

# Bibliometric analysis of entrepreneurial orientation

Bibliometric  
analysis of EO

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## Abstract

**Purpose** – The remarkable concept of entrepreneurial orientation (EO) has attracted scholars' attention for its relevance to a firm's performance. Based on bibliometric and distance-based visualization of similarities (VOS) analysis, the purpose of this paper is to outline a broad-spectrum perspective of the structure of research in EO across more than 20 years of publications, identifying the most prominent journals, authors and articles in this field.

**Design/methodology/approach** – The paper uses the Web of Science Core Collection and the VOS viewer software. The analysis searches for all the documents connected to EO available in the database from 1976 to 2017. The graphical visualization maps the bibliographic data using both bibliographic coupling and co-citation data.

**Findings** – *Entrepreneurship Theory and Practice Journal, Journal of Business Venturing* and *Family Business Review* are the most relevant journals in the field. Among the many important authors in the EO literature, key contributors are Lumpkin, Payne, Short, Covin, Dess and Wiklund. Three different streams of research are linked to the EO concept; strategy and entrepreneurship, family business and miscellaneous work in psychometrics, methods, marketing and knowledge/capability-based approaches to organizations.

**Originality/value** – This paper contributes to EO research by providing a global perspective on the concept's investigation, using bibliometric data and graphical networks.

**Keywords** Bibliometrics, Web of Science, Entrepreneurial orientation, Analytics, VOS network analysis

**Paper type** Research paper

## 1. Introduction

Entrepreneurial orientation (EO) is one of the most important concepts in the field of entrepreneurship (Wales *et al.*, 2011), and entrepreneurship is linked to healthy economic development of countries. Researchers in this field have identified it as an cultural orientation or strategic logic that permits the search for and exploitation of new business prospects, even those that do not include the launch of new initiatives (Lumpkin and Dess, 1996; Covin and Miles, 1999; Zahra *et al.*, 1999; Rauch *et al.*, 2009).

The organizational phenomena of EO can be understood as a dominant logic that permeates the organization at all levels (see Prahalad and Bettis, 1986), as manifested in attitudes and behaviors and a strategic position (George and Marino, 2011) that captures patterns and processes in three specific dimensions: innovativeness, proactiveness and risk taking (Wiklund and Shepherd, 2005). These concepts were defined by Lumpkin and Dess (1996) as follows: innovativeness is the will to introduce a new entry (new products, new services and new processes) through practices of experimentation and creative methods (Lumpkin and Dess, 1996); proactiveness refers to the independent action of an individual or team whose goal is to give birth to a business concept or vision and to carry it out until its end (Lumpkin and Dess, 1996); and risk taking means adopting measures based on a decision-making process without full knowledge about possible outcomes (Lumpkin and Dess, 1996).

Given its importance and proximity to innovation, organizational theory and strategy, research on EO has been continuously expanding for more than two decades (Covin and Lumpkin, 2011). Research on EO has largely considered its positive relationship with



performance, as highlighted in different meta-analyses (i.e. Rauch *et al.*, 2009; Saeed *et al.*, 2014). These studies note that some contingent variables moderate the relationship at two different levels. First, at a macroeconomic level, variables such as national culture, the regulatory environment, market size, the economic development and political stability of a country affect the relationship between EO and performance (Saeed *et al.*, 2014). Second, other features of the firm have also been explored as variables, such as the structure and size of the organization and its processes and resources (Rauch *et al.*, 2009). Nonetheless, this information does not give a complete overview of the structure of research on EO, and the influence and relevance of journals, authors, papers or institutions in the development of this subfield in entrepreneurship.

Analysis using bibliometric techniques can consider different levels of relevance for research in any field, incorporating the most important papers and journals in the investigation by combining useful information such as citations, the number of publications and other data that allow categorization according to the relevance to the discipline, making it possible to construct an overview.

To categorize all of the information coming from different studies, scholars in different disciplines have provided a general bibliometric perspective of fields related to EO, including innovation, management and entrepreneurship. In the innovation case, bibliometric analysis has been conducted from a general perspective (Fagerberg *et al.*, 2012) and from more specific perspectives, such as an overview of the most relevant papers (Shafique, 2013), journals (Durisin *et al.*, 2010; Thongpapanl, 2012), institutions (Fagerberg and Verspagen, 2009; Fagerberg *et al.*, 2012), countries (Must, 2006; Teixeira, 2014; Merigó *et al.*, 2015), continents (Toivanen and Ponomariov, 2011) and other related subjects (Watts *et al.*, 1998; Zhu and Guan, 2013; Sakata *et al.*, 2013).

Bibliometric procedures have also been applied to the management discipline in subjects such as strategy (Moed, 2000; Ramos-Rodríguez and Ruiz-Navarro, 2004; Nerur *et al.*, 2008; Vogel and Güttel, 2013), knowledge management (Ponzi, 2002; Gu, 2004; Zhang and Xu, 2008; Akhavan *et al.*, 2016), information management (Hanqing, 2009), technology management (Pilkington and Teichert, 2006), sales management (Johnson, 2006), operation and production management (Chang and Hsieh, 2008; Hsieh and Chang, 2009), program management (Artto *et al.*, 2009), supply chain management (Charvet *et al.*, 2008; Fahimnia *et al.*, 2015), HHRR (Fernandez-Alles and Ramos-Rodríguez, 2009), corporate sustainability (Schaltegger *et al.*, 2013), customer relationship management (Tsai, 2011) and even sports management (Shilbury, 2011). As in the case of innovation, bibliometric procedures have identified the most relevant researchers (Podsakoff *et al.*, 2008), institutions (Vogel, 2012), journals (Shilbury, 2011) and countries (Courtault *et al.*, 2010) in the field of management.

Entrepreneurship has been explored through bibliometrics at a general level (Luor *et al.*, 2014; Ferreira *et al.*, 2015) and at the knowledge structure level (Landström *et al.*, 2012, 2015), identifying the most important articles (Volery and Mazzarol, 2015), authors (Shane, 1997), journals (McElwee and Atherton, 2005; Wan *et al.*, 2009; Dos Santos *et al.*, 2011), institutions (Schildt *et al.*, 2006; Grimaldi *et al.*, 2011; Teixeira, 2011) and countries (Zhai *et al.*, 2014) to the field. In the same manner, bibliometric procedures have been utilized to explore more specific fields of entrepreneurship, such as technological entrepreneurship (Ferreira *et al.*, 2016), social entrepreneurship (Etemad and Lee, 2003; Sassmannshausen and Volkmann, 2013; Kraus *et al.*, 2014; Rey-Martí *et al.*, 2016), entrepreneurship in family business (López-Fernández *et al.*, 2016), international entrepreneurship (Kraus, 2011; Servantie *et al.*, 2016), national systems of entrepreneurship (Ács *et al.*, 2014) and the scales and indicators utilized to measure entrepreneurship (Kuskova *et al.*, 2011; Álvarez *et al.*, 2014).

Even when all of the aforementioned studies are related to the concept of EO, their focus does not allow for an independent perspective about our domain of interest. Moreover, because this subject includes a great variety of contributions and contributors to the entrepreneurship domains, no single published article provides a global vision on research

related specifically to this concept. Consequently, this paper aims to help close this gap by providing an overall perspective of the key contributions and contributors to EO research through the use of bibliometrics and visualization of similarities (VOS) based on distances techniques using the Web of Science database. The timeframe considered in our analyses starts from 1976, which is the year that the seminal article of Khandwalla: "Some top management styles, their context and performance" first mentioned the term "EO" in the context of culture inside a firm. All of the obtained information was organized and categorized according to its relevance to the EO research by articles, authors and journals.

Because the purpose of this paper is to provide an overview of the most prolific and prominent research related to the EO, we consider the Web of Science database that covers most world reputed management and entrepreneurship journals.

This paper is organized as follows. Section 2 provides a description of the methodology addressed; Section 3 presents the results of most prominent EO research at the articles level of analysis; Section 4 accounts for the most prolific and prominent researchers in the concept; and Section 5 provides some conclusions.

## 2. Methodology

Bibliometric analyses of citations and co-citations are based on purely quantitative approaches and are supported by the premise that citations are a valid and reliable indicator of scientific interaction between researchers and research institutions (Garfield, 1979; Kraus *et al.*, 2012). Thus, they can be used to determine both the relevance and impact of any author, publication or journal and the structure of the field of study addressed (Small, 1978).

The bibliometric analysis was based on the proposed procedures of Merigó *et al.* (2015), and the mapping techniques used the VOS approach based on the work of Van Eck and Waltman (2010), using the Web of Science database (Clarivate/Thomson Reuters), as the relevant information source. This database was chosen due to the prestige within the academic and scientific community of the journals indexed there and its adherence to key quality criteria that can be generalized to any revision process that covers some type of subject or area of specific knowledge (Torraco, 2005). The data search was limited to the main collection of Web of Science, which covers approximately 151 areas of research, grouping more than 12,000 journals and approximately 50m articles and other products of scientific publication to the date in which this search was developed. Although there are several databases with high prestige among the scientific community, such as Scopus or EBSCOhost, this research focused on the Web of Science database.

A basic search was made, limiting the request to the specific words: "EO" OR "EO\*" OR "Orientación Emprendedora." This concrete and delimited exploration helped concentrate the results in the specific construct focus of this paper. By using this procedure until year 2017, 1,144 results were found across seven different publication categories and were grouped as follows: articles (1,062); reviews (68); proceedings papers (14); editorial materials (7); book chapters (2); meeting abstracts (4); book reviews (1); and corrections (2). To guide the results of the search toward the production of scientific knowledge in the topic of EO in the purest way as possible, only articles and reviews, totaling 1,130 documents, were considered for the analysis.

Analysis of the information was approached through two main complementary perspectives: first, H-index analysis of journals and articles, accompanied by a citation exploration; and second, mapping construction and analysis based on co-citation patterns.

