Steen and Verreynne, 2015), and supporting entrepreneurs in transforming innovative ideas into profitable businesses (Cruz, Pimenta, Azevedo Carvalho and Maciel, 2016). Particularly, social entrepreneurship has emerged as a new BM that combines a social goal with a business mentality, which allows creating social innovations and value through sustainability (Witkamp, Raven & Royakkers, 2011). This trend within the business model research has attracted the interest of many scholars to acquire a better understating of the topic, identifying theoretical and practical implications, and limitations.

The social issues demand a new way to be solved in this century (Wilson and Post, 2013). The entrepreneurial orientation has become a new mechanism to mitigate some of these social problems, especially in developing countries throughout the sustainable business model. Social entrepreneurship produced a new market-based ecosystem at the base of the pyramid, which involves new challenges, and different strategic actions (Goyal, Sergi and Jaiswal, 2016). New actors such as social entrepreneurs, and for-profit social enterprises emerged, further research is needed within the business model literature for getting a better understanding of the inclusive BM, and market challenges such as ethical dilemma, market failures, and imperfection, quantifying the social, economic impact of these initiatives (Goyal *et al.*, 2016). The entrepreneurship topic will continue to develop into the research field, but with a certain emphasis on other types of entrepreneurs, such as social and corporate entrepreneurship.

### **Business Model and Theory development**

The major advancements in the field of business model research occurred just in the last two decades. The topic developed exponentially and became very popular within the business and academic literature. However, this research stream still needs theoretical development. The studies conducted have identified different theories in which the topic could be expended for its consolidation. Theories such as innovation and strategic management, resource-based theory, dynamic



capabilities, institutional theory, knowledge-based view, absorptive-capacity, system theory, contingency, and value creation theory among others have been proposed for getting a better understanding of the business model (BM), and for its development within the academic literature (Amit and Zott, 2001).

Resource-based theory and dynamic capabilities (DC) are the two main theories in which the business model research thrived in the recent years based on the bibliographic data, and according to the co-occurrence of keywords. Taking into account that BM structures and organizes their activities and their processes to create, deliver and capture value (Osterwalder and Pigneur, 2010; Teece, 2010; Amit and Zott, 2012), the resource-based view theory perfectly matches for the theoretical development of the BM. Such theory argues that value is created from unique combinations of resources from the value creation Schumpeterian perspective (Barney, 1991), and consider the firm as a bundle of complementary and specialized resources and capabilities, which are heterogeneous within an industry, scarce, not easily traded and hard to imitate (Peteraf, 1993).

From this perspective, the BM would be a valuable resource, and a capability of the firm for creating and capture value, reducing firms costs and increasing their revenues (Barney, 2013). This capability is also interpreted as a firm's differentiation strategy for achieving sustainable competitive advantage compared with the competitors that would not have these abilities or resources. The holistic approach of the topic can help create competitive advantages reducing the imitability since it is more difficult to imitate a BM rather than a product or service in a certain period of time (Chesbrough, 2007; Kindström, 2010). Moreover, specific resources and capabilities will be needed to design, and innovate business models (Kindström and Kowalkowski, 2014). The assumption within this theory is that, even in equilibrium, the firms have different resources and capabilities that they control until some exogenous changes occur, which demand the adaptation or creation of new business models.

Dynamic capabilities (DC) is an extension of the resource-based theory (Teece, Pisano and Shuen, 1997). The BM has been analyzed based on DC focusing on the processes of value creation, product development,

strategic decision-making, alliances, knowledge creation, and their transfer of capabilities. Specifically, the process of business model innovation can be conceptualized as a distinct dynamic capability for exploiting business opportunities and the capacity of the firm to develop valuable and unique BM, and reconfigure the firms competencies and resources accordingly (Mezger, 2014). The changes in the business environment and the emerging technologies require a BM based on the application of competencies and dynamic capabilities to select and apply appropriate resources (Cautela, Pisano and Pironti, 2014). Managerial DC will play a central role to adapt and transform business models, improving the firms performance at the organizational and strategic level (Basile and Faraci, 2015). The bibliographic data shows that the theory development of the field will be a priority for the consolidation of the topic. Besides resource-based theory and dynamic capabilities, other theories will be helpful in the search of theoretical groundings such as system theory (Wei, Yang, Sun and Gu, 2014), contingency theory, transaction cost (DaSilva and Trkman, 2014), knowledge-based view (Bathelt, Kogler and Munro, 2010; Gambardella and McGahan, 2010; Van der Borgh, Cloudt and Romme, 2012; Souto, 2015; Yun, Yang and Park, 2016), etc. The business model literature still is in a developing phase, which brings many opportunities and future directions for theoretical development and empirical investigations.

