

## Research Article

# Review on the Relationship of Absorptive Capacity with Interorganizational Networks and the Internationalization Process

**L. F. Agramunt,<sup>1</sup> J. M. Berbel-Pineda,<sup>2</sup> M. M. Capobianco-Uriarte ,<sup>3</sup> and M. P. Casado-Belmonte<sup>3</sup>**

<sup>1</sup>Faculty of Economic Sciences, Universidad Nacional del Litoral, Moreno 2557, S3000CVE Santa Fe, Argentina

<sup>2</sup>Department of Business Organization and Marketing, Faculty of Business Studies, University of Pablo de Olavide, Carretera Utrera, Km. 1, 41013 Seville, Spain

<sup>3</sup>Department of Economics and Business, University of Almeria, Carretera de Sacramento, s/n, 04120 La Cañada, Almería, Spain

Correspondence should be addressed to M. M. Capobianco-Uriarte; mercedescapobianco@ual.es

Received 12 November 2019; Revised 29 January 2020; Accepted 1 February 2020; Published 21 March 2020

Academic Editor: Ana Meštrović

Copyright © 2020 L. F. Agramunt et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

There is evidence about the international competitiveness of Small and Medium Enterprises having a close relationship with their absorptive capacity and internationalization networking, and for that reason, it is relevant to find out the main trends in this field of knowledge. The objective of this study is to provide a bibliometric analysis of the status of the existing research in the field to recognize main topics and help identify research gaps. This study was done through a review of 1,710 documents published about this relationship from the Scopus and Web of Science databases (1994–2018), using as processing software application that employs two combinations of terms associated with Boolean operators. This was taken into account in order to optimize the accuracy of the search and to facilitate large data capture. The results show that these studies are in a period of high production and concentrated in a few countries and researchers' networks in the United States, the People's Republic of China, and some European countries. Moreover, the trend words used by researchers are those which link absorptive capacity with networking, open innovation, and firm performance.

## 1. Introduction

During the current century, the business's environment shows CEOs, entrepreneurs, researchers, and even politicians that firm's international competitiveness depends basically on innovation [1–10]. This is why it is obvious that the focus is placed on how to help firms and in consequence to increase national growth. While SMEs engaged in international markets tend to be more productive and innovative than those which are not, they can further improve their performance through internationalization [11]. In most countries, SMEs account for a significant proportion of employment and they are the ones which need more attention. It is common for the following question to be

present into the mind of those actors: which is the best way to bring innovation to firms, especially those which have less resources, SMEs? There are many theories about the innovation process and the main situations and activities that could reach that goal. One of these analyzes the positive moderating effect that the interorganizational networks and the absorptive capacity (ACAP) have on the innovation process. For SMEs, these networks are critical in order to give them the chance to be competitive. On the contrary, not all firms have the same ability to process this new data and transform knowledge into business opportunities. The capability of having this ability was described by Cohen and Levinthal [12] years ago and named as absorptive capacity. "This concept exhibits a significant importance to analyze

the business ability of seizing the external knowledge, combining it with its own domains and generating a dynamic learning and feedback that favors the innovative process and subsequently the maintenance of competitive advantages" [4]. So, if SMEs want to be competitive, the key factors in the innovation process needed for this are (a) the interorganizational networks and (b) ACAP.

In this vein, the concept of sustainability is deemed as a relevant concept in order to achieve competitive advantage. Some authors, Fichman [13] and Wink [14], analyzed the sustainability concept with interorganizational networks and ACAP although it was not until Van Wijk et al.'s study [15] that examine how knowledge, organization, and network level could impact on organizational knowledge and transform into sustainable competitive advantage. Subsequent research [16] has emphasized the importance of corporate sustainability to achieve competitive advantage. Especially for SMEs, the difficulties in international markets make the analysis of the impact of sustainable goals necessary. In such a way, the report by the World Trade Organization is an attempt to address with sustainable development goals included in Agenda 2030 [17].

Although the research field is deemed as interesting and flourishing due to the existing volume of the literature, there are few bibliometric studies that have analyzed ACAP as a knowledge area. While relatively recent studies based on the results of bibliographic analysis concerning ACAP in the management context exist [18–20], some others assess if there is a relationship between open innovation and ACAP [15] or analyze the role of ACAP in the relationship between strategic alliance portfolios and innovation performance [21], and none of them has addressed ACAP's relationship in networking and internationalization. The main motivation of this paper is to cover the current gap regarding ACAP's relationship in networking and internationalization so as to help researchers to identify future research trends.

For the reason stated above, the purpose in this study is to show a qualitative and quantitative examination of the dynamics of global research in the last 25 years (from 1994 to 2018) to determine the current state of scientific production about "ACAP's relationship" with networks and internationalization in the process to access external knowledge. To achieve this goal, bibliometric methods were employed. As Capobianco-Uriarte et al. [22] mentioned, bibliometric techniques allow the identification of the main elements of a research topic. In addition, it enables to detect the most productive agents in the research field, authors, institutions, or countries. In such a way, the main driving force behind a field of research is shown [22].

Therefore, the contributions of this study are twofold. First, this paper identifies the main trends in ACAP research, revealing the evolution of the field. Second, the link of the main concept to networking-internationalization issues is highlighted, suggesting future research challenges. In the next section, a theoretical view of the main approaches of the concept of ACAP is presented. After that, the bibliometric methodology used is explained. Subsequently, the main results are shown and analyzed. Finally, conclusion section is presented.

## 2. Theoretical Background

Innovation is defined as the "implementation of a new product or service or their significant improvement, a better or improved process or marketing method or a new organizational method in business practices" [23] and has just one cause of origin: knowledge. Knowledge is the key factor of the innovation process, and it is possible to obtain it from two different sources: internally, through the own effort of the firms to research and develop (R&D) to improve the process, which is not easy for SMEs, or externally, when the firm tries to obtain it from markets, competitors, providers, universities, and other actors. A huge investment is not usually necessary to attain it, just having the tools to get it from those actors or "nodes" [24]. One and maybe the most important tool to obtain external knowledge is to create or to be part of strong interorganizational networks [9, 24–26].

These networks are critical for SMEs in order to give them the chance to be competitive. On the contrary, not all firms have the same ability to process these new data and transform knowledge into business opportunities.

*2.1. Interorganizational Networks.* The possibility of accessing knowledge through interorganizational networks is usually the only way that SMEs have to improve their competitiveness [27] by attaining a competitive advantage [28]. The level of internationalization, the size, and the intensity and heterogeneity of the networks are relevant factors that define if a network could help SMEs more or less in the process to access external knowledge [24, 29–33].

All the ties of the network are positive, and all have their own value in the innovation process, but if firms can extend their "nodes" to other countries, the benefits will be greater. In fact, the positive influence of SMEs' international experience can be verified in studies conducted by Chetty and Blankenburg-Holm [34], and Chetty et al. [9, 24] developed a matrix that allows identifying the insertion of companies according to the improvements developed and their level of internationalization. To find out what is happening, developing, creating, consuming, and/or studying in international markets and/or environments is critical, especially if the firm hopes to succeed with their products or services.

The size of the network gives firms the possibility of establishing relations with many and different actors where new knowledge may be obtained. In this way, they can improve and/or increase the benefits [24, 29, 30, 35–38] in two ways: (1) because more "nodes" means more sources and (2) because with more contacts and links, the firms have the chance to obtain different points of view on the same topic [30, 38] and this helps the firm to define what is the real value for it and what is not in order to be more competitive.

Finally, the intensity of the connection of the SMEs with the actors or "nodes" of the network is an important factor that gives them more chances to get, discuss, and/or test the ideas or the new concepts [29, 36]. Demirkan and Demirkan [31] and Brink [33] show that the intensity of connections as well as the heterogeneity of knowledge and experiences lead to innovation. Capaldo [39] points out in his study where he

addressed the way three furniture intensive design companies managed their networks and that the ability to integrate a wide periphery of weak and heterogeneous ties and a core of strong connections with leading companies provides a fertile ground to obtain and sustain competitive advantages.

The positive effect between the innovation process and interorganizational networks, especially in relation with international “nodes,” is present in many papers [34, 39, 40].

*2.2. Absorptive Capacity.* The concept of ACAP [12] analyzes the firm’s business capability to process external knowledge, combining it with its own internal sources in order to develop new business opportunities. It is a process which includes different and successive stages: it begins with the recognition of the value of the external knowledge; the next step is its evaluation with reference to the firm’s own skills to use it for its benefit; and finally, the decision about if it is possible to transform that external knowledge into business opportunities [41, 42]. In the words of Zahra and George [29], ACAP constitutes “a group of organizational routines and strategic processes by means of which companies acquire, assimilate, transform, and exploit knowledge with the intention of creating a value.”

As SMEs have few chances of creating innovations by themselves and need external knowledge to do so, ACAP is a critical factor and allows the firms to be more proactive and more competitive. So, this process includes not only the assimilation of external knowledge but the creation of new knowledge: a new business opportunity (innovation).

In the construction of ACAP, the human capital that the firm has is important [43]. It is the “gate” through which external data enter [12], and it is important because of its qualification and its experience in business analysis and because it knows the specific capabilities of the firm to use external knowledge [44, 45]. Therefore, the individual characteristics of this human capital contribute to the development of ACAP and especially so if it has international experience obtained through interorganizational networks [44].

There are other key factors that firms can handle to improve ACAP. The main one is of course the capacities of internal creation of knowledge from external data, but the information management systems and the practices for social integration which can place external knowledge close to the “gates” are important too [46–48].

There are many studies which prove that ACAP has a positive moderating role in the ACAP innovation process. For instance, Cassol et al. [49] show empirical results referring to Brazilian industries; Kohlbacher et al. [50] regarding a business cluster in Central Europe; Tsai [51] focusing on Taiwanese companies; and Kotabe et al. [8] concerning the international background and the performance of senior executives in China.

Despite the importance of ACAP in the SMEs context and its connection to interorganizational networks in the internationalization process, there is no analysis of scientific research regarding this relationship. Thus, our work allows

the evaluation of research and the analysis of its impact on the academic world. Therefore, a bibliometric analysis of ACAP should take into consideration the terms regarding interorganizational networks.

### 3. Materials and Methods

Bibliometrics is a quantitative evaluation of publication and citation data [52], now used in almost all scientific fields to evaluate growth [53, 54], maturity [55, 56], leading authors [57, 58], conceptual and intellectual maps [59, 60], and a scientific community’s trends and future agenda [61]. In social sciences, a large number of bibliometric studies related to different areas of knowledge, such as economics [62, 63], finance [64, 65], management, and business [66–68], among others, have been conducted.

It is also used in research performance evaluation, especially in university and government labs and also by policymakers, research directors and administrators, information specialists and librarians, and scholars themselves. The results of a bibliometric analysis allow the analysis of past research and the detection of future trends of research. Bibliometric analyses require a bibliometric data source [69].

As stated above, this research adopts the bibliometric analysis technique as the method to conduct this review. As in bibliometric analysis carried out by Terán-Yépez et al. [70], this paper follows five steps: (1) definition of the field of study, (2) database selection, (3) research criteria adjustment, (4) codification of recovered material, and (5) examination of the information (Figure 1). The results of bibliometric analysis may vary depending on the database used [71]. Web of Science, produced by Clarivate Analytics, and Scopus, created by Elsevier, are the two most used bibliometric data sources, together with Google Scholar by Microsoft. Harzing and Alakangas [72] suggest that all three databases provide sufficient stability of coverage to be used across five major disciplines (Humanities, Social Sciences, Engineering, Sciences, and Life Sciences) although Martín-Martín et al. [73] conclude that, in all areas. Google Scholar citation data are essentially a superset of Web of Science and Scopus, with substantial extra coverage. However, Google Scholar lacks transparency, suffers from data quality problems, and is very difficult to use for large-scale analysis [69]. For these reasons, the two most commonly used bibliometric data sources, Web of Science and Scopus, will be used in this study. In this analysis, a search formula was used with two combinations of terms connected together with Boolean operators included in order to optimize the accuracy of the search and to facilitate large data capture, TITLE-ABS-KEY (“absorpt\*capa\*”) AND (“internationali\*ation” OR “network\*”) to extend the concept of ACAP in the context of internationalization. The search was limited in the time period encompassing 1994–2018 years, due to the fact that the first year of the search coincides with the contribution by Cohen and Levinthal [12], generally accepted as the founding paper, where ACAP is defined as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends.”