The H-index is an important bibliometric instrument that is highly accepted by the academic community to measure the impact of scientific production (Hirsch, 2005). This index aims to measure the impact of the achievements in research production based on individual outcomes (Alonso *et al.*, 2009). The H-index is calculated as the number of publications that have received at least the same number of citations.

The analysis based on the VOS corresponds to a bibliometric mapping and clustering technique in which the distance between two items reflects the strength of the relation between them, with the shortest distance representing the strongest relationship and vice versa. The key difference between citation and co-citation analysis is that the former aims to identify the relevance of different authors or journals based on the number of times they are cited (Voeth *et al.*, 2006), whereas the latter aims to provide information on the internal structure of the field of research based on the relationship between authors and publications, quantifying proximity based on the similarity of the content of the publications analyzed (Kraus *et al.*, 2012) and the number of times they are cited together (Van Eck and Waltman, 2010). The software utilized in this analysis was the VOS viewer, version 1.6.4, developed by Van Eck and Waltman (2010).

VOS viewer has been a useful tool for creating, visualizing and exploring bibliometric maps of science (Van Eck and Waltman, 2010). For instance, mapping entire areas of research in full fields of study such as marketing (González-Valiente, 2014), strategic management (Maia *et al.*, 2015) and even in other sciences, such as clinical medicine (Alfonzo *et al.*, 2014; Xing *et al.*, 2018). One of its strengths is that it can map field structures at different levels of analysis such as journals (Van Leeuwen and Wouters, 2017; Merigó *et al.*, 2016; Kolle, 2016; Cancino *et al.*, 2017), geographical spaces, countries or continents (Lu and Wolfram, 2010), and even more detailed subjects or sub fields like new product development (Andrade-Valbuena and Merigo, 2018), green supply chain management (Mishra *et al.*, 2017), technology road mapping (Zhang *et al.*, 2013), fuzzy research (Blanco-Mesa *et al.*, 2016) among others. Moreover, specific constructs at the level of the firm as market orientation (Valenzuela-Fernández *et al.*, 2018), or social value (Fulgencio *et al.*, 2016) have been researched using this technique, highlighting its usefulness for outlining the literature on EO, purpose of this investigation.

The VOS analysis was completed using the fractional counting method, which fractionates each publication by the number of authors, giving the same proportion of authorship to each author.

### 3. Results and analysis

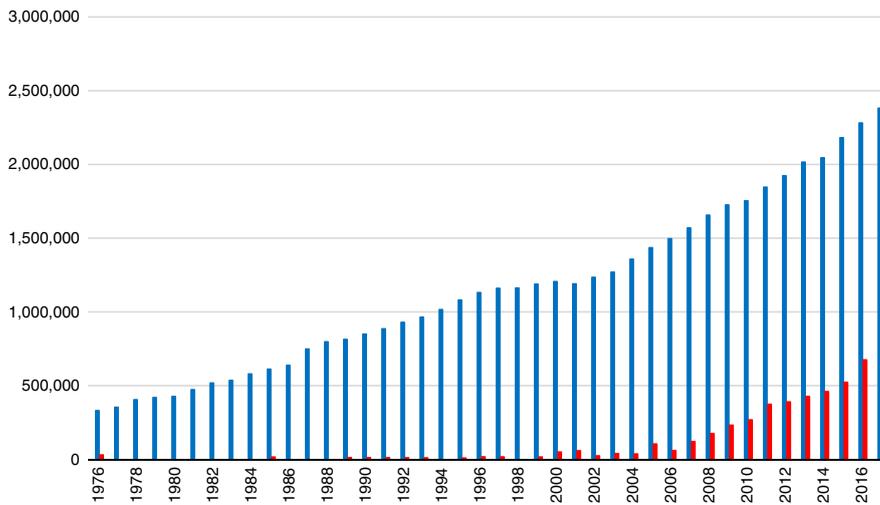
#### 3.1 A general overview of EO research

The distribution of the intellectual production of EO over time is shown in Figure 1.

As shown in Figure 1, the number of publications related to EO has been constantly increasing, especially over the last ten years, during which nearly 94 percent of all of the analyzed material was published. Notably, in the last two years (2016 and 2017), the number of publications is already 35 percent greater than the number of publications from 2015 and 2014, which reflects the relevance that the concept of EO has been gathering among scholars.

Computing the H-index for the EO research yields a value of 58, which indicates that the same number of articles have received at least 58 citations. These data prompt a question about the citation structure of the articles that have been published about EO. Table I addresses this issue, showing the number of citations with the number of papers published per year.

Table I shows a construction of knowledge and learning based on the results of what can be called leaders of the field, with only one paper exceeding 500 citations and seven exceeding 250 citations, as has been verified in different areas of research such as biology or physics. This is consistent with the fact that despite the earlier publication by Khandwalla (1976), where he introduced the concept, EO research exploded after the year 2000. It can be argued that the triggers of this wave of research on EO were the two articles by Lumpkin and Dess (1996, 2001) where they redefine and measure the EO concept and link it to performance, both articles with the higher citation counts in the sample.



**Notes:** Total articles+reviews published in WoS per year. Blue bars indicate the number of papers published per year, and red bars indicate the ratio  $(EO-TP/WoS-TP) \times 10^{11}$ , where EO-TP is the total number of papers published related to EO and WoS-TP the number of papers published in WoS

**Figure 1.**  
Total articles  
published on  
entrepreneurial  
orientation by year

### 3.2 Most relevant journals in EO research

In the same way, we can explore the relative prominence and relevance of journals that publish articles referring to EO. Table II shows the ranking of the 100 most prominent journals in the research on EO indexed in the core collection of the Web of Science database, considering the H-index based on EO research. The second classification item corresponds to the number of papers published in EO, and the third classification item is the number of citations per EO articles. Moreover, we have included some other well-known bibliometric classification items such as the total number of papers published in each journal, the number of citations received in these papers, the general H-index, and the impact factor that the Web of Science database has calculated.

Table II shows that the most relevant journals for the investigation of the EO are *Entrepreneurship Theory and Practice* and the *Journal of Business Venturing*, for which the H-indexes based on OE (H-EO) are almost doubled compared to that of the third-ranked journal on the list, the *Family Business Review*. The preponderance of the *Entrepreneurship Theory and Practice Journal*, and the presence of others such as the *Entrepreneurship and Regional Development Journal* and the *International Entrepreneurship and Management Journal* were expected because they are very influential journals in the field of entrepreneurship, as can be verified by other H-indexes. This last journal actively engages with EO research, with nearly 8 percent of its publications devoted to this subject. The interdisciplinary nature of the concept of EO is evident by the presence of journals in the Top 100 ranking (like *Industrial Marketing Management*, *Journal of Business Research*, *Strategic Management Journal* or *Journal of World Business*) that do not directly include the scope of entrepreneurship in its publications. In addition, it is interesting to note that a considerable percentage of the journals in Table II are specialized publications for small businesses and family businesses, as noted by different meta-analyses on the topic concerning the positive impact of this strategy for these type of firms (see Rauch *et al.*, 2009; Saeed *et al.*, 2014).

PY	≥500	≥250	≥100	≥50	≥25	≥10	≥5	≥1	TP	%P	%Acum. P.
1976	-	-	-	-	1	1	1	1	1	0.1	0.1
1977	-	-	-	-	-	-	-	-	0	0.0	0.1
1978	-	-	-	-	-	-	-	-	0	0.0	0.1
1979	-	-	-	-	-	-	-	-	0	0.0	0.1
1980	-	-	-	-	-	-	-	-	0	0.0	0.1
1981	-	-	-	-	-	-	-	-	0	0.0	0.1
1982	-	-	-	-	-	-	-	-	0	0.0	0.1
1983	-	-	-	-	-	-	-	-	0	0.0	0.1
1984	-	-	-	-	-	-	-	-	0	0.0	0.1
1985	-	-	-	1	1	1	1	1	1	0.1	0.2
1986	-	-	-	-	-	-	-	-	0	0.0	0.2
1987	-	-	-	-	-	-	-	-	0	0.0	0.2
1988	-	-	-	-	-	-	-	-	0	0.0	0.2
1989	-	-	-	-	-	1	1	1	1	0.1	0.3
1990	-	-	-	1	1	1	1	1	1	0.1	0.4
1991	-	-	-	-	-	1	1	1	1	0.1	0.5
1992	-	-	-	-	-	-	-	-	1	0.1	0.5
1993	-	-	-	-	1	1	1	1	1	0.1	0.6
1994	-	-	-	-	-	-	-	-	0	0.0	0.6
1995	-	-	-	-	1	1	1	1	1	0.1	0.7
1996	1	1	1	2	2	2	2	2	2	0.2	0.9
1997	-	-	1	1	2	2	2	2	2	0.2	1.1
1998	-	-	-	-	-	-	-	-	0	0.0	1.1
1999	-	-	-	-	-	1	2	2	2	0.2	1.3
2000	-	-	4	5	6	6	6	6	6	0.5	1.8
2001	-	2	4	5	6	7	7	7	7	0.6	2.5
2002	-	-	-	-	2	3	3	3	3	0.3	2.7
2003	-	-	1	1	3	4	4	5	5	0.5	3.2
2004	-	1	3	3	4	4	5	5	5	0.5	3.6
2005	-	2	4	8	11	13	13	14	15	1.4	5.0
2006	-	-	3	4	6	7	8	9	9	0.8	5.8
2007	-	-	3	7	13	16	18	19	19	1.7	7.5
2008	-	-	3	9	14	22	25	29	29	2.6	10.2
2009	-	1	3	13	20	28	34	39	40	3.6	13.8
2010	-	-	-	10	19	34	40	47	47	4.3	18.1
2011	-	-	1	3	21	38	48	62	69	6.3	24.4
2012	-	-	1	4	17	38	50	71	75	6.8	31.2
2013	-	-	-	-	4	31	46	79	86	7.8	39.0
2014	-	-	-	-	1	12	41	77	94	8.5	47.5
2015	-	-	-	-	-	3	11	74	114	10.4	57.9
2016	-	-	-	-	-	-	43	90	230	20.9	78.8
2017	-	-	-	-	-	-	-	31	233	21.2	100.0
Total	1	7	32	75	153	273	367	585	1,130	100.00	-
Percentage	0.10	0.90	4.10	9.60	19.50	34.80	46.80	74.50	100.00	-	-

**Table I.**  
Citation structure of the investigations related to entrepreneurial orientation

**Notes:** PY, publication year; ≥100, ≥50, ≥25, ≥10, ≥5, ≥1 is the number of papers that has reached that threshold of citations; TP, total number of papers published in that year; %P, the percentage of papers that has been published in that year with respect to the total of papers published; %Acum. P., the accumulated percentage of papers published until that year

### 3.3 Most relevant articles in EO research

One of the most relevant features related to the use of bibliometric indicators is revealing the most important publications, or those that have had the greatest impact on research. To this end regarding EO, Table III is constructed. In this ranking, it is evident that the most reputed article in the field of the EO is by Lumpkin and Dess (1996).