## Conclusion

The literature on the business model is growing in a variety of fields such as strategy, innovation, value creation, information systems, organization theory, marketing, economics, sustainability, entrepreneurship, etc. The topic is considered to be in a developing and consolidation phase regarding conceptualization, typologies, frameworks, applications, and the continuous theory development around the field. The methods used to describe and analyse this research stream is diverse in conceptual and empirical approaches, allowing scholars to examine business models from a heuristic approach, analyzing the antecedents and consequences for value creation, firm focal performance, industry structures, competitive dynamics, technological development, and societal wealth (Demil, Lecocq, Ricart and Zott, 2015).

The paper aimed to analyze the evolution of the business model research identifying its potential research directions. The bibliometric analysis conducted based on the bibliographic data mapping demonstrated that the topic had grown exponentially in the last two decades, and its study has been included in diverse disciplines and research issues. The most notable fields are related to innovation and strategy, sustainability and green business, technological and digital development, entrepreneurship, and theory development. The bibliographic data showed that the most influential institutions are in the USA, the UK, and in Europe, and the most productive journals within the field focus on strategic management, innovation, and clean production. Regarding the authors, the most influential ones affiliate themselves with top worldwide-recognized business schools in the fields of business and strategy. The research trends show that the topic will be developing into sustainability and clean production issues as well as the digitalization and information systems developments that will be leading to the creation of new business models.

The study highlights the resource-based view and dynamic capabilities as the suitable theoretical perspectives, in which the scholars have studied the topic for its development. However, business models can be linked with other conceptual frameworks and theories that would allow to get a better understanding of the topic and to advance in its consolidation such as knowledge-based view, transaction cost, and system theory. It will be needed to continue the theory development of the

field with further conceptual and empirical research, drawing attention to the methodological issues. The co-occurrence of keywords analysis and visualization suggest potential research directions that would also be influenced by other business and technological trends, and by the interest of each institution, author or journal.

However, this study has some limitations. Firstly, it is limited to specific subject areas of management, business, finance, and economics published in the Web of Science database. Secondly, the co-occurrence of keywords and citation activity is based only from on the five hundred (500) most cited articles within the total records, providing a limited number of clusters and significant keywords. However, it has to be cautious to generalize the conclusions. Nevertheless, the descriptive statistical information and graphical maps provide valuable insights about the current state-of-the-art of the topic, its evolution, and future directions. For further researches, it would be necessary to consider the quality of the publications and methodological issues used. It would be interesting to analyze in depth each relevant topic concerning the business model research, or to employ a bibliometric study on a certain journal that complements this study with other mapping techniques (e.g., co-citation, bibliographic coupling analysis) providing a systematic description of the structure of the field. The article tries to provide insights to structure and consolidate the topic within the academic literature, identifying research themes for its future development and consolidation.