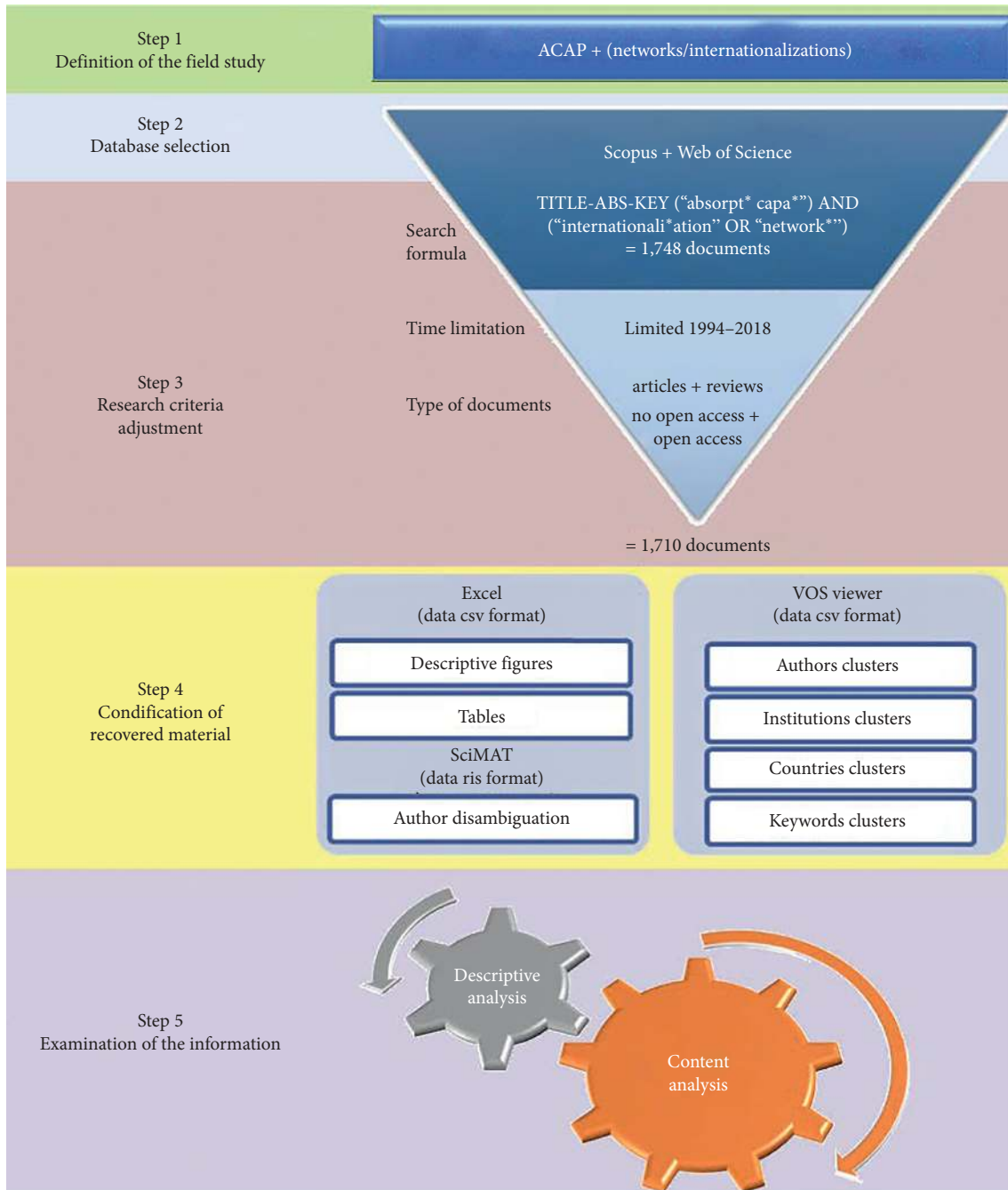


FIGURE 1: Five-step bibliometric methodology flowchart. Source: own elaboration.

The search in both databases (Scopus + Web of science) was undertaken in July 2019.

The selection criteria for the scientific document sample to be analyzed through the proposed bibliometric analysis follow the guidelines of Capobianco-Uriarte et al. [22]. Only scientific articles and reviews, including open access and nonopen access documents, were taken into account in the search.

Data are retrieved from two major databases, Scopus and Web of Science. Once the data were treated, the analysis was carried out using VOSviewer [69], which is a powerful tool that enables scientific maps to be illustrated, visualized, and

discovered. Finally, the results are shown by descriptive analysis and content analysis. First, the descriptive analysis shows the most productive agents in the research field, authors, institutions, or countries [22]. And then, the content analysis in a temporal evolution of the fields considered was studied in terms of timelines for the keywords [74] and keywords networks [75].

VOSviewer software [75] was selected for the creation of bibliometric networks and their visualization as bibliometric maps of the topic. VOSviewer is a freely accessible software for academic nonprofit use, offering an easy and fast analysis tool, specifically for authors, institutions, countries,

coauthorship, and keywords cooccurrence networks, and combining visualization and clustering techniques [75]. Although VOSviewer can be used to construct and visualize bibliometric maps of cooccurrence data, the software tool does not allow any cooccurrence matrix from the bibliometric data to be extracted and built [76]. This software builds a similarity matrix from a cooccurrence matrix using a similarity measure known as the association strength [75]. Furthermore, the software tool has no preprocessing modules to prepare the data for later analysis (as duplicate items detection, time slicing, and data and network reduction). Thus, an external process is needed [77]. Moreover, VOSviewer mapping technique builds only on two-dimensional map, in which the elements are located. In such a way, the distance between any pair of items reflects their similarity as accurately as possible, while other software features 3D networks (as Gephi or Cyvision). Despite the limitations presented by VOSviewer, this visualization software has been used to construct scientific maps from network-based data due to its powerful user graphic interface, which allows to examine the generated maps easily, being used for a diverse range of disciplines and scientific fields [77].

## 4. Results and Discussion

*4.1. Descriptive Analysis.* Though the concept of ACAP was introduced in 1990 by Cohen and Levinthal [12], belonging to the Carnegie Mellon University and the University of Pennsylvania, respectively, Carlsson and Jacobsson [78] published the first article linking ACAP with topics of internationalization and network formation. From 1994 to now, a large number of articles have been published in the Web of Science and Scopus, a total of 1,710. Linking ACAP with internationalization and network formation has been addressed by 3,297 authors, whose works have been published in 553 academic journals indexed in databases considered between 1994 and 2018 (Table 1). Carlsson and Jacobsson [78], who related ACAP with topics of network formation, belong to Case Western Reserve University (United States) and Chalmers University of Technology (Sweden), respectively. In addition to this, these authors analyzed networks of agents interacting in a specific area of technology (the Swedish automotive sector) under a particular institutional infrastructure and confirmed that this constitutes a useful unit of analysis not only for innovation and diffusion studies but also for work related to technology policy. Although the authors did not directly address the issue of internationalization, they supported the early identification of important developments and increasing the economy's ACAP as being important aspects of public policy.

There were few publications during the first 5 years (1994–1998), but one of them [79] has stood out for the relevant number of citations obtained (Table 2).

Szulansky's study [79] evidences that the major barriers to internal knowledge transfer are knowledge-related factors such as the recipient's lack of absorptive capacity, causal ambiguity, and an arduous relationship between the source

TABLE 1: Summary of data.

Data	Absorptive capacity and networking (internationalization research)
Number of articles	1,710
Number of citations	36,879
Number of journals	553
Number of authors	3,297
Number of institutions	783
Number of countries	64
Study time (data sources)	1994–2018 (Scopus and Web of science)

Source: own elaboration with Web of Science and Scopus data (2018).

TABLE 2: Main characteristics of the data used.

Year	A	C	C/A	AU	AUA	JA	COA	IA
1994	1	37	37.00	2	2	1	1	1
1995	1	35	35.00	3	3	1	1	1
1996	1	3,539	3,539.00	1	1	1	1	1
1997	0	0	0.00	0	0	0	0	0
1998	1	543	543.00	2	2	1	1	1
1999	3	463	154.33	6	7	3	2	2
2000	4	582	145.50	6	7	4	4	4
2001	10	3,697	369.70	23	24	7	9	10
2002	7	1,599	228.43	16	17	7	4	7
2003	14	3,266	233.29	22	25	13	7	14
2004	17	3,682	216.59	34	38	13	8	16
2005	32	3,834	119.81	72	68	29	14	27
2006	35	7,214	206.11	74	70	31	16	32
2007	31	2,619	84.48	63	63	23	15	30
2009	67	3,823	57.06	156	155	45	20	61
2010	78	3,689	47.29	184	171	60	20	72
2011	118	2,876	24.37	284	271	85	28	97
2012	136	4,152	30.53	340	326	91	26	112
2013	126	2,500	19.84	316	307	92	29	113
2014	160	3,039	18.99	409	391	101	35	146
2015	155	1,989	12.83	397	376	106	31	137
2016	205	1,543	7.53	528	510	135	41	175
2017	200	882	4.41	541	526	137	40	172
2018	243	377	1.55	670	638	149	46	204
	1,710	60,338	35.29					

Source: own elaboration with Web of Science and Scopus data bib73(2018). A, total number of articles published per year; C, number of article citations per year; C/A, average citation per article; AU, number of authors per year; AUA, number of authors that published at least 1 article in a specific year; JA, number of journals that published at least 1 article in a specific year; COA, number of countries that published at least 1 article in a specific year; IA, number of institutions that published at least 1 article in a specific year.

and the recipient, contrary to conventional wisdom that primarily blames motivational factors. In the following 5 years (1999–2004), the subject took on a greater dimension as to the volume of publications, though this remained at a low level, not surpassing 38 publications annually. At the beginning of this period, in 1999, the first article appeared which related ACAP with topics of firm internationalization [80]. In this study, Meyer-Krahmer and Reger [80] highlighted the changes in the innovation strategies of large multinational companies, included in the agenda of

technology policy in Europe, a greater emphasis on collaboration and mobility outside Europe, strengthening the attractiveness of the European Union for foreign investment in R&D and the absorption capacity of R&D organizations in Europe. In 2011, there were more than 100 annual publications. In 2016, the production duplicated this with more than 200 publications. The evolution of the scientific production in ACAP related with internationalization and network formation shows an exponential growth from its beginnings in 1994 (Figure 2).

The number of journals interested in these topics increases from 2011 and 2012. This increase is significant, being an average of 100 different journals per year which publish on this matter. A greater number of authors (681) and of journals (149) interested in it is noted in the last year (2018). Table 1 indicates a significant number of countries and institutions participating in indexed publications on these topics although initially the average for each one of them is low (less than 27 articles per country and slightly more than 2 per institution). These figures are notably modified if we only consider the last 5 years of production (2014–2018) as 56% of the total of articles of the 24-year period are concentrated in these five years (Table 2).

The number of authors who have addressed the topic of ACAP in internationalization and network formation has increased polynomially since 2004, having a maximum of annual production in 2011, with the participation of more than 400 authors who published at least one article (Figure 3). There were 681 authors in 2018. The authorship average in the articles published on this topic is between 2 and 3 authors per article (2.63). There is an average concentration of the productivity as to the number of authors who publish. The distribution of frequency of authors according to the number of articles published is the following: 15.20% of the articles are produced by a sole author, 34.04% by 2 authors, 32.57% by 3 authors, and the remaining 18.19% by four or more authors.