R	Journal	H-EO	TC-EO <sup>a</sup>	TP-EO	%EO/ TP	TP	TC	H	IF	T50
1	<i>Entrepreneurship Theory and Practice</i>	22	1,675	46	6.6	696	21,294	74	3.414	7
2	<i>Journal of Business Venturing</i>	20	2,245	26	2.5	1,038	53,306	113	4.204	0
3	<i>Family Business Review</i>	12	608	17	5.3	321	5,969	41	4.147	0
4	<i>International Small Business Journal</i>	12	339	30	4.4	686	6,157	35	2.215	2
5	<i>Entrepreneurship and Regional Development</i>	11	515	16	3.5	460	7,202	39	1.629	0
6	<i>Journal of Small Business Management</i>	10	461	38	4.8	799	13,617	54	1.937	3
7	<i>Industrial Marketing Management</i>	9	649	18	0.6	2,813	42,233	80	1.93	1
8	<i>Journal of Business Research</i>	9	521	38	0.8	5,048	77,473	105	2.129	2
9	<i>Journal of World Business</i>	9	473	15	1.8	813	17,435	61	2.811	0
10	<i>Small Business Economics</i>	9	388	15	1.0	1,507	27,155	72	1.795	0
11	<i>Strategic Management Journal</i>	8	1,238	10	0.4	2,435	248,748	232	3.38	0
12	<i>Technovation</i>	7	222	10	0.5	1,938	30,789	71	2.243	0
13	<i>International Journal of Entrepreneurial Behaviour Research</i>	7	119	22	10.1	217	966	15	1.863	0
14	<i>British Journal of Management</i>	6	169	9	1.2	734	13,343	51	2.188	0
15	<i>Management Decision</i>	6	160	19	1.5	1,279	7,701	37	1.134	0
16	<i>International Entrepreneurship and Management Journal</i>	6	149	20	7.5	265	1,488	19	0.659	0
17	<i>International Business Review</i>	6	140	15	1.8	828	8,399	39	1.669	0
18	<i>Strategic Entrepreneurship Journal</i>	6	138	6	2.8	214	3,562	31	1.8	0
19	<i>Journal of Management Studies</i>	6	110	6	0.2	2,513	70,293	119	4.131	0
20	<i>Research Policy</i>	5	321	8	0.3	3,030	121,241	159	3.47	0
21	<i>International Marketing Review</i>	5	169	9	1.3	687	8,526	42	1.588	0
22	<i>Journal of Product Innovation Management</i>	5	139	12	0.6	1,915	41,087	96	2.086	0
23	<i>International Journal of Hospitality Management</i>	5	80	7	0.6	1,219	23,624	67	3.445	0
24	<i>Journal of Technology Transfer</i>	5	64	10	1.9	530	6,882	38	2.932	0
25	<i>Journal of Business Ethics</i>	5	7	8	0.1	7,059	163,945	135	2.917	0
26	<i>Academy of Management Review</i>	4	2,594	5	0.2	2,295	335,790	292	8.855	1
27	<i>Academy of Management Journal</i>	4	746	4	0.1	2,812	378,988	311	6.7	3
28	<i>Journal of Management</i>	4	303	7	0.4	1,664	112,991	158	6.051	0
29	<i>Journal of International Marketing</i>	4	229	4	0.8	507	10,544	52	3.25	1
30	<i>International Journal of Production Economics</i>	4	81	6	0.1	5,972	144,644	125	4.407	0
31	<i>Journal of Family Business Strategy</i>	4	69	11	6.6	167	1,321	18	2.605	0
32	<i>Service Industries Journal</i>	4	65	9	0.5	1,803	11,886	36	0.776	0
33	<i>International Journal of Technology Management</i>	4	63	9	0.5	1,982	10,899	35	0.867	0
34	<i>Asia Pacific Journal of Management</i>	4	54	7	1.8	396	4,038	32	2.135	2
35	<i>Journal of Business Industrial Marketing</i>	4	39	9	1.2	733	6,500	31	1.833	0

(continued)

**Table II.**  
100 most prominent  
journals in  
entrepreneurial  
orientation research

R	Journal	H-EO	TC-EO <sup>a</sup>	TP-EO	%EO/ TP		TP	TC	H	IF	T50
36	<i>Baltic Journal of Management</i>	4	39	7	2.9	242	1,140	16	1.149	0	
37	<i>Journal of Management Organization</i>	4	9	9	1.6	554	2,918	21	1.189	0	
38	<i>Journal of Operations Management</i>	3	173	3	0.4	783	61,505	135	4.899	0	
39	<i>R D Management</i>	3	169	6	0.3	2,071	29,153	78	1.857	1	
40	<i>Journal of the Academy of Marketing Science</i>	3	98	5	0.5	1,042	66,581	129	8.488	0	
41	<i>Technology Analysis Strategic Management</i>	3	77	7	0.6	1,208	16,187	53	1.744	0	
42	<i>Human Resource Management</i>	3	62	3	0.2	1,502	29,461	75	2.474	0	
43	<i>Supply Chain Management an International Journal</i>	3	57	3	0.4	692	20,389	68	3.833	0	
44	<i>International Journal of Human Resource Management</i>	3	42	3	0.1	2,410	42,016	77	2.425	0	
45	<i>Journal of International Management</i>	3	39	4	1.1	351	6,631	41	2.298	0	
46	<i>European Journal of International Management</i>	3	38	14	3.6	384	1,728	17	0.672	0	
47	<i>European Management Journal</i>	3	38	7	1.7	419	2,233	18	1.437	0	
48	<i>European Journal of Marketing</i>	3	38	4	0.3	1,548	14,148	46	1.088	0	
49	<i>Canadian Journal of Administrative Sciences Revue Canadienne Des Sciences De L Administration</i>	3	34	6	0.9	679	5,628	38	0.674	0	
50	<i>Journal of Small Business and Enterprise Development</i>	3	29	14	8.6	162	318	8	-	0	
51	<i>Innovation Management Policy Practice</i>	3	28	4	1.2	336	1,777	19	0.915	0	
52	<i>Transformations in Business Economics</i>	3	26	4	0.4	934	2,414	16	1.112	0	
53	<i>Journal of International Entrepreneurship</i>	3	24	6	8.5	71	161	7	-	0	
54	<i>African Journal of Business Management</i>	3	23	11	0.6	1,968	6,246	24	1.105	0	
55	<i>South African Journal of Business Management</i>	3	22	8	2.8	290	683	10	0.277	0	
56	<i>Journal of Management and Organization</i>	3	19	7	1.4	490	1,501	15	0.405	0	
57	<i>Decision Sciences</i>	2	116	3	0.2	1,408	48,416	101	1.641	0	
58	<i>Review of Managerial Science</i>	2	105	6	3.2	187	905	13	1.483	0	
59	<i>E M Ekonomie A Management</i>	2	45	2	0.3	590	2,429	19	1.311	0	
60	<i>Technological Forecasting and Social Change</i>	2	38	5	0.1	4,299	53,829	84	3.129	0	
61	<i>Entrepreneurial Business and Economics Review</i>	2	30	7	5.1	136	169	6	-	0	
62	<i>Creativity and Innovation Management</i>	2	30	6	2.0	300	2,572	24	1.553	0	
63	<i>Nonprofit and Voluntary Sector Quarterly</i>	2	23	3	0.2	1,515	18,547	62	1.932	0	
64	<i>Sustainability</i>	2	21	14	0.2	5,654	23,904	37	2.075	0	
65	<i>Industrial Management Data Systems</i>	2	19	3	0.2	1,664	25,469	69	2.948	0	

Table II.