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## Appendix A

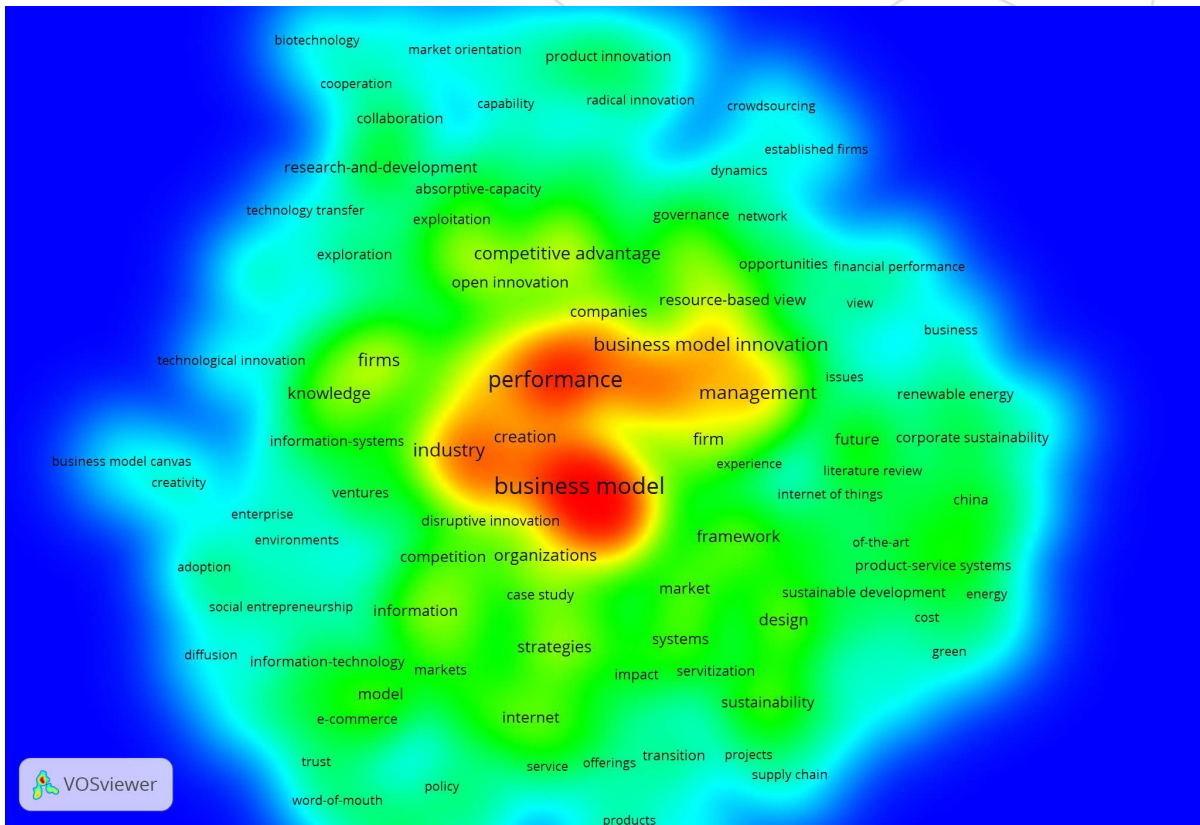
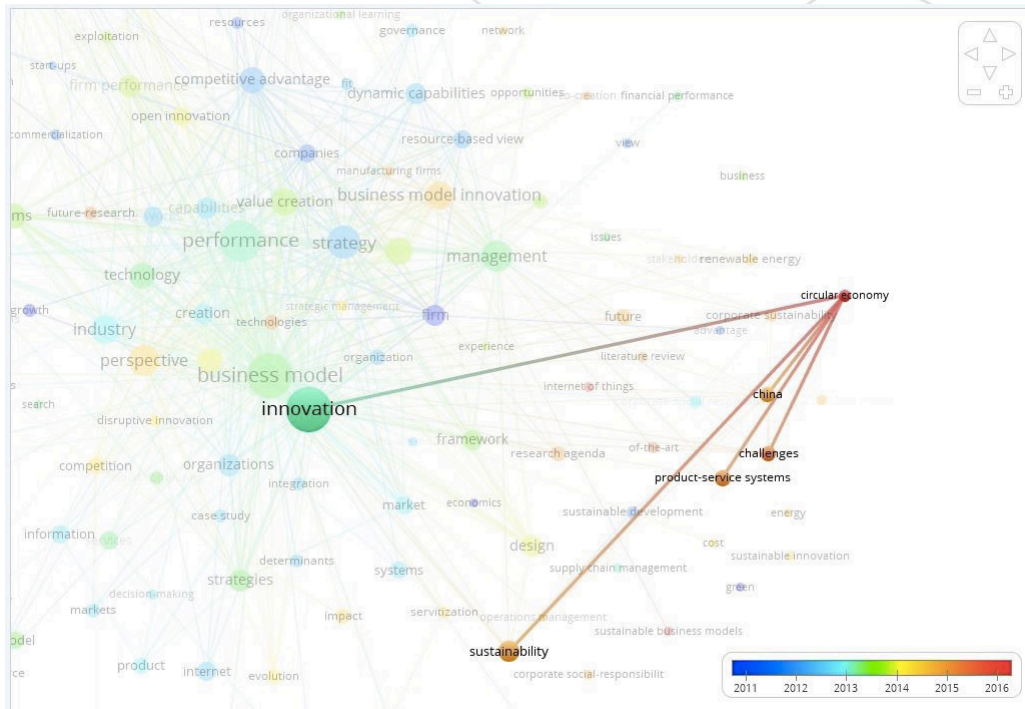
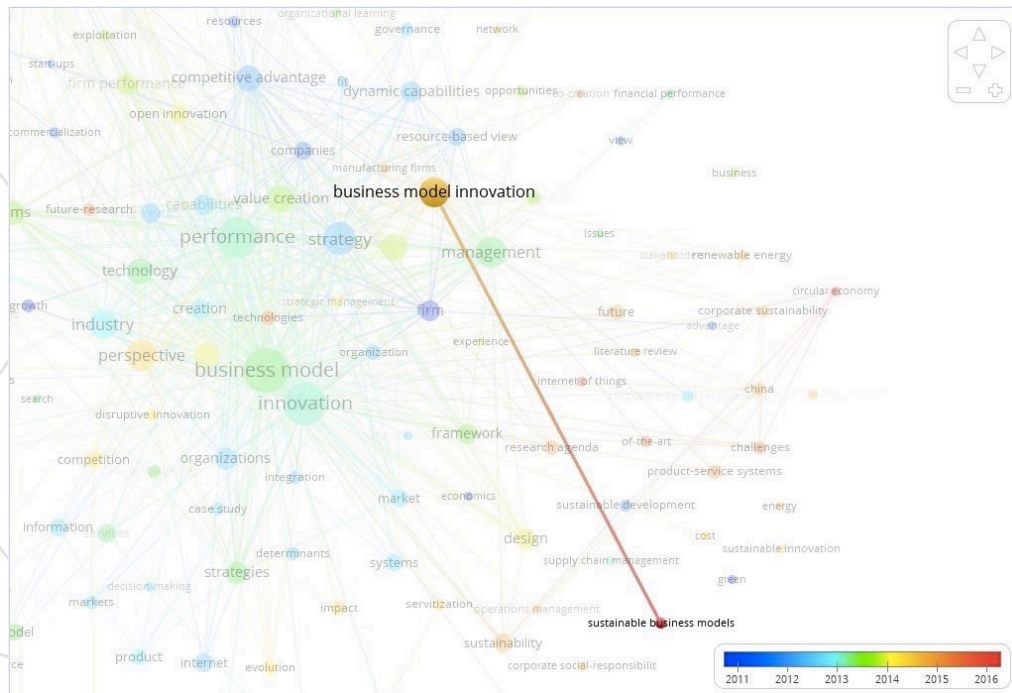