The journals which published scientific works related with the topic analyzed have also constantly grown, surpassing a hundred in 2011 and reaching 149 in 2018. The distribution of the articles published in the journals indexed in Scopus and Web of Science is very atomized, as there are many journals which publish on the subject and most present a low average of articles published. Taking into account that the first 10 journals in the ranking of volume of articles published (Table 3) does not reach 19% of the total (325 out of 1711), each one of them with an average of 32.5 articles over 24 years and there being a reasonably low dispersion around the average (45 being the maximum number of articles published and 24 the minimum). All these publications maintain their presence in the last year covered (2018), indicating a current interest in the topic. Research Policy and International Business Review stand out among the journals with a greater volume of publications on this topic. Both are published by Elsevier. The former is a multidisciplinary social science journal. The latter is a specialized journal. International Business Review provides a forum to share the latest developments and advances in the knowledge and practice of international business. However,

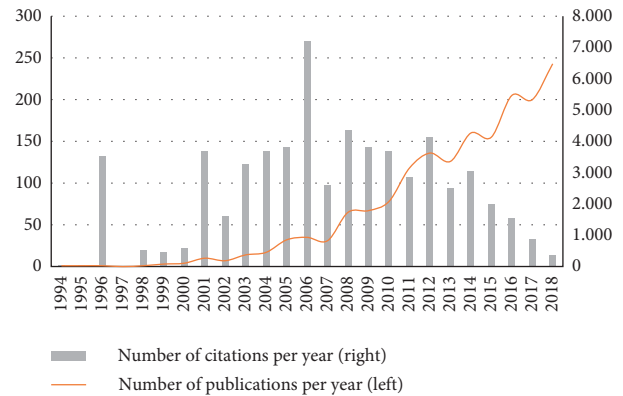


FIGURE 2: Number of citations and publications per year (1994–2018). Source: own elaboration with Web of Science and Scopus data (2018).

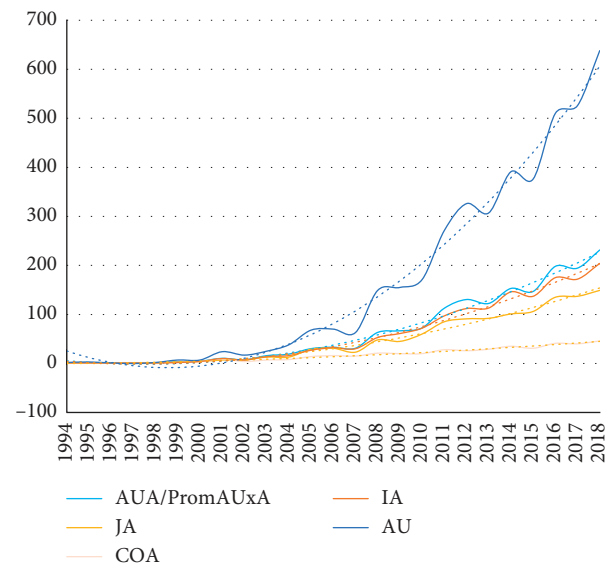


FIGURE 3: Number of authors, institutions, countries, and journals per year (1994–2018). Source: own elaboration with Web of Science and Scopus data (2018).

Journal of Knowledge Management is published by Emerald and is also a specialized journal, dedicated to all aspects of managing knowledge in organizations. It is highlighted that Strategic Management Journal, although it is neither the most productive journal nor the most cited within the top ten journals group, has published 2 of the 5 most cited articles on the topic (Table 4).

Spanish researchers stand out in the ten most productive authors in ACAP related with internationalization and network formation. The most cited authors are American and Dutch researchers. Molina-Morales F. X., of the University Jaume I, is the author who has the greatest quantity of articles published and Lavie D., of the University Texas, is the most cited author (Table 5).

It is not only interesting to analyze the productivity of the researchers but also the collaboration networks, which are both intrainstitutional and interinstitutional and

TABLE 3: Top ten most productive journals.

Rank	Journal	A	C	C/A	1st A	Last A	h index
1	Research Policy	45	3842	85.4	1999	2018	26
2	International Business Review	39	1068	27.4	2005	2018	18
3	Journal of Knowledge Management	38	804	21.2	2009	2018	17
4	International Journal of Technology Management	38	307	8.08	2007	2018	11
5	Technological Forecasting and Social Change	30	311	10.4	2004	2018	12
6	Technology Analysis and Strategic Management	30	286	9.53	2006	2018	10
7	Strategic Management Journal	28	7656	273	1996	2018	20
8	Journal of Business Research	27	684	25.3	2007	2018	14
9	Industry and Innovation	26	807	31	2008	2018	10
10	Regional Studies	24	988	41.2	2004	2018	14

Source: own elaboration with Web of Science and Scopus data (2018). A, total number of articles; C, number of citations for all articles; C/A, average citation per article; 1st A, year of the first published article; Last A, year of the last published article.

TABLE 4: The most cited articles.

Title	Author/s	Journal	C	Year	C/A
Exploring internal stickiness: impediments to the transfer of best practice within the firm	Szulanski G.	Strategic Management Journal	3,539	1996	160.9
Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation	Bathelt H. Malmberg A. Maskell P.	Progress in Human Geography	1,849	2004	252.8
Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance	Tsai W. P.	Academy of Management Journal	1,804	2001	108.8
Network structure and knowledge transfer: the effects of cohesion and range	Reagans R. McEvily B.	Administrative Science Quarterly	1,468	2003	120.3
Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms	Yli-Renko H. Autio E. Sapienza H. J.	Strategic Management Journal	1,222	2001	86.4

Source: own elaboration with Web of Science and Scopus data bib73 (2018).

TABLE 5: Ten most productive authors.

Authors	A	C	C/A	1st A	Last A	h index	Country	Affiliation
Molina-Morales F. X.	23	516	22.43	2005	2018	11	Spain	University Jaume I
Belso-Martinez J. A.	11	54	4.91	2011	2018	5	Spain	University Miguel Hernandez
Lavie D.	10	1,876	187.60	2006	2016	6	United States	University Texas
Duysters G.	10	1,124	112.40	2006	2018	6	Netherlands	Tilburg University
Lyles M. A.	10	920	92.00	2008	2016	5	United States	Indiana University
Pedersen T.	8	349	43.63	2008	2015	5	Denmark	Centre of Strategic Management and Globalization
Parra-Requena G.	8	94	11.75	2010	2018	4	Spain	University Castilla La Mancha
Garcia-Villaverde P. M.	8	93	11.63	2010	2018	4	Spain	University Castilla La Mancha
Diez-Vial I.	8	86	10.75	2014	2018	4	Spain	Complutense University of Madrid
Boschma R.	7	850	121.43	2007	2015	6	Netherlands	Utrecht University

Source: own elaboration with Web of Science and Scopus data (2018). A, total number of articles; C, number of citations for all articles; C/A, average citation per article; 1st A, year of the first published article; last A, year of the last published article.

intranational and international. For these purposes, the first author of each of the works published is considered and the author Williams C. is excluded for being the only U.S. reference in a Chinese network and simultaneously representing five different institutions around the world; it not being possible to identify if this reference corresponds to the same person who is affiliated to different institutions or to different people with the same name. Additionally, and there

not being another North American node in this Chinese network, this reference is excluded given its scant relevance in the total universe. Taking into account 10 or more scientific documents in common, it is possible to detect the following five scientific networks of different collaborations (Table 6).

Figure 4 shows the cumulative time-varying collaboration networks between authors and research groups during

TABLE 6: Main intranational and international scientific networks.

Intranational networks	International networks
(i) Swedish	(i) American (USA)-European-Asian
(ii) Spanish	(ii) American (Canadian)-Asian
(iii) Chinese	
(iv) British	

Source: own elaboration.

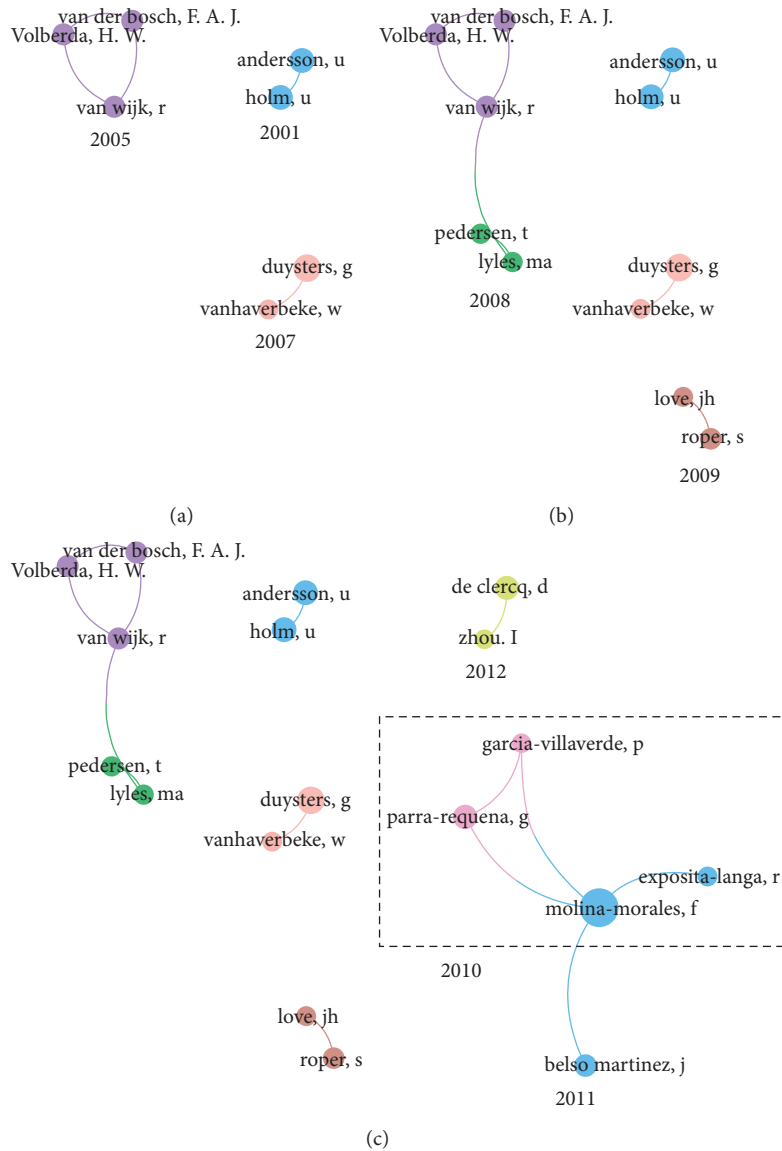


FIGURE 4: Continued.



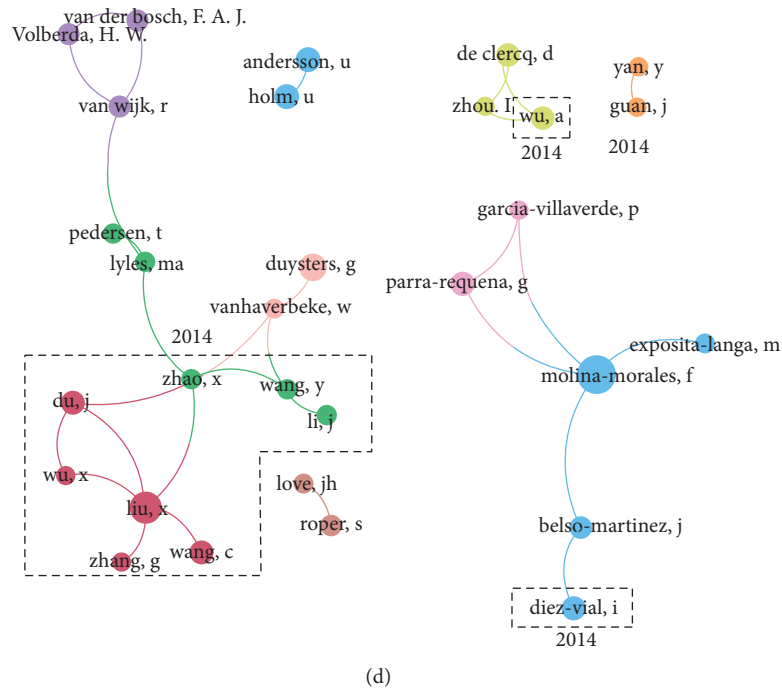


FIGURE 4: On time-varying authors' collaboration networks (1994–2018), taking into account 5 or more scientific documents in common. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software. (a)  $T_1 = 1994-2007$ ,  $N_1 = 7$ ,  $G_1 = 3$ ; (b)  $T_2 = 1994-2009$ ,  $N_2 = 11$ ,  $G_2 = 5$ ,  $GN_2 = 2$ ,  $GA_2 = 0$ ,  $GJ_2 = 2$ ; (c)  $T_3 = 1994-2012$ ,  $N_3 = 18$ ,  $G_3 = 7$ ,  $GN_3 = 2$ ,  $GA_3 = 1$ ,  $GJ_3 = 0$ ; (d)  $T_4 = 1994-2016$ ,  $N_4 = 30$ ,  $G_4 = 9$ ,  $GN_4 = 2$ ,  $GA_4 = 2$ ,  $GJ_4 = 5$ .  $T$  = time period;  $N$  = number of nodes;  $G$  = number of groups;  $GN$  = number of new groups;  $GA$  = number of amplified group;  $GJ$  = number of groups joined.

the period 1994–2018. This information is useful not only for the visualization of the evolution of scientific production of the networks but also for the changes in the configuration of these collaborative networks. The relevance of the study in the time-varying collaboration networks is highlighted in the work by Viana et al. [81], who claimed the importance of the analysis of the moment in which a network emerges and the identification of the characteristics of the collaborative patterns. In this vein, this analysis allows the stability of the activity of networks.