(continued)

R	Journal	H-EO	TC-EO <sup>a</sup>	TP-EO	%EO/ TP	TP	TC	H	IF	T50
66	<i>Journal of Organizational Change Management</i>	2	17	7	0.6	1,245	14,433	51	1.262	0
67	<i>Journal of Cleaner Production</i>	2	16	7	0.1	9,435	176,544	126	5.651	0
68	<i>African Journal of Business Management</i>	2	11	11	0.6	1,968	3,690	17	1.105	2
69	<i>International Journal of Contemporary Hospitality Management</i>	2	11	5	0.6	785	8,246	39	2.874	0
70	<i>Asian Business Management</i>	2	11	4	1.4	281	1,181	15	1.179	0
71	<i>Journal for East European Management Studies</i>	2	11	4	1.7	235	677	10	0.794	0
72	<i>BRQ Business Research Quarterly</i>	2	10	5	5.9	85	378	10	2.41	0
73	<i>Long Range Planning</i>	2	10	4	0.1	3,922	39,396	82	3.221	0
74	<i>Asian Journal of Technology Innovation</i>	2	9	3	1.2	251	785	9	0.845	0
75	<i>Journal of Business Economics and Management</i>	2	9	3	0.5	576	3,994	27	1.503	0
76	<i>European Management Review</i>	2	7	4	1.4	294	3,925	34	1.25	1
77	<i>Baltic Journal of Economics</i>	2	7	2	1.3	151	214	7	1	0
78	<i>South African Journal of Industrial Engineering</i>	2	6	3	0.6	517	697	9	0.409	0
79	<i>International Journal of Entrepreneurial Venturing</i>	2	5	5	8.5	59	43	3	-	0
80	<i>Spanish Journal of Psychology</i>	2	5	3	0.3	1,143	6,740	31	0.629	0
81	<i>Academy of Management Annals</i>	1	84	2	1.2	167	12,997	61	9.281	0
82	<i>International Small Business Journal Researching Entrepreneurship</i>	1	31	8	11.8	68	627	13	3.9	0
83	<i>Rae Revista De Administracao De Empresas</i>	1	13	5	1.1	473	825	9	0.404	0
84	<i>Cuadernos De Economia Y Direccion De La Empresa</i>	1	9	2	1.4	147	316	9	0.268	0
85	<i>South African Journal of Economic and Management Sciences</i>	1	7	3	0.6	493	900	11	0.505	0
86	<i>Journal of Strategic Marketing</i>	1	6	5	3.8	131	302	8	-	0
87	<i>International Journal of Innovation Management</i>	1	5	9	3.4	263	175	5	-	0
88	<i>Management Research Review</i>	1	5	6	2.9	208	367	7	-	0
89	<i>World Journal of Entrepreneurship Management and Sustainable Development</i>	1	5	4	5.8	69	84	4	-	0
90	<i>Rbgn Revista Brasileira De Gestao De Negocios</i>	1	4	3	0.9	319	301	6	0.278	0
91	<i>Amfiteatru Economic</i>	1	4	2	0.3	751	2,214	17	0.664	0
92	<i>Journal of Enterprising Culture</i>	1	3	3	6.0	50	33	3	-	0
93	<i>Anthropologist</i>	1	3	2	0.2	911	895	8	0.195	
94	<i>Global Business Review</i>	1	2	3	0.9	346	282	6	-	0
95	<i>Jurnal Teknologi</i>	1	2	3	0.1	3,022	1,067	7	-	0
96	<i>Polish Journal of Management Studies</i>	1	1	3	1.1	261	251	6	-	0

(continued)

Table II.

R	Journal	H-EO	TC-EO <sup>a</sup>	TP-EO	%EO/ TP	TP	TC	H	IF	T50
97	<i>African Journal of Economic and Management Studies</i>	0	0	3	3.1	98	109	4	-	0
98	<i>Academia Revista Latinoamericana De Administracion</i>	0	0	2	0.8	255	316	8	0.617	0
99	<i>Asia Pacific Journal of Marketing and Logistics</i>	0	0	2	1.2	170	253	7	1.204	0
100	<i>Economics Sociology</i>	0	0	2	0.8	244	525	11	-	

**Notes:** R, ranking; H-EO, the H-index based on EO papers solely; TC-EO and TP-EO, the total number of citations and papers in EO, respectively, during the period 1990-2017; TP, TC, the total number of papers and journal citations during the period, respectively; %EO/TP, the ratio of all the publications compared to the EO publications; H and IF, the H-index and the impact factor reported by WoS; T50, the number of papers classified in the Top 50 of the ranking evidenced in Table V. <sup>a</sup>The ranking is organized from high to low values, using the EO-H-index as its first classification item. The second classification item corresponds to the number of EO papers, and the third classification item is the number of citations per EO paper

Table II.

Another article of great relevance is by Rauch *et al.* (2009), which has the second highest number of citations per year.

Using the H-index, it is also possible to calculate the impact factor that EO articles have had on EO research based on both the number of citations and the number of articles published. The relevant impact factor can be observed in Table IV and is based on the ratio of the number of citations received by a publication of years ( $t-1$ ) and ( $t-2$ ) in year ( $t$ ) with respect to the number of papers published that same year.

In general, it can be seen from Table III that the impact factor has remained high and exhibited signs of a growth trend. This can be explained by the inclusion of entrepreneurship in the research scope of different journals, the emergence of new journals during the indicated period and the increasing relevance of the subject in relation to other research areas such as marketing and international business, which allows more EO publications in the same year.

### 3.4 Most prolific and relevant researchers in EO

To provide a more holistic view of research on EO, this section aims to integrate the most active and relevant researchers of EO with findings from previous sections.

Table V presents the Top 30 ranking of the most prominent authors in EO, ordered by the EO H-index. Lumpkin, G.T. is the author who has had the greatest impact on EO research, as shown by analyzing the number of citations received in his publications, having collected approximately 31 percent of all citations made in EO publications. Other well-known authors within this list include Payne, Short, Covin and Wiklund. With respect to the institutions of these authors, there is not a very marked domain, except the country in which they are located. In this sense, the dominance of the USA as the place with the greater accumulation of EO researchers is apparent. It is also interesting to observe that universities from Sweden (Jonkoping University) and the UK (Loughborough University) have produced two researchers each in this ranking.

To monitor the influence of the authors' publications, the number of publications in the ten most prominent journals in EO research from Table III is quantified in Table VI. It should be noted that all of the most prominent authors on entrepreneurship research noted in Table V have published at least once in one of the ten most prominent journals in this subject. The most important authors in this list include Covin (nine articles), Lumpkin (eight articles), Wiklund, Chirico and Wales (seven articles), Dess (four articles).

R	Journal	EO TC	Title	Author(s)	Year	Citations /year
1	<i>AoMR</i>	1,554	Clarifying the entrepreneurial orientation construct and linking it to performance	Lumpkin, G.T.; Dess, G.G.	1996	77.7
2	<i>SMJ</i>	496	Internal capabilities, external networks, and performance: a study on technology-based ventures	Lee, C.; Lee, K.; Pennings, J.M.	2001	33.1
3	<i>JoBV</i>	448	Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle	Lumpkin, G.T.; Dess, G.G.	2001	29.9
4	<i>SMJ</i>	438	Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses	Wiklund, J.; Shepherd, D.	2003	33.7
5	<i>JoBV</i>	400	Entrepreneurial orientation and small business performance: a configurational approach	Wiklund, J.; Shepherd, D.	2005	36.4
6	<i>JoM</i>	357	The effects of strategic orientations on technology- and market-based breakthrough innovations	Zhou, K.Z.; Yim, C.K.; Tse, D.K.	2005	32.5
7	<i>IMM</i>	335	Innovativeness: its antecedents and impact on business performance	Hult, G.T.M.; Hurley, R.F.; Knight, G.A.	2004	27.9
8	<i>ET&amp;P</i>	313	Entrepreneurial orientation and business performance: an assessment of past research and suggestions for the future	Rauch, A.; Wiklund, J.; Lumpkin, G.; Frese, M.	2009	44.7
9	<i>RP</i>	211	Entrepreneurial orientation, technology transfer and spinoff performance of US universities	O'Shea, R.P.; Allen, T.J.; Chevalier, A.; Roche, F.	2005	19.2
10	<i>ET&amp;P</i>	209	Strategic process effects on the entrepreneurial orientation-sales growth rate relationship	Covin, J.G.; Green, K.M.; Slevin, D.P.	2006	20.9
11	<i>AoMR</i>	205	Entrepreneurial orientation and new venture performance: the moderating role of intra- and extra-industry social capital	Stam, W.; Elfring, T.	2008	25.6
12	<i>JoBV</i>	191	The impact of network capabilities and entrepreneurial orientation on university spinoff performance	Walter, A.; Auer, M.; Ritter, T.	2006	19.1
13	<i>JoEM</i>	178	Environmental strategy and performance in small firms: a resource-based perspective	Aragon-Correa, J.A.; Hurtado-Torres, N.; Sharma, S.; Garcia-Morales, V.J.	2008	22.3
14	<i>JoM</i>	159	Enhancing entrepreneurial orientation research: operationalizing and measuring a key strategic decision-making process	Lyon, D.W.; Lumpkin, G.T.; Dess, G.D.	2000	9.9
15	<i>AoMJ</i>	156	Cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation dimensions	Richard, O.C.; Barnett, T.; Dwyer, S.; Chadwick, K.	2004	13.0
16	<i>FBR</i>	154	Entrepreneurial orientation, risk taking, and performance in family firms	Naldi, L.; Nordqvist, M.; Sjoberg, K.; Wiklund, J.	2007	17.1
17	<i>JoBV</i>	153	Culture and entrepreneurial potential: a nine country study of locus of control and innovativeness	Mueller, S.L.; Thomas, A.S.	2001	10.2
18	<i>E&amp;RD</i>	153	Human capital, social capital, and innovation: a multi-country study	Dakhli, M.; De Clercq, D.	2004	12.8

(continued)