Figure A.1: Expansion of BM research and hypothetical research direction (VOS Viewer visualization)

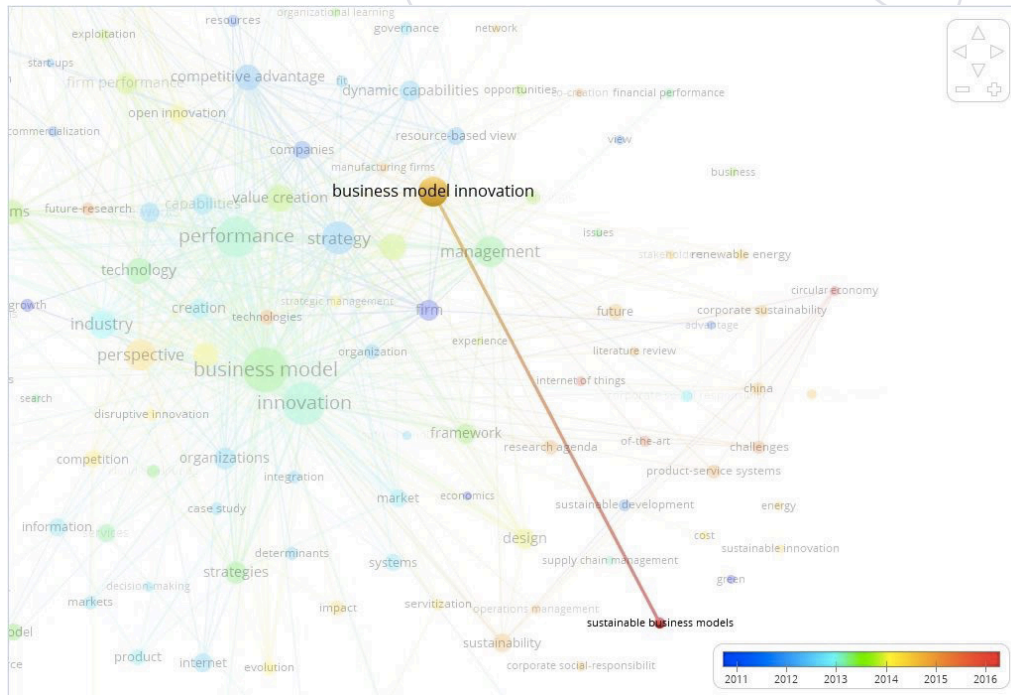
## Appendix B



**Figure B.1: More recent keyword associated with the business model: Circular economy (VOS Viewer visualization)**



**Figure B.2: More recent keyword associated with the business model: Sustainable business models (VOS Viewer visualization)**



**Figure B.3: More recent keyword associated with the business model: Internet of things (VOS Viewer visualization)**



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