Figure 4(a) shows that the first collaborative network is identified in 2001, encompassing Swedish authors, namely, Andersson U. and Holm U. from University Uppsala. This network worked until 2002.

The second network is from the Netherlands, where Volberda H. W., Van den Bosch F. A. J., and Van Wijk R. are the authors belonging to Erasmus University, their first publication was in 2005, and they continued publishing until 2012.

The third network is also from the Netherlands, created in 2007 by Duysters G. and Van Haverbeke W., both from ECIS-Eindhoven University of Technology, although a second affiliation of Van Haverbeke W. was detected in Hasselt University (Belgium). They continued working until 2012.

The scientific network with the greatest scientific productivity is national and interinstitutional (Table 6), located in Spain, and led by the most productive author. This

network emerges in 2011 between Molina-Morales F. X. (University Jaume I), Exposito-Langa M. (University Politech. Valencia), and Parra-Requena G. and Garcia-Villaverde P. (both University Castilla La Mancha) (Figure 4(c)). Later, two authors, Belso-Martinez J. (University Miguel Hernandez) and Diez-Vial I. (University Complutense Madrid), were incorporated in this network, in 2011 and 2014, respectively (Figures 4(c) and 4(d)).

Within the other transnational networks, it is underscored that, unlike the Spanish network (interinstitutional), there are two intrainstitutional networks: the British network and the Chinese network (Table 6). In 2009, the first British network was created in this field, with Love J. H. (Aston University) and Roper S. (University Warwick), still working (Figure 4(b)). The Asian network, with Guan J. C. and Yan Y., was created in 2014 (Figure 4(d)), both authors belonging to University Chinese Acad Sci (People's Republic of China).

On the contrary, the most productive American author, Lyles M. A. of Indiana University (Table 5), leads the most extensive international network with European links, along with Pedersen T. of the Centre of Strategic Management and Globalization (Denmark) and Volberda H. W. and van Wijk R. of the Erasmus University (Netherlands) in 2008 (Figure 4(b)). In 2016, this network continues working and linked the American-Denmark-Dutch network to the Asian one (Table 6), by the common work of Lyles M. A. with Zhao X., belonging to China Europe Int Business Sch (People's

Republic of China), with a Chinese intranational collaboration, Wu X. and Du J. of the Zhejiang University, Liu X. of Xiamen University, and Wang C. and Zhang G. of the Shandong University, and with a European collaboration, Vanhaverbeke W. of the Hasselt University (Belgium) and Duysters G. of the Tilburg University (Netherlands). The Canadian-Chinese (Table 6) network is made up of the Canadian scientists Clercq D. and Zhou L. of the Brock University in 2012 (Figure 4(c)), and then, in 2016, Wu A. Q. of Zhejiang University (Figure 3(d)) joined this Canadian network.

To sum up, 3 collaborative networks worked until 2005 ( $G_1 = 3$ ) in the field of interorganizational networks and the internationalization process. Thereafter, in 2008, the first international network American-Denmark-Dutch ( $G_2 = 2$ ) was created becoming the first international network. The British network was born in 2009. In 2010, the Spanish network appeared, highlighting for being intrainstitutional and the most productive up until this time ( $GN_3 = 2$ ). Later, in 2012, the Canadian network emerged. In 2014, the Chinese group was born, and the Canadian and Spanish networks ( $GA_4 = 2$ ) were extended. Finally, 2014 highlights for the extension of the international network American-Denmark-Dutch-Chinese ( $GJ_4 = 5$ ) that continues being the unique international network.

Finally, the Chinese scientists Zhao X., Yan Y., and Guan J., along with the Spanish scientists Belso-Martinez J. A. and Diez-Vial I. present the most recent scientific activity (Figure 5).

Within the 10 most productive institutions regarding publications about the reference topic (Table 7), nine of them are European and one is Asian. Though the number of articles published by each institution is relatively low (maximum 19, minimum 10, with an average of 14 articles per institution), the Spanish production stands out as it includes four institutions within the 10 main ones (Table 7), which in turn concentrates 40% (64 of 162) of the total of this country (Table 8). The same situation is presented with respect to the most productive authors (Table 5), three of them belonging to the first two most productive academic institutions and marking a significant presence from the moment that a growing interest began to be shown toward the topic under analysis (2010–2012), all of them being maintained active at the last record (2018).

The institutional networks are based on networks formed among the scientists. The interinstitutional network formed at the international level, which studies the relation of ACAP with internationalization and network formation, presents six main clusters, taking into account 10 or more scientific works in common (Figure 6). The blue cluster is the most productive inasmuch, as it includes five Spanish academic institutions. As can be seen from Table 7, they concentrate the most productive authors and it shows a relevant network between them. Surprisingly, other two Spanish universities, namely, Granada University and Seville University, are also productive regarding number of articles (Table 7), but there is a lack of linkage between them despite being

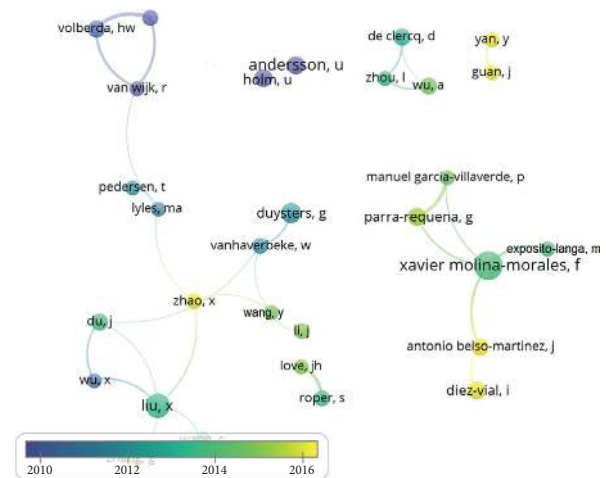


FIGURE 5: Temporal evolution of scientific production in each author networks. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software.

geographically proximate. The blue cluster, through the University Bologna and Uppsala University, is linked with the green cluster. The green cluster is led by the Copenhagen Business School of the Centre of Strategic Management and Globalization of Denmark, the third research center of highest production at the global level (Table 3). This center is directly linked with British universities (University Manchester, University Nottingham, and University Sheffield), the Dutch universities of the University Groningen (pale blue cluster) and the Tilburg University (violet cluster), and intercontinentally with the Asian university Zhejiang University, fourth at the global level for its productivity (Table 3). This Danish research center and the Chinese university are the most interrelated academic institutions at a global level. The Zhejiang University is linked with the yellow cluster made up of a British university (University Lancaster), a Canadian university (University Ottawa), U.S. universities (University Indiana, University George Washington, and University Minnesota), and Finnish universities (Aalto University and Lappeenranta University Tech.). Furthermore, Zhejiang University works in collaboration with the red cluster, formed by other Asian institutions (Hong Kong University, University Chinese Acad Sci, and Xi An Jiao Ton University of the People's Republic of China) and European institutions (Erasmus University and Oxford University, among others).

Finally, Zhejiang University is interrelated with the violet cluster made up mainly of European universities, such as Hasselt University, Tilburg University, Maastricht University, and the Natl. University Singapore of south-east Asia. Lastly, the smallest cluster is formed of two European academic institutions, University Groningen and University Granada.

Timewise, the institutions which present the most recent scientific activity (Figure 7) are University Chinese Acad Sci and University Groningen, and within the most productive cluster is the University Castilla La Mancha and the University Politech. Valencia.

TABLE 7: Ten most productive institutions.

Rank	Institution	Country	A	C	C/A	1st A	Last A	h index
1	University Castilla La Mancha	Spain	19	175	9.21	2010	2018	6
2	University Jaume I	Spain	17	437	25.71	2005	2018	9
3	Ctr Strateg Management & Globalizat	Denmark	17	702	41.29	2008	2017	11
4	Zhejiang University	People's Republic of China	16	202	12.63	2007	2018	7
5	University Granada	Spain	14	137	9.79	2008	2018	6
6	University Seville	Spain	14	424	30.29	2009	2018	10
7	Lappeenranta University Technol	Finland	12	318	26.50	2008	2013	6
8	Uppsala University	Sweden	11	839	76.27	2001	2018	6
9	University Utrecht	Netherlands	10	880	88.00	2009	2018	7
10	Erasmus University	Netherlands	10	621	62.10	2005	2017	6

Source: own elaboration with Web of Science and Scopus data (2018). A, total number of articles; C, number of citations for all articles; C/A, average citation per article; 1st A, year of the first published article; last A, year of the last published article.

TABLE 8: Top ten most productive countries.

Rank	Country	A	P*	AP	C	C/A	1st A	Last A	h index
1	United States	228	327,096,265	0.70	4,672	20.49	1992	2018	66
2	United Kingdom	162	67,141,684	2.41	4,882	30.14	2001	2018	37
3	Spain	162	46,692,858	3.47	3,682	22.73	2001	2018	28
4	People's Republic of China	139	1,427,647,786	0.10	3,379	24.31	2006	2018	20
5	Germany	82	83,124,418	0.99	1,882	22.95	1999	2018	26
6	Netherlands	80	17,059,560	4.69	1,816	22.70	2000	2018	27
7	Italy	80	60,627,291	1.32	1,832	22.90	1995	2018	21
8	Taiwan	59	23,726,460	2.49	1,257	21.31	2001	2018	18
9	Canada	52	37,074,562	1.40	1,216	23.38	2003	2018	18
10	Australia	51	24,898,152	2.05	1,183	23.20	2007	2018	16

Source: own elaboration with Web of Science and Scopus data (2018). \*United Nations Department of Economic and Social Affairs (2018) 1st July 2018. A, total number of articles; P, population (inhabitants); AP, number of articles per 1 million inhabitants; C, number of citations for all articles; C/A, average citation per article; 1st A, year of the first published article; last A, year of the last published article.

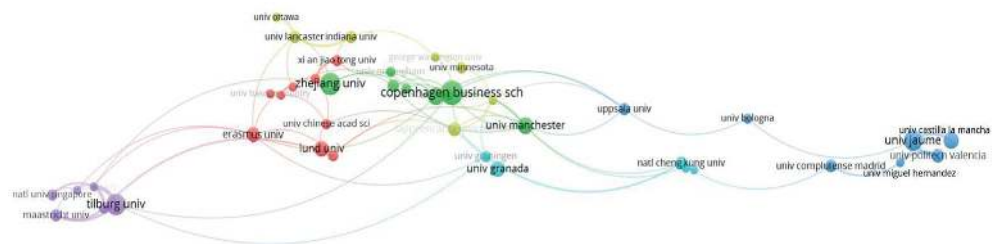


FIGURE 6: Institutional networks. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software.