**Table III.**  
Top 50 ranking  
of the most important  
publications in  
EO research

R	Journal	EO TC	Title	Author(s)	Year	Citations /year
19	<i>JoIM</i>	149	Entrepreneurship and marketing strategy: the SME under globalization	Knight, G.	2000	9.3
20	<i>FBR</i>	149	Socioemotional wealth in family firms: theoretical dimensions, assessment approaches, and agenda for future research	Berrone, P.; Cruz, C.; Gomez-Mejia, L.R.	2012	37.3
21	<i>JoBV</i>	148	Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs	Rosenbusch, N.; Brinckmann, J.; Bausch, A.	2011	29.6
22	<i>JoBR</i>	144	The positive effect of a market orientation on business profitability: a balanced replication	Slater, S.F.; Narver, J.C.	2000	9.0
23	<i>SMJ</i>	137	An operationalization of Stevenson's conceptualization of entrepreneurship as opportunity-based firm behavior	Brown, T.E.; Davidsson, P.; Wiklund, J.	2001	9.1
24	<i>JoWB</i>	135	Culture, entrepreneurial orientation, and global competitiveness	Lee, S.M.; Peterson, S.J.	2000	8.4
25	<i>JoBV</i>	128	Cross-cultural reliability and validity of a scale to measure firm entrepreneurial orientation	Knight, G.A.	1997	6.7
26	<i>AoME</i>	126	The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship	Dess, G.G.; Lumpkin, G.T.	2005	11.5
27	<i>ET&amp;P</i>	120	Entrepreneurial orientation, learning orientation, and firm performance	Wang, C.L.	2008	15.0
28	<i>JoBV</i>	112	Firm networks and firm development: the role of the relational mix	Lechner, C.; Dowling, M.; Welpe, I.	2006	11.2
29	<i>IMM</i>	103	Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth	Hughes, M.; Morgan, R.E.	2007	11.4
30	<i>JoSBM</i>	101	The complementary effects of market orientation and entrepreneurial orientation on profitability in small businesses <sup>a</sup>	Baker, W.E.; Sinkula, J.M.	2009	14.4
31	<i>JoBV</i>	101	The effects of entrepreneurial orientation and marketing information on the performance of SMEs	Keh, H.T.; Nguyen, T.T.M.; Ng, H.P.	2007	11.2
32	<i>SBE</i>	99	Building an integrative model of small business growth	Wiklund, J.; Patzelt, H.; Shepherd, D.A.	2009	14.1
33	<i>ET&amp;P</i>	98	Entrepreneurial orientation and growth of SMEs: a causal model	Moreno, A.M.; Casillas, J.C.	2008	12.3
34	<i>JoWB</i>	97	The drivers of the early internationalization of the firm	Zucchella, A.; Palamara, G.; Denicolai, S.	2007	10.8
35	<i>JoWB</i>	96	Firms' degree of born-globalness, international entrepreneurial orientation and export performance	Kuivalainen, O.; Sundqvist, S.; Servais, P.	2007	10.7
36	<i>JoM</i>	92	Research on organizational configurations: past accomplishments and future challenges	Short, J.C.; Payne, G.T.; Ketchen, D.J.	2008	11.5
37	<i>JoBR</i>	90	Just entrepreneurial enough: the moderating effect of entrepreneurship on the relationship between market orientation and performance	Bhuian, S.N.; Menguc, B.; Bell, S.J.	2005	8.2
38	<i>Tech.</i>	88	Drivers of innovativeness and performance for innovative SMEs in South Korea: mediation of learning orientation	Rhee, J.; Park, T.; Lee, D.H.	2010	14.7

Table III.

(continued)

R	Journal	EO TC	Title	Author(s)	Year	Citations /year
39	<i>CB</i>	83	Mapping human and social dimensions of conservation opportunity for the scheduling of conservation action on private land	Knight, A.T.; Cowling, R.M.; Difford, M.; Campbell, B.M.	2010	13.8
40	<i>JoBR</i>	80	Entrepreneurial orientation of SMEs, product innovativeness, and performance	Avlonitis, G.J.; Salavou, H.E.	2007	8.9
41	<i>ET&amp;P</i>	78	Entrepreneurial orientation theory and research: reflections on a needed construct	Covin, J.G.; Lumpkin, G.T.	2011	15.6
42	<i>JoBV</i>	76	Antecedents of international and domestic learning effort	Sapienza, H.J.; De Clercq, D.; Sandberg, W.R.	2005	6.9
43	<i>JoSBM</i>	73	Moderating effects of entrepreneurial orientation on market orientation-performance linkage: evidence from Chinese small firms	Li, Y.; Zhao, Y.B.; Tan, J.; Liu, Y.	2008	9.1
44	<i>AoMJ</i>	72	CEO personality, strategic flexibility, and firm performance: the case of the Indian business process outsourcing industry	Nadkarni, S.; Herrmann, P.	2010	12.0
45	<i>ET&amp;P</i>	71	Exploring an inverted U-shape relationship between entrepreneurial orientation and performance in Chinese ventures	Tang, J.T.; Tang, Z.; Marino, L.D.; Zhang, Y.L.; Li, Q.W.	2008	8.9
46	<i>IMR</i>	69	Entrepreneurial, market, and learning orientations and international entrepreneurial business venture performance in South African firms	Kropp, F.; Lindsay, N.J.; Shoham, A.	2006	6.9
47	<i>R&amp;DM</i>	68	Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation	Wu, W.Y.; Chang, M.L.; Chen, C.W.	2008	8.5
48	<i>SBE</i>	68	The internationalization of small and medium-sized firms	De Clercq, D.; Sapienza, H.J.; Crijns, H.	2005	6.2
49	<i>ET&amp;P</i>	66	Alternative knowledge strategies, competitive environment, and organizational performance in small manufacturing firms	Bierly, P.E.; Daly, P.S.	2007	7.3
50	<i>IJoPM</i>	66	The influence of business strategy on project portfolio management and its success – a conceptual framework	Meskendahl, S.	2010	11.0

**Notes:** R, ranking; EO–TC, total number of citations of the EO published papers; *AMR*, *Academy of Management Review*; *SMJ*, *Strategic Management Journal*; *JBV*, *Journal of Business Venturing*; *JM*, *Journal of Marketing*; *IMM*, *Industrial Marketing Management*; *ET&P*, *Entrepreneurship Theory and Practice*; *RP*, *Research Policy*; *JEM*, *Journal of Environmental Management*; *AMJ*, *Academy of Management Journal*; *FBR*, *Family Business Review*; *E&RD*, *Entrepreneurship and Regional Development*; *JIM*, *Journal of International Marketing*; *JBR*, *Journal of Business Research*; *JWB*, *Journal of World Business*; *AME*, *Academy of Management Executive*; *JSBM*, *Journal of Small Business Management*; *SBE*, *Small Business Economics*; *Tech.*, *Technovation*; *CB*, *Conservation Biology*; *IMR*, *International Marketing Review*; *R&DM*, *R&D Management*; *IJPM*, *International Journal of Project Management*

Table III.

Another interesting classification is made in Table VII, which provides a greater perspective on EO research. It cross-references the six most-quoted journals with the authors who have written on EO to verify the occurrence of their publications in them. The presence of great names that have arisen throughout EO research is evident in these journals. In this sense, *Entrepreneurship Theory and Practice* is the most-cited journal and brings together a large number of publications from several leading authors, thus indicating the high standards of selection and accuracy of these journals.

3.5 Mapping the structure of research on EO

Our analysis continues describing the structure of research on EO. This type of analysis makes it possible to describe and understand the patterns of relationships between articles, journals or authors which are publishing EO research. In particular, we analyzed both journals and authors' co-citations to understand EO research structure. As explained earlier, VOS viewer considers co-citation measures between journals (or authors) as measures of proximity, and develops bibliographic maps based on these measures.

The bibliographic data map included in Figure 2 is based on the co-citations of the Top 500 journals publishing EO research. In this analysis, the most prominent – and central – journals of the EO research structure are: *Strategic Management Journal* (6,011 co-citations), followed by the *Entrepreneurship Theory and Practice Journal* (5,261 co-citations) and the *Journal of Business Venturing* (4,261 co-citations), from 11,461 journals considered.

Overall, four distinct and clear clusters can be observed in Figure 2: the first includes strategy and entrepreneurship (gray items); the second includes marketing and innovation (blue items); the third considers international business (red items); and the fourth includes family businesses and governance journals (yellow items).

In the strategy and entrepreneurship cluster, the most relevant journals are the *Strategic Management Journal*, and *Entrepreneurship Theory and Practice*, with both having appeared in the ranking of the 100 most prominent journals in EO research. In general, it is clear from density analysis that the gray cluster is the most important for the development of research on the subject.

The strategy sub-cluster includes the *Academy of Management Review* and the *Academy of Management Journal* as new high-impact elements for OE research that were not highlighted when using the H-index approach, which is due to the large number of items that can be grouped and analyzed together under the bibliographic data map, compared to the H-index method. The sub-cluster for entrepreneurship includes the *Journal of Entrepreneurship Theory and Practice* and the *Journal of Business Venturing*, which is the second most prominent journal according to the H-index method.

The marketing and innovation cluster is the most dispersed of all since EO has been researched but related to different correlate variables and theoretical frameworks. In this cluster, popular journals within the scientific community include the *Journal of Marketing* and the *Journal of Marketing Research*, as well as the *Journal of Product Innovation Management and Technovation*, which are high-impact publications in the fields of marketing and innovation, respectively.