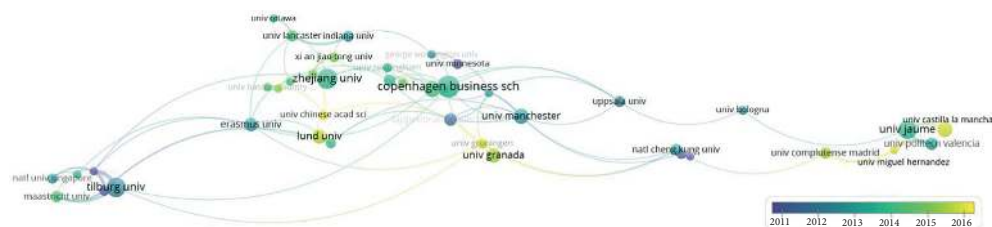


FIGURE 7: Temporal evolution of institutional networks. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software.

This behavior is reproduced in some way in the origin of the researchers and/or institutions involved (Table 5). Almost two-thirds of them (1,095 articles published by researchers and institutions of these countries out of a total of 1,711) have their origin in only 10 countries (Table 8). In addition, the five first countries of the ranking have been responsible for 45% of the total production (773 out of 1,711) and their composition within this universe of 5 is distributed among countries belonging to the European Union (53%), the United States (29%), and the People's Republic of China (18%), which are in turn the three main actors of the global economy and trade.

If we analyze the structure of the research at the country level, taking into account 15 or more works in common, five clusters are noted (Figure 8). Two of the most productive countries are intensely related in the green cluster, the United States and the United Kingdom, where the United States is directly related with Canada. On the contrary, Spain and its intranational and interinstitutional network are located in the yellow cluster, along with Belgium and the Netherlands. The red cluster is the most numerous, made up mostly of European Union countries, such as Denmark, France, Finland, Germany, Sweden, and Italy. The blue cluster is formed by south-east Asian countries and is led by the People's Republic of China, which presents a direct and intense relation with the United States.

The countries which show scientific activity in the most recent network (Figure 9) are the People's Republic of China, Portugal, and India.

In the previous section about the analysis of the evolution of the volume of scientific production on the concept of ACAP linked with network formation and the process of firm internationalization, the article of Szulanski [79] titled "Exploring internal stickiness: impediments to the transfer of best practice within the firm" mainly stood out. As well as being one of the first articles which specifically links ACAP with network formation, it was published in the *Strategic Management Journal*, which also figures in the top ten group of the most published journals (Table 3). It is as well the most cited article since 1994, so it can be considered as an article which marks a trend in the topic analyzed (Table 4).

The article titled "Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation" [82] is the second most cited. It deals with the spatial clustering of economic activity and its relation to the spatiality of knowledge creation in interactive learning processes. It questions the view that tacit knowledge transfer is confined to local milieus, whereas codified knowledge may roam the globe almost frictionlessly. Their hypothesis therefore was that the more developed the pipelines between the cluster and distant sites of knowledge, the higher the quality (and value) of local buzz benefiting all firms in the local cluster. This is why a firm will learn more if its neighbouring firms in the cluster are globally well connected rather than being more inward-looking and insular in their orientation. Finally, some policy implications, stemming from this argument, are identified, especially in the development of global pipelines,

which requires institutional and infrastructure support. In the third most cited article, titled "Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance," Tsai [51] carried out an empirical analysis about 24 business units in a petrochemical company and 36 business units in a food-manufacturing company and concluded that organizational units can produce more innovations and enjoy better performance if they occupy central network positions that provide access to new knowledge developed by other units and depend on the units' absorptive capacity or ability to successfully replicate new knowledge. In Reagans and McEvily's [83] article titled "Network structure and knowledge transfer: the effects of cohesion and range," the research considered how different features of informal networks, such as network structure influences, affect knowledge transfer. Their results indicated that both social cohesion and network range ease knowledge transfer, over and above the effect of the strength of the tie between two people. The last of the five most cited articles is the article of Yli-Renko et al. [84], titled "Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms," in which they examined the effects of social capital in key customer relationships on knowledge acquisition and knowledge exploitation. They carried on an empirical study of 180 entrepreneurial high-technology ventures based in the United Kingdom. The most cited articles mentioned of this search are focused on the study of ACAP and different types of networks, but they do not deal with the link of ACAP with internationalization. Meyer-Krahmer and Reger's article [80], although it is the first one which relates ACAP with firm internationalization topics, is not the most cited paper. Lavie and Miller's article [85], titled "Alliance portfolio internationalization and firm performance," published in the journal *Organizational Science*, has 184 citations. This study introduced the notion of alliance portfolio internationalization, which refers to the degree of foreignness of partners in a firm's collection of immediate alliance relationships. They test the framework using data on the alliance portfolios of U.S.-based software firms (1994–2001), and their results provide support for the sigmoid relationship as well as for our predictions that firms, which have gained experience with foreign partners and maintained wholly owned subsidiaries in their partners' countries of origin and can overcome some of the liabilities of alliance portfolio internationalization and better leverage its benefits.

*4.2. Content Analysis.* The number of articles which have ACAP as a topic axis has grown notably since 2008 (Figure 2) and have conserved, over the 25 years of the period analyzed, a close relation with three key concepts: innovation, networks, and their performance or innovative result. Firstly, the close relationship of innovation concept with ACAP construct stands out (Tables 9 and 10 and Figure 10). This is highlighted even more if it is taken into account that the word "innovation" is not in the search formula. The

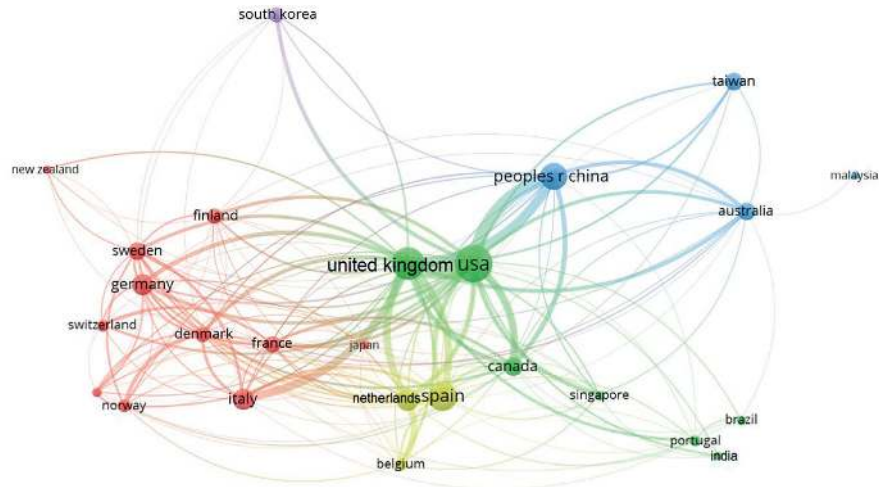


FIGURE 8: Country networks. Source: own elaboration with Web of Science and Scopus data bib73(2018) processed with VOSviewer software.

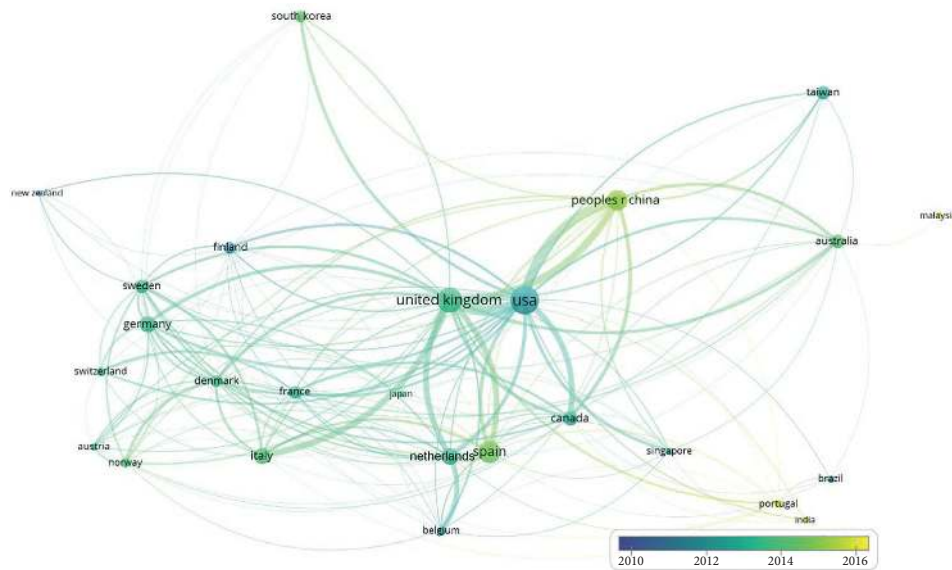


FIGURE 9: Temporal evolution of country networks. Source: own elaboration with Web of Science and Scopus data bib73(2018) processed with VOSviewer software.

second term emphasizes the topic of networks, a concept which, the same as innovation, is not a fashion in the scientific production as it remains invariably and significantly linked during all the periods.

On the contrary, the studies concerning the result (performance) of ACAP in relation with the innovative result and its greater competitiveness have appeared more intensely in the last 10 years and stand out even more so if they are added to those which specifically address the performance of SMEs (Figure 10, period 2014–2018).

Though numerous other links exist which relate ACAP with diverse and varied topics, it is also important to note that there is a greater relevance of the association of the topic with SMEs than with large firms, as well as the association with other firm dynamic capacities, in

particular those linked to the management of knowledge. The previously revealed verification (the greater association of the ACAP construct with SMEs) is logical and reasonable given the possibilities of innovating SMEs being much more related with the possibility of accessing external knowledge than that of generating new knowledge. This is particularly due to the scarcity of resources available for this purpose, at least if we compare them with large firms.

In a similar vein to what was stated before, SMEs should find advantages in their internationalization process from ACAP and the innovations derived from it. However, evidence does not exist, at least until now, that the studies in this sense are relevant. On the contrary, Table 4 shows that “internationalization” only appears in

TABLE 9: The most used keywords.

Rank	Keywords	1994–2018		1994–2008*		2008–2018	
		A	%	A	%	A	%
1	<i>Absorptive-capacity</i>	1604	30.99	195	19.92	1,409	29.71
2	Innovation	680	13.14	113	11.54	567	11.95
3	<i>Networks</i>	578	11.17	89	9.09	489	10.31
4	Performance	515	9.95	47	4.80	468	9.87
5	Firms	387	7.48	65	6.64	322	6.79
6	Research and development	342	6.61	28	2.86	314	6.62
7	Knowledge	338	6.53	54	5.52	284	5.99
8	Knowledge transfer	278	5.37	31	3.17	247	5.21
9	Competitive advantages	239	4.62	31	3.17	208	4.39
10	Perspectives	225	4.35	31	3.17	194	4.09
11	Strategic alliances	209	4.04	30	3.06	179	3.77
12	Capabilities	206	3.98	26	2.66	180	3.80
13	Management	188	3.63	18	1.84	170	3.58
14	Technology	186	3.59	30	3.06	156	3.29
15	Multinationals	184	3.55	21	2.15	163	3.44
16	Firm performance	172	3.32	8	0.82	164	3.46
17	Organization	164	3.17	40	4.09	124	2.61
18	Dynamic capability	158	3.05	12	1.23	146	3.08
19	Product development	153	2.96	17	1.74	136	2.87
20	Collaborations	142	2.74	23	2.35	119	2.51
31	<i>Internationalization</i>	91	1.76	10	1.02	81	1.71
	Total keywords	5176		979		4,743	

Source: own elaboration with Web of Science and Scopus data bib73(2018) processed with VOSviewer software.

the position 31 of the most used keywords, which confirms the scant relevance given to the topic in the articles analyzed.

Numerous works published in recent years, and which we have already provided an account of, show the positive influence of networks in the internationalization process of SMEs as do the previous experience, which they have had in external markets and the favorable environment to internationalization in which they participate [4, 9].

The temporal evolution was examined by considering the keywords timelines [74]. The frequencies were normalized by the total number of keywords in each time period. The resulting timelines are shown in Figure 10. The timelines of ACAP show an extraordinary growth, but its growth rate decreased in the last period (2014–2018). This type of visualization allows detecting keywords that can belong to different research fields. For example, the first subperiod (1994–1998) shows that the keyword “firm” is the one that has increased. The keyword “performance” emerged in the second subperiod (1999–2003) until the fourth subperiod. Thus, in the third subperiod, the keyword “firm performance” emerged and its use has increased until the last subperiod.

As can be seen in the cluster analysis of Figure 11, eight heterogeneous keyword groups are shown in different colours. There are two clusters that stand out. First, the red node labelled “absorptive-capacity” is related to other nodes such as “dynamic capacity” y “knowledge acquisition,” which are related conceptually. Second, the green node labelled “innovation” is linked to “networks” keyword together with “collaboration,” “research and development,” and “technology”. Finally, the word

“internationalization” is related directly to the red cluster but in a peripheral place.

Figure 12 shows the keywords tendency. As can be seen, the current keywords most used appear in yellow, which share the core concept of innovation, such as open innovation, innovation performance, product innovation, innovation capability, and technological innovation. In a similar way, other trendy keywords are firm performance and collaborative networks.

As can be seen in Figure 12, the sustainability topic has gained relevance and interest. Attention is paid to sustainable development and sustainability oriented innovation (SOI). In such a vein, the sustainability concept, by sustainable development of Brundtland report [86], is highlighted in the context of SMEs, as a challenge to achieve competitive advantage by innovation [16]. Moreover, Melane-Lavado and Álvarez-Herranz [87] argue that the achievement of sustainability is mainly due to innovation and they presented a comparative study to try to shed light on the possible differences in the paths taken to obtain SOI by firms with and without Foreign Direct Investment, considering their different forms of knowledge management.

However, the evidence gathered in this bibliographic study shows that there still exists a practically unexplored field referring precisely to the relationships between networks and the internationalization of SMEs, and the positive moderator effect of ACAP in this process. Keywords, such as innovation capability, and SMEs give an idea of the current trends and close relationship with networking, but much less significant with internationalization, and end up defining that opportunity of exploration.

TABLE 10: Evolution of the most used keywords.

Rank	Keywords	1994–1998		1999–2003		2004–2008		2009–2013		2014–2018	
		A	%	A	%	A	%	A	%	A	%
1	Innovation	2	8.0	28	13.40	167	19.06	484	24.71	923	25.10
2	Networks	2	8.0	17	8.13	94	10.73	219	11.18	348	9.46
3	Adoption	1	4.0	14	6.70	73	8.33	178	9.09	311	8.46
4	Adaptation	1	4.0	11	5.26	54	6.16	176	8.98	292	7.94
5	Best practice transfer	1	4.0	10	4.78	43	4.91	130	6.64	229	6.23
6	Capabilities	1	4.0	10	4.78	43	4.91	106	5.41	192	5.22
7	Competence	1	4.0	8	3.83	30	3.42	105	5.36	180	4.89
8	Competitive advantage	1	4.0	7	3.35	28	3.20	104	5.31	142	3.86
9	Internal stickiness	1	4.0	6	2.87	27	3.08	91	4.65	133	3.62
10	Knowledge	1	4.0	6	2.87	25	2.85	85	4.34	126	3.43
Total keywords		25	48.0	209	55.98	876	66.76	1959	85.66	3678	78.19

Source: own elaboration with Web of Science and Scopus data bib73(2018) processed with VOSviewer software.

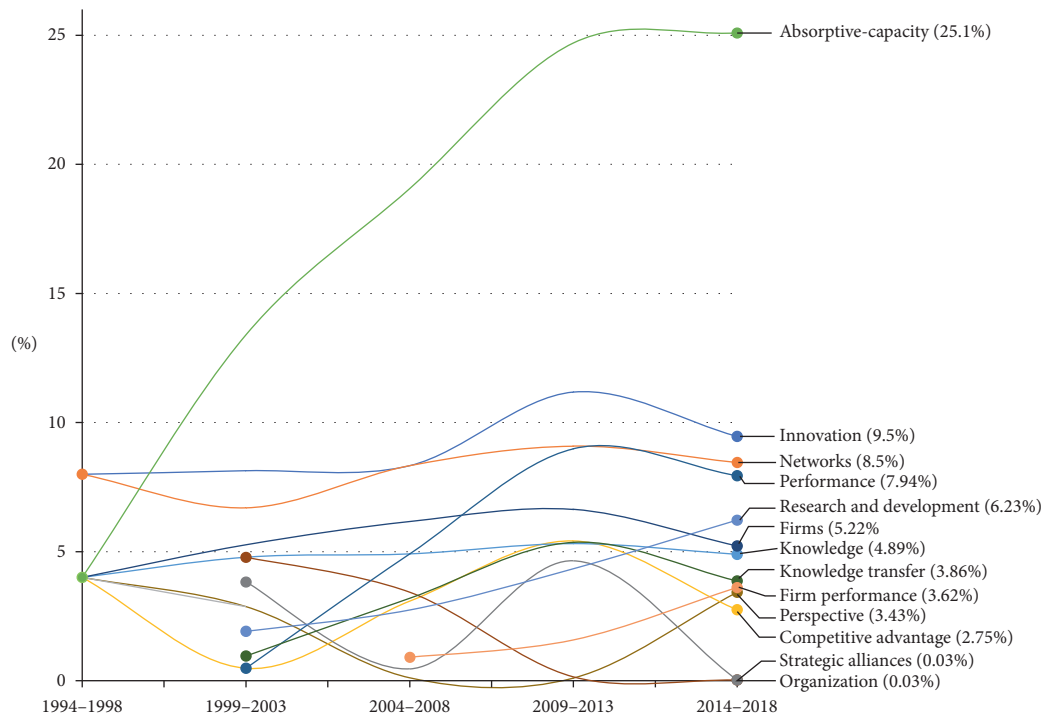


FIGURE 10: Normalized frequency of occurrence for each keyword among papers published in the time period considered. Source: own elaboration with Web of Science and Scopus data (2018) processed with Excel Microsoft.

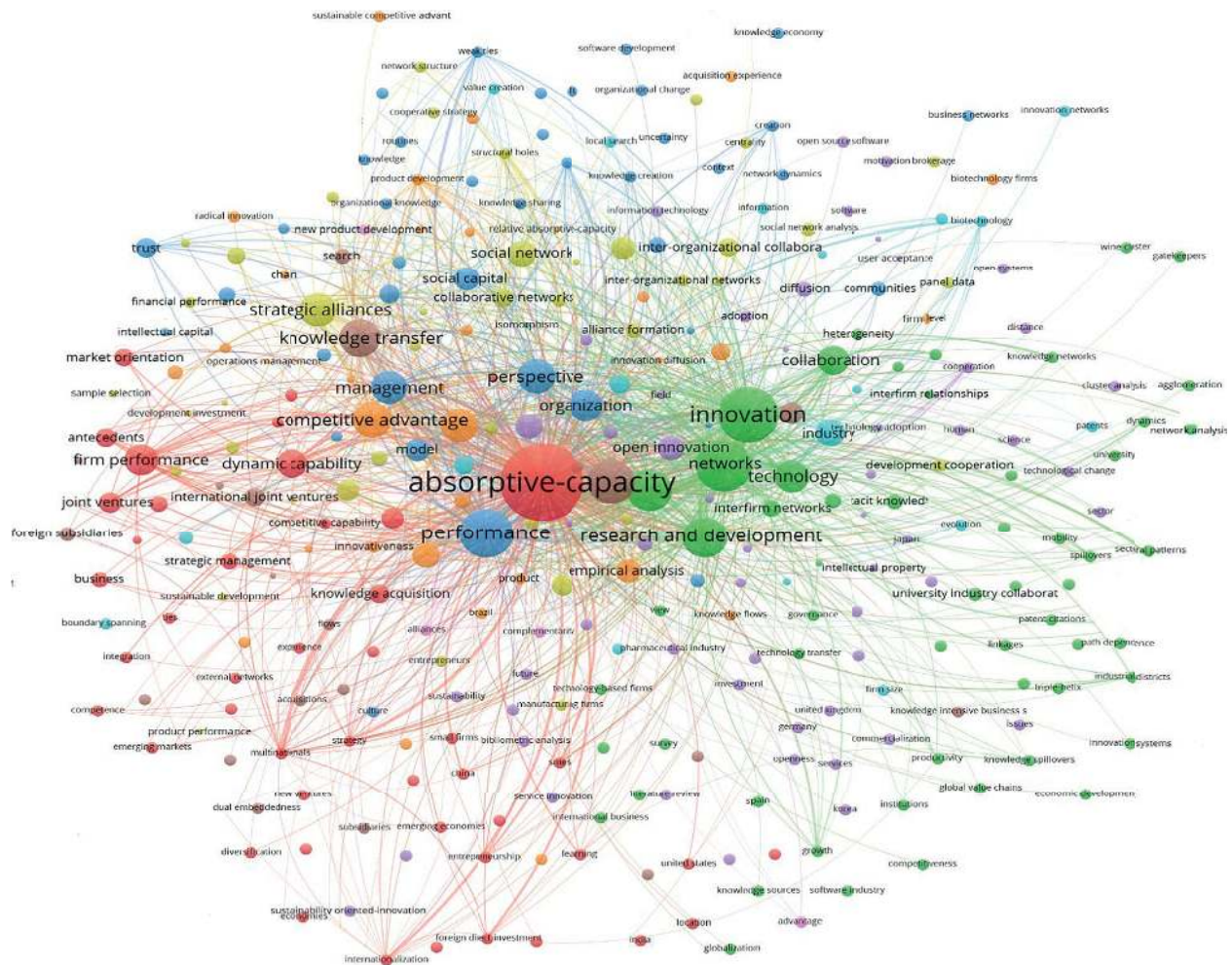


FIGURE 11: Keywords network. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software.