Regarding the international business clusters (blue items) and family businesses (yellow items), there is a greater convergence between their components because their subjects are quite central. For the first cluster, the *Journal of International Business Studies* has the greatest relevance on EO research and for the second cluster, two journals show the higher levels of research prominence on EO: the *Family Business Review* and *Family Business Research*, which show similarities in their contents, scope and presence.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EO-TP	9	19	29	40	47	69	75	86	94	114	154
EO-TC	203	358	432	622	823	1,422	1,382	1,954	2,388	2,905	3,268
EO-TP2	20	24	28	48	69	87	116	144	161	180	208
EO-TC2	39	77	48	91	148	268	199	421	415	383	391
EO-IF	1.95	3.21	1.71	1.90	2.14	3.08	1.72	2.92	2.58	2.13	1.88

**Table IV.**  
Impact factor of  
EO during the  
last ten years

**Notes:** EO-TP, total of papers published during the (*t*) year; EO-TC, total number of citations received in the (*t*-2) year; EO-TC2, total number of citations received in the year (*t*) from the papers published in the years (*t*-1) and (*t*-2); EO-IF, impact factor of EO in the year (*t*)

R	Author	H-EO <sup>a</sup>	TP-EO	TC-EO	Country	Last institution registered	H	TP	TC	TP-EO5	TC-EO5	T50
1	Lumpkin, G.T.	13	13	4,021	USA	University of Oklahoma – Norman	22	37	4,129	5	160	6
2	Payne, G.T.	11	11	291	USA	Texas Tech University	14	32	613	9	147	1
3	Short, J.C.	11	10	323	USA	University of Oklahoma	19	38	1,081	7	152	1
4	Covin, J.	8	12	519	USA	Indiana University Bloomington	21	39	1,917	8	199	2
5	Wiklund, J.	8	9	1,616	USA	Syracuse University	21	33	1,273	3	75	6
6	Chirico, F.	7	9	142	Sweden	Jonkopings University	9	20	343	9	142	0
7	Wales, W.J.	6	14	233	USA	State University of New York (SUNY) Albany	13	14	172	162	162	0
8	Kraus, S.	6	12	102	Liechtenstein	Univ Liechtenstein	10	38	250	12	89	0
9	De Clercq, D.	6	10	370	Canada	Brock University	16	49	741	5	22	3
10	Marino, L.D.	6	9	212	USA	University of Alabama	6	8	179	3	39	1
11	Nordqvist, M.	6	6	322	Sweden	Jonkopings University	14	26	690	3	98	1
12	Engelen, A.	5	10	60	Germany	Dortmund University of Technology	12	31	348	9	46	0
13	Frese, M.	5	6	420	Germany	University of Luneburg	15	33	737	4	43	1
14	Slevin, D.P.	5	6	338	USA	University of Pittsburgh	6	7	193	2	18	1
15	Casillas, J.C.	5	6	267	Spain	University of Seville	10	15	356	2	12	1
16	Hughes, M.	5	6	225	UK	Durham University	11	21	400	4	85	1
17	Miller, D.	5	6	159	Canada	University of Montreal	20	53	1,249	6	159	0
18	Moss, T.W.	5	6	150	USA	Syracuse University	7	14	355	4	92	0
19	Dess, G.G.	5	5	1,190	USA	University of Texas at Dallas	26	40	6,863	1	9	4
20	Brigham, K.H.	5	5	205	USA	Texas Tech University	11	15	452	2	46	0
21	Brettel, M.	4	9	52	Germany	Aachen University	13	48	486	9	51	0
22	Cadogan, J.W.	4	8	126	UK	Loughborough University	12	25	311	6	61	0
23	Dimitratos, P.	4	8	63	UK	University of Glasgow	10	30	312	8	63	0
24	Tang, Z.	4	7	89	USA	Rochester Institute of Technology	6	11	161	5	46	1
25	Eggers, F.	4	7	50	USA	Menlo College	5	11	97	8	50	0
26	Shepherd, D.	4	6	975	USA	Indiana University Bloomington	29	70	1,803	3	37	3
27	Wincent, J.	3	7	58	Sweden	Lulea University of Technology	13	63	695	5	12	0
28	Story, V.M.	3	6	58	UK	Loughborough University	4	9	78	5	51	0
29	Anokhin, S.	3	6	53	USA	Kent State University	8	23	188	4	7	0
30	Rauch, A.	3	5	345	The Netherlands	University of Groningen	6	20	753	4	32	1

**Notes:** R, ranking; H-EO, the H-index based solely on EO papers; TC-EO and TP-EO, the total number of citations and papers, respectively, during the period 1990–2017; TP-EO5, TC-EO5, the total number of papers and citations in EO over the last five years; TP, TC, the total number of papers and citations of research in any given subject during the period, respectively; T50, the number of papers ranked in the Top 50 list in Table III. <sup>a</sup>The ranking is organized from high to low values, using the EO H-index as its first classification item. The second classification item corresponds to the number of EO papers and the third classification item is the number of citations per EO paper

**Table V.**  
Top 50 ranking of the  
most prominent  
researchers in  
entrepreneurial  
orientation

R	Top 50 authors	ET&P	FBR	JBR	JBV	JSBM	ISBJ	E&RD	SBE	IMM	JWB	Total
1	Covin, J.	5		2	1					1		9
2	Lumpkin, G.T.	4	2					1	1			8
3	Wiklund, J.	2	1		2		1		1			7
4	Chirico, F.	3	1			2	1					7
5	Wales, W.J.	2		1			4					7
6	Payne, G.T.	1	5									6
7	De Clercq, D.	1			2		1	1	1			6
8	Marino, L.D.	4			1				1			6
9	Nordqvist, M.		2			1	1	1	1			6
10	Short, J.C.	1	4									5
11	Engelen, A.	2				2					1	5
12	Casillas, J.C.	2	1				1	1				5
13	Miller, D.	4	1									5
14	Brettel, M.					5						5
15	Shepherd, D.	3			1				1			5
16	Story, V.M.			2	1		1			1		5
17	Frese, M.	2		1				1				4
18	Slevin, D.P.	2		1	1							4
19	Moss, T.W.	1	1					1	1			4
20	Cadogan, J.W.			2	1		1					4
21	Tang, Z.	2				2						4
22	Anokhin, S.			1	1	1	1					4
23	Rauch, A.	1		1	1			1				4
24	Kraus, S.			2						1		3
25	Dess, G.G.	1			2							3
26	Brigham, K.H.		2					1				3
27	Wincent, J.			1	1	1						3
28	Dimitratos, P.	1				1						2
29	Eggers, F.			1						1		2
30	Hughes, M.									1		1
	Total	44	20	15	15	15	12	8	7	5	1	142

**Table VI.**  
Total number of papers published by the 30 most prominent researchers in EO in the ten most prominent journals in EO

**Notes:** R, ranking; *E&RD*, *Entrepreneurship and Regional Development*; *ET&P*, *Entrepreneurship Theory and Practice*; *FBR*, *Family Business Review*; *IMM*, *Industrial Marketing Management*; *ISBJ*, *International Small Business Journal*; *JBR*, *Journal of Business Research*; *JBV*, *Journal of Business Venturing*; *JSBM*, *Journal of Small Business Management*; *JWB*, *Journal of World Business*; *SBE*, *Small Business Economics*

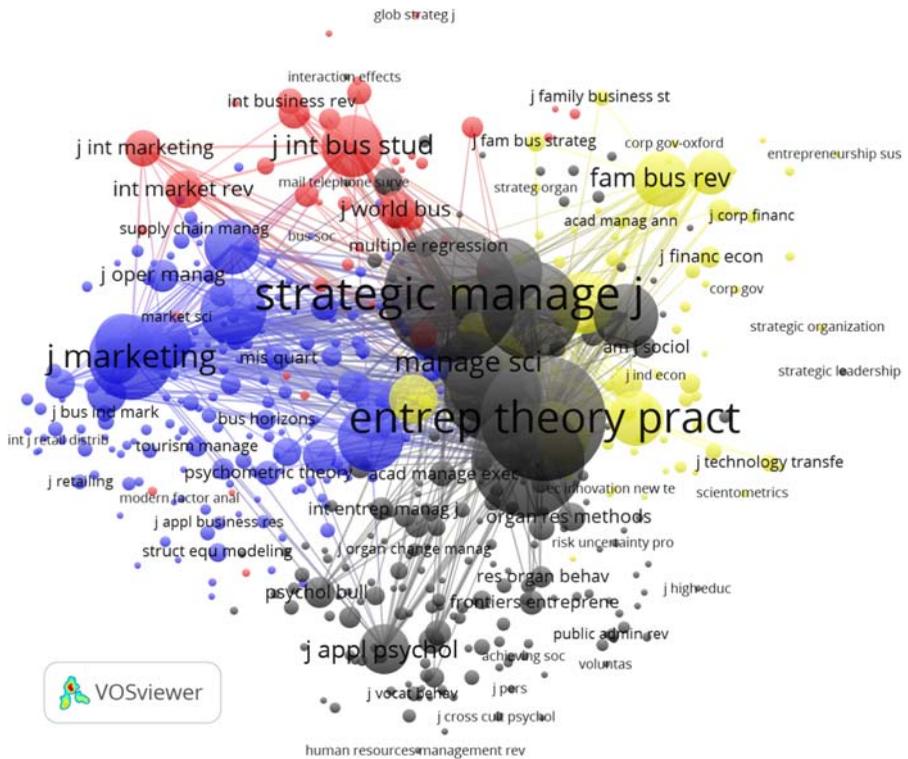
A second analysis was performed using the first authors of each article or publication, and the fractional co-citation counts, authors instead of articles. Using authors, instead of journals, three different clusters of authors can be defined (see Figure 3): the gray cluster of authors in entrepreneurship and strategy; the yellow cluster of researchers in family businesses and small enterprises; and the green cluster of authors in more diverse subjects, including psychometrics, management and international business and marketing.

The most prominent authors of the gray cluster are already familiar names – Covin, Lumpkin and Dess – making indisputable their great contributions from the areas of entrepreneurship and strategy. However, it is also noteworthy, the presence of two other prominent authors in the strategy field: Zahra and Miller. Danny Miller is one of the most important authors regarding strategy types, and has several seminal papers on the origins on the drivers of entrepreneurship and innovation (Miller, 1983; Miller and Friesen, 1983). Another key author is Shaker A. Zahra, who has developed very important advances related to entrepreneurship, innovation and strategy (see e.g. Zahra *et al.*, 2006), although his core research has not been on the concept of EO itself.

R	Author	JoBV	TP-EO	Author	ET&P	TP-EO	Author	SMJ	TP-EO	Author	FBR	TP-EO	Author	IMM	TP-EO	Author	JoWB	TP-EO
1	Tang, J.T.	2	Covin, J.	5	Patel, P.C.	2	Payne, G.T.	5	O'Cass, A.	3	Tang, J.T.	2						2
2	Dess, G.G.	2	Lumpkin, G.T.	4	Parida, V.	2	Short, J.C.	4	Tsai, K.H.	2	Dess, G.G.	2						2
3	De Clercq, D.	2	Marino, L.D.	4	Wiklund, J.	2	Zachary, M.A.	3	Gabrielsson, M.	2	De Clercq, D.	2						2
4	Wiklund, J.	2	Miller, D.	4	Shepherd, D.	1	McKenny, A.F.	3	Hult, G.T.M.	2	Wiklund, J.	2						2
5	Shepherd, D.	1	Chirico, F.	3	Zahra, S.A.	1	Nordqvist, M.	2	Covin, J.	1	Shepherd, D.	1						1
6	Covin, J.	1	Shepherd, D.	3	Wales, W.J.	1	Naldi, L.	2	Eggers, F.	1	Covin, J.	1						1
7	Marino, L.D.	1	Slevin, D.P.	3	Bansal, P.	1	Brigham, K.H.	2	Gonzalez-Padron, T.	1	Marino, L.D.	1						1
8	Rauch, A.	1	Frese, M.	3	Brown, T.E.	1	Lumpkin, G.T.	2	Hughes, M.	1	Rauch, A.	1						1
9	Slevin, D.P.	1	Wales, W.J.	3	Davidsson, P.	1	Wiklund, J.	1	Hurley, R.F.	1	Slevin, D.P.	1						1
10	Nguyen, T.T.M.	1	Wiklund, J.	3	Foss, N.J.	1	Miller, D.	1	Calantone, R.	1	Nguyen, T.T.M.	1						1

**Notes:** R, rankings; *JBV*, *Journal of Business Venturing*; *ET&P*, *Entrepreneurship Theory and Practice*; *SMJ*, *Strategic Management Journal*; *AMR*, *Academy of Management Review*; *FBR*, *Family Business Review*

**Table VII.**  
EO authors with the  
highest number of  
publications in the  
five most-cited  
journals in EO



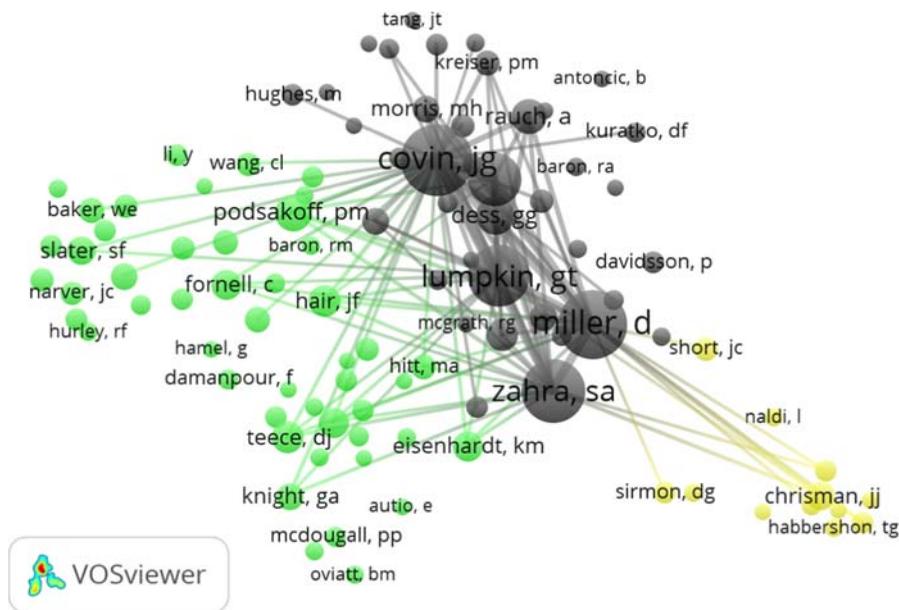
**Figure 2.**  
Bibliographical data  
map of journals  
publishing  
entrepreneurial  
orientation research

**Note:** Bibliographical data map, based on co-citation fractional analysis of the authors on EO (1990–2017) – size-adjusted network visualization

With respect to the family business cluster (yellow), the most co-cited authors are Chrisman, J.J. and Sharma, P., who are prominent authors on the subject of family businesses related to the EO.

Finally, the green cluster indicates the great variety of topics related to EO research, although without much depth. The wide dispersion of the different topics and their lack of connections with each other reveal a cluster with weak and varied relations with different concepts and EO itself. Nonetheless, well-known researchers from different disciplines are recognizable: Narver and Slater the key authors from marketing and the market orientation concept, Podsakoff, Nunnally and Hair for psychometrics, scales and multivariate analysis; and Teece and Hamel seminal authors in the area of dynamic capabilities and dynamic competition.

This structural analysis suggests that EO research has been very multidisciplinary in nature, going beyond the entrepreneurship literature. EO has taken concepts and theoretical strength from sister literatures in strategy, innovation, marketing and organization theory. It is also interesting to notice that when looking at the EO research structure from the journals standpoint, the level of separation is clearer, and four distinct clusters emerge, mostly related to disciplinary distinctions. However, when looking at the relationships and co-citation patterns using first authors, clusters tend to be a little bit blurred, reducing to three, showing that authors tend to be more open in terms of their knowledge base. Journals sometimes reduce the opportunity to cross-fertilization of disciplines because in order to be published you need to include more literature published in those subdiscipline or particular journals.



**Note:** Bibliographic data map, based on co-citation analysis of the authors on EO (1990–2017)  
– size-adjusted network visualization

**Figure 3.**  
Bibliographical data  
map of authors  
publishing  
entrepreneurial  
orientation research

#### 4. Conclusions, implications and future research directions

The use of bibliometric techniques and distance-based similarity visualization (VOS) based on information in the Web of Science database allowed us to present a general overview of the research in EO. This global exploration made it possible to recognize both contributions and key contributors in advancing knowledge about the concept of EO across more than 20 years of research. To this end, the most relevant journals, articles and authors for this research topic were identified. Also four different clusters can be identified that have studied EO: the strategy and entrepreneurship journals, the family business and governance/finance journals, the marketing and innovation journals and the international business journals. This is particularly interesting, showing that EO research has had an impact beyond entrepreneurship and management. The structure of the field using first authors co-citation patterns shows a three clusters structure: one most identified with strategy and entrepreneurship, one in the family and small business subfield and one with authors working from a more multidisciplinary perspective (marketing, strategy, innovation, psychometrics, etc.).

With regard to the number of papers and publications, the journals *Entrepreneurship Theory and Practice*, *Journal of Business Research*, *Journal of Small Business Management*, *International Small Business Journal* and *Journal of Business Venturing* published approximately 40 percent of all EO publications in the Top 30 ranking categorized by the EO H-index. Other journals stand out for gathering the largest number of citations, namely, the *Journal of Business Venturing*, *Entrepreneurship Theory and Practice*, *Strategic Management Journal*, *Academy of Management Review* and *Family Business Review*.

Based on the H-index and the number of publications, the five most important authors in the field of EO are Lumpkin, Payne, Shorts, Covin and Wiklund. One prolific author with more publications is Kraus, who is also representative of an institution outside the USA, unlike the five mentioned above.

Whereas the purpose of this review is to provide a general overview of the most prolific and prominent research with regards to EO, it is important to highlight some limitations that emerge by the nature and characteristics of the methodology utilized. First, the information presented here is restricted to the WoS database. Then, relevant work in journals included in other indexes (Scopus, SciELO, etc.) or conferences papers were not included in this paper. However, we believe that the study covers the most relevant journals of the fields of entrepreneurship and management, and therefore the papers covered are a representative sample of the stronger contributions on EO in the business literature.

Second, our results showing the prominence and relevance of particular authors and are based on two bibliometric approaches: H-index and citation explorations, and the VOS viewer mapping and clustering approach for co-citations. Also, when performing our analysis like the EO H-index and the co-citation counts for author consider just the first author. Additionally, our focus has been on research on EO, therefore, all conclusions regarding author and journal prominence can only be referred to this particular domain, and not the whole domain of entrepreneurship.

For example, the assignment of authorship when calculating the EO H-index was stipulated by granting full authorship per paper. Even though we tried to lessen this situation by using the VOS viewer approach, the results presented here should be taken with some caution.

Future research may include other databases like Scopus, SciELO or ESCI, in order to extend the generalizability of the results presented here. In fact, it will be interesting to check and explore research on EO in emerging journals (and nations), which are considered in SciELO, ESCI and other databases. Further research may apply bibliometric techniques to the analysis and study of the relationships of EO to dependent variables like new product performance, innovation or organizational performance including combined searches of those constructs in the databases.

On another and more general note, research on entrepreneurship is multidisciplinary in nature, and uses theories and approaches from different disciplines (as has been presented here, from strategy, marketing, innovation, etc.), it will also be interesting to explore the influence EO and entrepreneurship research has had on other disciplines using complementary techniques like bibliographic coupling.

Implications from this research for management can be observed in at least two directions. First, in the case of firms, managers should consider that EO seems to be a relevant cultural/organizational logic construct not just for new or small businesses, and for innovation purposed, but also for conquering markets, and reaching strategic objectives. Therefore, for managers, the measure and promotion of EO within their organizations can be very relevant, as has been stated in several related disciplines.

A second stream of implications is associated with the management of academic institutions in particular school of businesses or academic departments. Since EO research, and entrepreneurship research in general, uses theories and has applications in different business fields, those schools that would like to make a stronger impact in terms of research and applications in entrepreneurship, and EO in particular, need to foster multidisciplinary teams and collaboration across areas (strategy management, marketing, innovation, technology management, finance and governance).

## References

- Ács, Z.J., Autio, E. and Szerb, L. (2014), "National systems of entrepreneurship: measurement issues and policy implications", *Research Policy*, Vol. 43 No. 3, pp. 476-494.
- Akhavan, P., Ebrahim, N.A., Fetрати, M.A. and Pezeshkan, A. (2016), "Major trends in knowledge management research: a bibliometric study", *Scientometrics*, Vol. 107 No. 3, pp. 1249-1264.