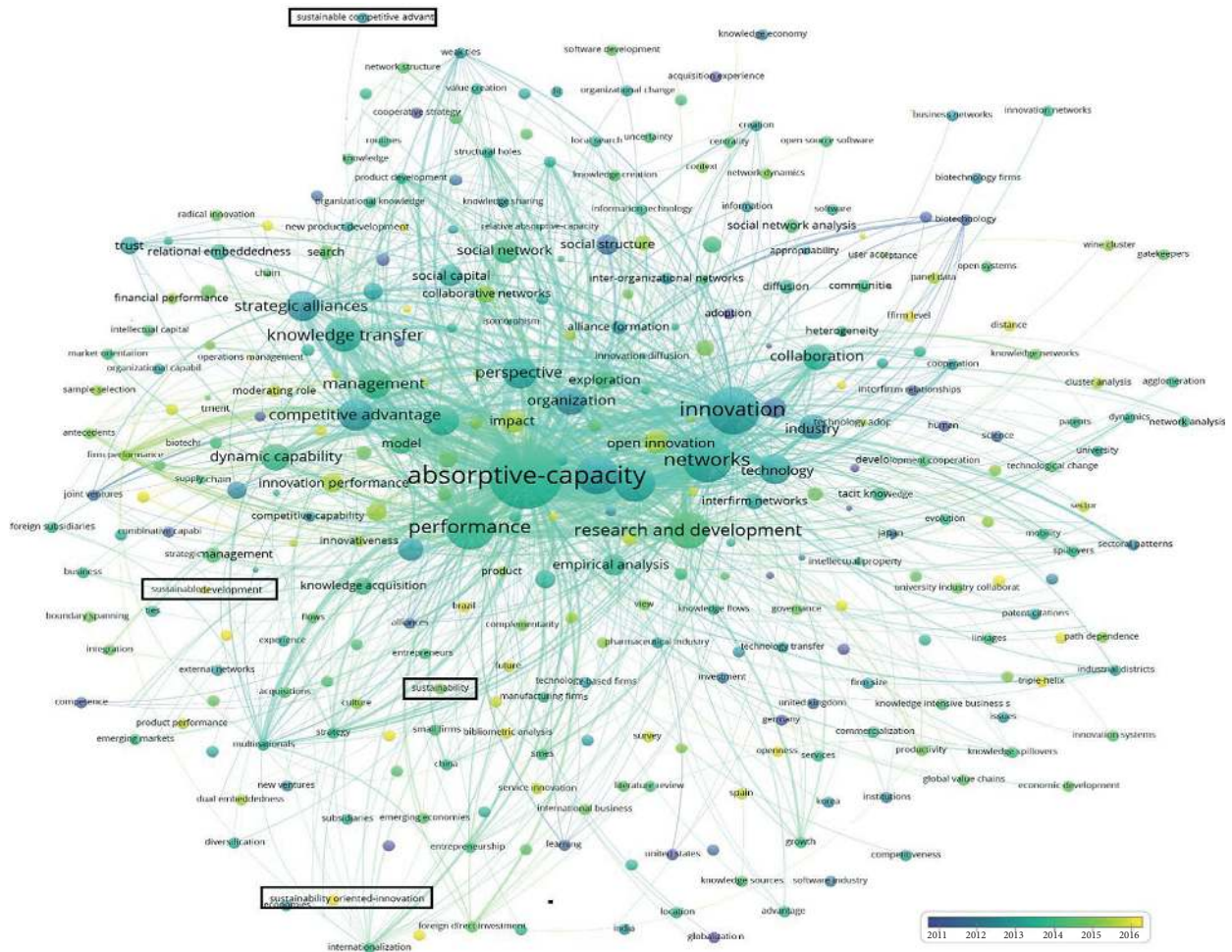


FIGURE 12: Temporal evolution of keywords network. Source: own elaboration with Web of Science and Scopus data (2018) processed with VOSviewer software.

## 5. Conclusions

ACAP is a key factor in the greater competitiveness of firms, particularly of SMEs, as has been demonstrated in various studies referenced in this work as it enables innovating from the access to external knowledge. This greater competitiveness is indispensable when developing strategies of accessing international markets, and in this sense, inter-organizational networks favor the process of internationalization, and ACAP acts as a factor which positively moderates this relation.

For this reason, the keywords “ACAP” and “Internationalization-Networking” were selected, meaning to understand how the study of these topics has been developed and how this study is currently and if there exists a gap which a research field can work on.

To that effect, it is verified that the scientific production reviewed in this study with the methodology described and which links the concepts of ACAP and internationalization-networking is found to be closely linked to their concepts of innovation and of performance. In the last five-year period, a growing trend has been perceived toward studies which include the topic of SMEs more intensely, but there is a still

scant interest in internationalization. Hence, a field without enough exploration has emerged. As a consequence, scientific investigation of this may be used by researchers, governments, and entrepreneurs to improve their international competitiveness.

The evidence of the survey carried out shows only 5 networks or clusters of countries and institutions where these studies are relevant, and of them, only 2 have a purely international profile, the North American-European-Asian network and the Canadian-Chinese one. Among the local networks (Spanish, Chinese, and British), the Spanish network stands out for its production and for being the only one with an interinstitutional profile. The other 2 lack this, concentrating themselves mainly on their own study and research centers.

The keywords tendency analysis shows that the current keywords most used share the core concept of innovation, such as open innovation, innovation performance, product innovation, innovation capability, and technological innovation. In a similar way, other trendy keywords are firm performance and collaborative networks. Finally, the sustainability topic has gained relevance and interest. Moreover, attention is paid to sustainable development and sustainability oriented innovation (SOI).

Although bibliometrics offers valuable information to support research evaluation, Waltman and Noyons [69] hold the position that bibliometric data sources such as Web of Science and Scopus offer only a limited coverage of the scientific and scholarly literature. International journals are typically well covered, but the coverage of national journals, journals in social sciences and humanities, conference proceedings, and books is much more limited. Finally, there is a bias of databases in favor of the literature in English, using a certain set of keywords for the search [88]. Another point to bear in mind about significant disciplinary differences is that different scientific fields have distinct publication, authorship, and citation practices.

Future research in the field of bibliometric studies could be the analysis of bibliometric indicators by 3D visualization.

## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest.

## References

- [1] J. Guimón, C. Cancino, A. López, and J. Miranda, "Nuevos modos de conexión con redes globales de innovación: el caso de Chile," *Revista Perfiles Latinoamericanos*, vol. 27, no. 54, pp. 1–28, 2019.
- [2] M. Presutti, C. Boari, A. Majocchi, and X. Molina-Morales, "Distance to customers, absorptive capacity, and innovation in high-tech firms: the dark face of geographical proximity," *Journal of Small Business Management*, vol. 57, no. 2, pp. 343–361, 2019.
- [3] Z. Al-Kalha, I. Reid, and B. Dehe, "Absorptive capacity perception towards supply chain quality integration," *Chain Management: An International Journal*, In press.
- [4] L. F. Agramunt and J. M. Berbel-Pineda, "The positive moderating effect of absorptive capacity on R&D investment: the case of Argentina's ICT firms," *Anais da Academia Brasileira de Ciências*, vol. 90, no. 3, pp. 3207–3221, 2018.
- [5] A. K. W. Lau and W. Lo, "Regional innovation system, absorptive capacity and innovation performance: an empirical study," *Technological Forecasting and Social Change*, vol. 92, pp. 99–114, 2015.
- [6] H.-T. Tsai, "Moderators on international diversification of advanced emerging market firms," *Journal of Business Research*, vol. 67, no. 6, pp. 1243–1248, 2014.
- [7] R. Chiva, P. Ghauri, and J. Alegre, "Organizational learning, innovation and internationalization: a complex system model," *British Journal of Management*, vol. 25, no. 4, pp. 687–705, 2014.
- [8] M. Kotabe, C. Jian, and J. Murray, "Examining the complementary effect of political networking capability with absorptive capacity on the innovative performance of emerging market firms," *Journal of Management*, vol. 43, no. 4, pp. 1131–1156, 2014.
- [9] S. K. Chetty and L. M. Stangl, "Internationalization and innovation in a network relationship context," *European Journal of Marketing*, vol. 44, no. 11–12, pp. 1725–1743, 2010.
- [10] D. D. Sharma and A. Blomstermo, "The internationalization process of born globals: a network view," *International Business Review*, vol. 12, no. 6, pp. 739–753, 2003.
- [11] World Trade Organization—WTO, "Levelling the trading field for SMEs," World Trade Report 2016, WTO Publishing, Geneva, Switzerland, 2016.
- [12] W. M. Cohen and D. A. Levinthal, "Absorptive capacity: a new perspective on learning and innovation," *Administrative Science Quarterly*, vol. 35, no. 1, pp. 128–152, 1990.
- [13] R. G. Fichman, "Real options and IT platform adoption: implications for theory and practice," *Information Systems Research*, vol. 15, no. 2, pp. 132–154, 2004.
- [14] R. Wink, "Commercialisation of bio-pharmaceutical therapies and risk management: the impact on the sustainability of markets for recombinant drugs," *International Journal of Biotechnology*, vol. 6, no. 2–3, pp. 186–201, 2004.
- [15] R. Van Wijk, J. J. P. Jansen, and M. A. Lyles, "Inter- and intra-organizational knowledge transfer: a meta-analytic review and assessment of its antecedents and consequences," *Journal of Management Studies*, vol. 45, no. 4, pp. 830–853, 2008.
- [16] B. Bigliardi and M. Bertolini, "Intermediaries driving eco-innovation in SMEs: a qualitative investigation," *European Journal of Innovation Management*, vol. 15, no. 4, pp. 442–467, 2012.
- [17] World Trade Organization—WTO, *Mainstreaming Trade to Attain the Sustainable Development Goals*, WTO Publishing, Geneva, Switzerland, 2018.
- [18] I. D. Apriliyanti and I. Alon, "Bibliometric analysis of absorptive capacity," *International Business Review*, vol. 26, no. 5, pp. 896–907, 2017.
- [19] M. Vargas Pérez, "La capacidad de absorción es dinámica?" *Innovar*, vol. 28, no. 67, pp. 75–87, 2018.
- [20] E. Seguí-Mas, E. Signes-Pérez, F. Sarrión-Viñes, and J. Alegre-Vidal, "Anàlisi bibliomètrica de la literatura internacional sobre innovació oberta i capacitat d'absorció," *Intangible Capital*, vol. 12, no. 1, pp. 51–72, 2016.
- [21] T. Macedo Soares, L. Diana, T. Silva Barboza, and F. P. De Oliveira Paula, "Absorptive capacity, alliance portfolios and innovation performance: an analytical model based on bibliographic research," *Journal of Technology Management & Innovation*, vol. 11, pp. 21–32, 2016.
- [22] M. M. Capobianco-Urriarte, M. P. Casado-Belmonte, G. M. Marín-Carrillo, and E. Terán-Yépez, "A bibliometric analysis of International competitiveness (1983–2017)," *Sustainability*, vol. 11, no. 7, p. 1877, 2019.
- [23] Organisation for Economic Co-operation and Development—OECD, *Paris Declaration on Aid Effectiveness. High Level Forum*, Publishing OECD, Paris, France, 2005.
- [24] B. M. Oviatt and P. P. McDougall, "Defining international entrepreneurship and modeling the speed of internationalization," *Entrepreneurship Theory and Practice*, vol. 29, no. 5, pp. 537–554, 2005.
- [25] J. Johanson and J.-E. Vahlne, "The Uppsala internationalization process model revisited: from liability of foreignness to liability of outsidership," *Journal of International Business Studies*, vol. 40, no. 9, pp. 1411–1431, 2009.
- [26] F. Achcaoucaou, P. Miravittles, and F. León-Darder, "Knowledge sharing and subsidiary R&D mandate development: a matter of dual embeddedness," *International Business Review*, vol. 23, no. 1, pp. 76–90, 2014.
- [27] J. Gibb, A. Sune, and S. Albers, "Network learning: episodes of interorganizational learning towards a collective performance goal," *European Management Journal*, vol. 35, no. 1, pp. 15–25, 2016.

- [28] J. Tarifa-Fernandez, J. De-Burgos-Jimenez, and J. Cespedes-Lorente, "Absorptive capacity as a confounder of the process of supply chain integration," *Business Process Management Journal*, vol. 25, no. 7, pp. 1587–1611, 2019, In press.
- [29] S. A. Zahra and G. George, "Absorptive capacity: a review, reconceptualization, and extension," *The Academy of Management Review*, vol. 27, no. 2, pp. 185–203, 2002.
- [30] A. Zucchella, G. Palamara, and S. Denicolai, "The drivers of the early internationalization of the firm," *Journal of World Business*, vol. 42, no. 3, pp. 268–280, 2007.
- [31] I. Demirkan and S. Demirkan, "Network characteristics and patenting in biotechnology, 1990–2006," *Journal of Management*, vol. 38, no. 6, pp. 1892–1927, 2012.
- [32] F.-J. Lin and Y.-H. Lin, "The effect of network relationship on the performance of SMEs," *Journal of Business Research*, vol. 69, no. 5, pp. 1780–1784, 2015.
- [33] T. Brink, "SME routes for innovation collaboration with larger enterprises," *Industrial Marketing Management*, vol. 64, pp. 122–134, 2017.
- [34] S. Chetty and D. B. Blankenburg-Holm, *The Role of Business Networks in the Internationalization of Manufacturing Firms: A Longitudinal Case Study*, Uppsala University, Uppsala, Sweden, 2000.
- [35] N. E. Coviello and H. J. Munro, "Growing the entrepreneurial firm," *European Journal of Marketing*, vol. 29, no. 7, pp. 49–61, 1995.
- [36] N. Coviello and H. Munro, "Network relationships and the internationalisation process of small software firms," *International Business Review*, vol. 6, no. 4, pp. 361–386, 1997.
- [37] I. Guler and A. Nerkar, "The impact of global and local cohesion on innovation in the pharmaceutical industry," *Strategic Management Journal*, vol. 33, no. 5, pp. 535–549, 2012.
- [38] S. T. Cavusgil and G. A. Knight, *Born Global Firms: A New International Enterprise*, Business Experts Press, New York, NY, USA, 2009.
- [39] A. Capaldo, "Network structure and innovation: the leveraging of a dual network as a distinctive relational capability," *Strategic Management Journal*, vol. 28, no. 6, pp. 585–608, 2007.
- [40] K. Eriksson and S. Chetty, "The effect of experience and absorptive capacity on foreign market knowledge," *International Business Review*, vol. 12, no. 6, pp. 673–695, 2003.
- [41] P. J. Lane and M. Lubatkin, "Relative absorptive capacity and interorganizational learning," *Strategic Management Journal*, vol. 19, no. 5, pp. 461–477, 1998.
- [42] P. J. Lane, B. R. Koka, and S. Pathak, "A thematic analysis and critical assessment of absorptive capacity research," in *Proceedings of the Annual Meeting of the Academy of Management*, vol. 6, Denver, CO, USA, 2002.
- [43] D. Cerrato and M. Piva, "The internationalization of small and medium-sized enterprises: the effect of family management, human capital and foreign ownership," *Journal of Management & Governance*, vol. 16, no. 4, pp. 617–644, 2012.
- [44] J. Onkelink, T. Manolova, and L. Edelman, "The human factor: investments in employee human capital, productivity, and SME internationalization," *Journal of International Management*, vol. 22, no. 4, pp. 351–364, 2016.
- [45] F. K. Yao and S. Chang, "Do individual employees' learning goal orientation and civic virtue matter? A micro-foundations perspective on firm absorptive capacity," *Strategic Management Journal*, vol. 38, no. 10, pp. 2041–2060, 2017.
- [46] S. Lev, A. Fiegenbaum, and A. Shoham, "Managing absorptive capacity stocks to improve performance: empirical evidence from the turbulent environment of Israeli hospitals," *European Management Journal*, vol. 27, no. 1, pp. 13–25, 2009.
- [47] K. Kostopoulos, A. Papalexandris, I. Papachroni, and G. Ioannou, "Absorptive capacity, innovation and financial performance," *Journal of Business Research*, vol. 64, pp. 1335–1343, 2011.
- [48] N. Roberts, P. S. Galluch, M. Dinger, and V. Grover, "Absorptive capacity and information system research: review, synthesis and directions for future research," *Information Systems*, vol. 6, pp. 25–40, 2012.
- [49] A. Cassol, C. R. Goncalo, and R. L. Ruas, "Redefining the relationship between intellectual capital and innovation: the mediating role of absorptive capacity," *Brazilian Administration Review*, vol. 13, no. 4, pp. 1–25, 2016.
- [50] M. Kohlbacher, D. Weitlaner, A. Hollosi, S. Grünwald, and H.-P. Grahsl, "Innovation in cluster: effects of absorptive capacity and environmental moderators," *Competitiveness Review*, vol. 23, no. 3, pp. 199–217, 2012.
- [51] W. Tsai, "Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance," *Academy of Management Journal*, vol. 44, no. 5, pp. 996–1004, 2001.
- [52] M. Aria and C. Cuccurullo, "Bibliometrix: an R-tool for comprehensive science mapping analysis," *Journal of Informetrics*, vol. 11, no. 4, pp. 959–975, 2017.
- [53] H. Baier-Fuentes, J. M. Merigó, J. E. Amorós, and M. Gaviria-Marín, "International entrepreneurship: a bibliometric overview," *International Entrepreneurship and Management Journal*, vol. 15, no. 2, pp. 385–429, 2019.
- [54] P. Sanguankaew and V. Vathanophas Ractham, "Bibliometric review of research on knowledge management and sustainability, 1994–2018," *Sustainability*, vol. 11, no. 16, p. 4388, 2019.
- [55] G. Sharma, "Innovation and entrepreneurship research in India from 2000 to 2018: a bibliometric survey," *Journal of Management Development*, vol. 38, no. 4, pp. 250–272, 2019.
- [56] M. Ansari, A. Pardakhty, O. Tajedini, A. Sadatmoosavi, and A. Khasseh, "Patterns of Iran's research collaboration in the field of pharmacology and pharmacy: a bibliometric study," *Library Philosophy and Practice*, no. 2326, pp. 1–26, 2019.
- [57] I. Danvila-del-Valle, C. Estévez-Mendoza, and F. J. Lara, "Human resources training: a bibliometric analysis," *Journal of Business Research*, vol. 101, pp. 627–636, 2019.
- [58] O. M. Cunill, A. S. Salvá, L. O. Gonzalez, and C. Mulet-Forteza, "Thirty-fifth anniversary of the international journal of hospitality management: a bibliometric overview," *International Journal of Hospitality Management*, vol. 78, pp. 89–101, 2019.
- [59] J. R. López-Robles, J. R. Otegi-Olaso, I. Porto Gómez, and M. J. Cobo, "30 years of intelligence models in management and business: a bibliometric review," *International Journal of Information Management*, vol. 48, pp. 22–38, 2019.
- [60] C. Cantù, D. Corsaro, A. Tunisini et al., "Interorganizational network and innovation: a bibliometric study and proposed research agenda," *Journal of Business & Industrial Marketing*, vol. 30, no. 3–4, pp. 354–377, 2015.
- [61] S. T. Matarneh, M. Danso-Amoako, S. Al-Bizri, M. Gaterell, and R. Matarneh, "Building information modeling for facilities management: a literature review and future research directions," *Journal of Building Engineering*, vol. 24, pp. 1–11, 2019.
- [62] L. N. Proskuryakova and G. V. Ermolenko, "The future of Russia's renewable energy sector: trends, scenarios and policies," *Renewable Energy*, vol. 143, pp. 1670–1686, 2019.

- [63] M. Ertz and S. Leblanc-Proulx, "Review of a proposed methodology for bibliometric and visualization analyses for organizations: application to the collaboration economy," *Journal of Marketing Analytics*, vol. 7, no. 2, pp. 84–93, 2019.
- [64] S. Corbet, M. Dowling, X. Gao, S. Huang, B. Lucey, and S. A. Vigne, "An analysis of the intellectual structure of research on the financial economics of precious metals," *Resources Policy*, vol. 63, 2019.
- [65] P. Jordão da Gama Silva, J. Brandalise Santos, and G. Portes Pereira, "Behavioral finance in Brazil: a bibliometric study from 2007 to 2017," *Latin American Business Review*, vol. 20, no. 1, pp. 61–82, 2019.
- [66] J. R. López-Robles, J. R. Otegi-Olaso, R. Arcos, N. K. Gamboa-Rosales, and H. Gamboa-Rosales, "Mapping the structure and evolution of JISIB: a bibliometric analysis of articles published in the journal of intelligence studies in business between 2011 and 2017," *Journal of Intelligence Studies in Business*, vol. 8, no. 3, 2019.
- [67] H. Liao, M. Tang, Z. Li, and B. Lev, "Bibliometric analysis for highly cited papers in operations research and management science from 2008 to 2017 based on essential science indicators," *Omega*, vol. 88, pp. 223–236, 2019.
- [68] F. Belussi, L. Orsi, and M. Savarese, "Mapping business model research: a document bibliometric analysis," *Scandinavian Journal of Management*, vol. 35, pp. 1–19, 2019.
- [69] L. Waltman and E. Noyons, *Bibliometrics for Research Management and Research Evaluation A Brief Introduction*, Centre for Science and Technology Studies (CWTS) at Leiden University, Leiden, Netherlands, 2018.
- [70] E. Terán-Yépez, G. M. Marín-Carrillo, M. P. Casado-Belmonte, and M. M. Capobianco-Urriarte, "Sustainable entrepreneurship: review of its evolution and new trends," *Journal of Cleaner Production*, vol. 252, Article ID 119742, 2019.
- [71] P. Mongeon and A. Paul-Hus, "The journal coverage of Web of Science and Scopus: a comparative analysis," *Scientometrics*, vol. 106, no. 1, pp. 213–228, 2016.
- [72] A.-W. Harzing and S. Alakangas, "Google scholar, scopus and the web of science: a longitudinal and cross-disciplinary comparison," *Scientometrics*, vol. 106, no. 2, pp. 787–804, 2016.
- [73] A. Martín-Martín, E. Orduna-Malea, M. Thelwall, and E. Delgado López-Cózar, "Google scholar, web of science, and scopus: a systematic comparison of citations in 252 subject categories," *Journal of Informetrics*, vol. 12, no. 4, pp. 1160–1177, 2018.
- [74] F. N. Silva, D. R. Amancio, M. Bardosova, L. d. F. Costa, and O. N. Oliveira, "Using network science and text analytics to produce surveys in a scientific topic," *Journal of Informetrics*, vol. 10, no. 2, pp. 487–502, 2016.
- [75] N. J. van Eck and L. Waltman, "Software survey: vosviewer, a computer program for bibliometric mapping," *Scientometrics*, vol. 84, no. 2, pp. 523–538, 2010.
- [76] G. Cantos-Mateos, M. D. L. A. Zulueta-García, B. Vargas-Quesada, and Z. Chinchilla-Rodríguez, "Estudio comparativo sobre la visualización de redes de co-words a través de los descriptores del science citation index y de medline," in *Proceedings of the Conference: I Congresso ISKO Espanha e Portugal/XI Congresso ISKO Espanha*, Porto, Portugal, November 2013.
- [77] M. J. Cobo, A. G. López-Herrera, E. Herrera-Viedma, and F. Herrera, "Science mapping software tools: review, analysis, and cooperative study among tools," *Journal of the American Society for Information Science and Technology*, vol. 62, no. 7, pp. 1382–1402, 2011.
- [78] B. Carlsson and S. Jacobsson, "Technological systems and economic policy: the diffusion of factory automation in Sweden," *Research Policy*, vol. 23, no. 3, pp. 235–248, 1994.
- [79] G. Szulanski, "Exploring internal stickiness: impediments to the transfer of best practice within the firm," *Strategic Management Journal*, vol. 17, no. 2, pp. 27–43, 1996.
- [80] F. Meyer-Krahmer and G. Reger, "New perspectives on the innovation strategies of multinational enterprises: lessons for technology policy in Europe," *Research Policy*, vol. 28, no. 7, pp. 751–776, 1999.
- [81] M. P. Viana, D. R. Amancio, and L. d. F. Costa, "On time-varying collaboration networks," *Journal of Informetrics*, vol. 7, no. 2, pp. 371–378, 2013.
- [82] H. Bathelt, A. Malmberg, and P. Maskell, "Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation," *Progress in Human Geography*, vol. 28, no. 1, pp. 31–56, 2004.
- [83] R. Reagans and B. McEvily, "Network structure and knowledge transfer: the effects of cohesion and range," *Administrative Science Quarterly*, vol. 48, no. 2, pp. 240–267, 2003.
- [84] H. Yli-Renko, E. Autio, and H. J. Sapienza, "Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms," *Strategic Management Journal*, vol. 22, no. 6-7, pp. 587–613, 2001.
- [85] D. Lavie and S. R. Miller, "Alliance portfolio internationalization and firm performance," *Organization Science*, vol. 19, no. 4, pp. 623–646, 2008.
- [86] G. H. Brundtland, *Presentation of the Report of the World Commission on Environment and Development to the Commission of the European Communities, the EC and EFTA Countries*, World Commission on Environment and Development, Brussels, Belgium, 1987.
- [87] A. Melane-Lavado and A. Álvarez-Herranz, "Different ways to access knowledge for sustainability-oriented innovation. The effect of foreign direct investment," *Sustainability*, vol. 10, no. 11, p. 4206, 2018.
- [88] T. Vilutiene, D. Kalibatiene, M. Reza Hosseini, E. Pellicer, and E. Kazimieras Zavadskas, "Building information modeling (bim) for structural engineering: a bibliometric analysis of the literature," *Advances in Civil Engineering*, vol. 2019, Article ID 5290690, 19 pages, 2019.