- Alfonzo, P.M., Sakaraida, T.J. and Hasting-Tolsma, M. (2014), "Bibliometrics: visualizing the impact of nursing research", *Online Journal of Nursing Informatics*, Vol. 18 No. 1, pp. 1-16.
- Alonso, S., Cabrerizo, F.J., Herrera-Viedma, E. and Herrera, F. (2009), "H-index: a review focused in its variants, computation and standardization for different scientific fields", *Journal of Informetrics*, Vol. 3 No. 4, pp. 273-289.
- Álvarez, C., Urbano, D. and Amorós, J. (2014), "GEM research: achievements and challenges", *Small Business Economics*, Vol. 42 No. 3, pp. 445-465.
- Andrade-Valbuena, N.A. and Merigo, J.M. (2018), "Outlining new product development research through bibliometrics: analyzing journals, articles and researchers", *Journal of Strategy and Management*, Vol. 11 No. 3, pp. 328-350.
- Artto, K., Martinsuo, M., Gemünden, H.G. and Murtoaro, J. (2009), "Foundations of program management: a bibliometric view", *International Journal of Project Management*, Vol. 27 No. 1, pp. 1-18.
- Blanco-Mesa, F., Lindahl, J.M.M. and Gil-Lafuente, A.M. (2016), "A bibliometric analysis of fuzzy decision making research", *2016 Annual Conference of the North American Fuzzy Information Processing Society, IEEE*, pp. 1-4.
- Cancino, C., Merigo, J.M., Coronado, F., Dessouky, Y. and Dessouky, M. (2017), "Forty years of computers & industrial engineering: a bibliometric analysis", *Computers & Industrial Engineering*, Vol. 113, pp. 614-629.
- Chang, P.L. and Hsieh, P. (2008), "Bibliometric overview of operations research/management science research in Asia", *Asia-Pacific Journal of Operational Research*, Vol. 25 No. 2, pp. 217-241.
- Charvet, F.F., Cooper, M.C. and Gardner, J. (2008), "The intellectual structure of supply chain management: a bibliometric approach", *Journal of Business Logistics*, Vol. 29 No. 1, pp. 47-73.
- Courtault, J.M., Hayek, N., Rimboux, E. and Zhu, T. (2010), "Research in economics and management in France: a bibliometric study using the H-index", *The Journal of Socio-Economics*, Vol. 39 No. 2, pp. 329-337.
- Covin, J. and Lumpkin, G. (2011), "Entrepreneurial orientation theory and research: reflections on a needed construct", *Entrepreneurship Theory and Practice*, Vol. 35 No. 5, pp. 855-872.
- Covin, J. and Miles, M. (1999), "Corporate entrepreneurship and the pursuit of competitive advantage", *Entrepreneurship Theory and Practice*, Vol. 23 No. 3, pp. 47-63.
- Dos Santos, B., Holsapple, C. and Ye, Q. (2011), "The intellectual influence of entrepreneurship journals: a network analysis", *Entrepreneurship Theory and Practice*, Vol. 35 No. 4, pp. 735-754.
- Durisin, B., Calabretta, G. and Parmeggiani, V. (2010), "The intellectual structure of product innovation research: a bibliometric study of the journal of product innovation management, 1984–2004", *Journal of Product Innovation Management*, Vol. 27 No. 3, pp. 437-451.
- Etemad, H. and Lee, Y. (2003), "The knowledge network of international entrepreneurship: theory and evidence", *Small Business Economics*, Vol. 20 No. 1, pp. 5-23.
- Fagerberg, J. and Verspagen, B. (2009), "Innovation studies: the emerging structure of a new scientific field", *Research Policy*, Vol. 38 No. 2, pp. 218-233.
- Fagerberg, J., Fosaas, M. and Sapprasert, K. (2012), "Innovation: exploring the knowledge base", *Research Policy*, Vol. 41 No. 7, pp. 1132-1153.
- Fahimnia, B., Sarkis, J. and Davarzani, H. (2015), "Green supply chain management: a review and bibliometric analysis", *International Journal of Production Economics*, Vol. 162, pp. 101-114.
- Fernandez-Alles, M. and Ramos-Rodríguez, A.A. (2009), "Intellectual structure of human resources management research: a bibliometric analysis of the journal human resource management, 1985–2005", *Journal of the American Society for Information Science and Technology*, Vol. 60 No. 1, pp. 161-175.
- Ferreira, J., Ferreira, F., Fernandes, C., Jalali, M., Raposo, M. and Marques, C. (2016), "What do we (not) know about technology entrepreneurship research?", *International Entrepreneurship and Management Journal*, Vol. 12 No. 3, pp. 713-733.

- Ferreira, M., Reis, N. and Miranda, R. (2015), "Thirty years of entrepreneurship research published in top journals: analysis of citations, co-citations and themes", *Journal of Global Entrepreneurship Research*, Vol. 5 No. 1, pp. 1-22.
- Fulgencio, H.T., Orij, R.P. and le Fever, H. (2016), "Mapping and conceptualizing the measurement of organizational social value using systems thinking", *European Public & Social Innovation Review*, Vol. 1, pp. 17-31.
- Garfield, E. (1979), "Is citation analysis a legitimate evaluation tool?", *Scientometrics*, Vol. 1 No. 4, pp. 359-375.
- George, B. and Marino, L. (2011), "The epistemology of entrepreneurial orientation: conceptual formation, modeling, and operationalization", *Entrepreneurship Theory and Practice*, Vol. 35 No. 5, pp. 989-1024.
- González-Valiente, C.L. (2014), "Marketing in the field of information disciplines: research trends in Latin America (1985-2012)", *Transinformação*, Vol. 26 No. 3, pp. 305-314.
- Grimaldi, R., Kenney, M., Siegel, D. and Wright, M. (2011), "30 years after Bayh-Dole: reassessing academic entrepreneurship", *Research Policy*, Vol. 40 No. 8, pp. 1045-1057.
- Gu, Y. (2004), "Global knowledge management research: a bibliometric analysis", *Scientometrics*, Vol. 61 No. 2, pp. 171-190.
- Hanqing, Q. (2009), "Mapping knowledge domain – a new field of information management and knowledge management", *Journal of Academic Libraries*, Vol. 1, p. 1.
- Hirsch, J. (2005), "An index to quantify an individual's scientific research output", *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 102 No. 46, pp. 16569-16572.
- Hsieh, P. and Chang, P. (2009), "An assessment of world-wide research productivity in production and operations management", *International Journal of Production Economics*, Vol. 120 No. 2, pp. 540-551.
- Johnson, M. (2006), "A bibliometric review of the contribution of attribution theory to sales management", *Journal of Personal Selling and Sales Management*, Vol. 26 No. 2, pp. 181-195.
- Khandwalla, P.N. (1976), "Some top management styles, their context and performance", *Organization and Administrative Sciences*, Vol. 7 No. 4, pp. 21-51.
- Kolle, S.R. (2016), "Mapping of scientific literature published in Natural Hazards (2005-2014): a web of science based bibliometric analysis", *Journal of Advances in Library and Information Science*, Vol. 5 No. 2, pp. 132-138.
- Kraus, S. (2011), "State-of-the-art current research in international entrepreneurship: a citation analysis", *African Journal of Business Management*, Vol. 5 No. 3, pp. 1020-1038.
- Kraus, S., Filser, M., O'Dwyer, M. and Shaw, E. (2014), "Social entrepreneurship: an exploratory citation analysis", *Review of Managerial Science*, Vol. 8 No. 2, pp. 275-292.
- Kraus, S., Filser, M., Eggers, F., Hills, G. and Hultman, C. (2012), "The entrepreneurial marketing domain: a citation and co-citation analysis", *Journal of Research in Marketing and Entrepreneurship*, Vol. 14 No. 1, pp. 6-26.
- Kuskova, V., Podsakoff, N. and Podsakoff, P. (2011), "Effects of theoretical contribution, methodological rigor, and journal quality, on the impact of scale development articles in the field of entrepreneurship", *Strategic Entrepreneurship Journal*, Vol. 5 No. 1, pp. 10-36.
- Landström, H., Åström, F. and Harirchi, G. (2015), "Innovation and entrepreneurship studies: one or two fields of research?", *International Entrepreneurship and Management Journal*, Vol. 11 No. 3, pp. 493-509.
- Landström, H., Harirchi, G. and Åström, F. (2012), "Entrepreneurship: exploring the knowledge base", *Research Policy*, Vol. 41 No. 7, pp. 1154-1181.
- López-Fernández, M., Serrano-Bedia, A. and Pérez-Pérez, M. (2016), "Entrepreneurship and family firm research: a bibliometric analysis of an emerging field", *Journal of Small Business Management*, Vol. 54 No. 2, pp. 622-639.

- 
- Lu, K. and Wolfram, D. (2010), "Geographic characteristics of the growth of informetrics literature 1987–2008", *Journal of Informetrics*, Vol. 4 No. 4, pp. 591-601.
- Lumpkin, G. and Dess, G. (1996), "Clarifying the entrepreneurial orientation construct and linking it to performance", *Academy of Management Review*, Vol. 21 No. 1, pp. 135-172.
- Lumpkin, G.T. and Dess, G. (2001), "Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role of environment and industry life cycle", *Journal of Business Venturing*, Vol. 16 No. 5, pp. 429-451.
- Luor, T., Lu, H.P., Yu, H. and Chang, K. (2014), "Trends in and contributions to entrepreneurship research: a broad review of literature from 1996 to June 2012", *Scientometrics*, Vol. 99 No. 2, pp. 353-369.
- McElwee, G. and Atherton, A. (2005), "Publication trends and patterns in entrepreneurship: the case of the international journal of entrepreneurship and innovation", *Journal of Small Business and Enterprise Development*, Vol. 12 No. 1, pp. 92-103.
- Maia, J.L., Serio, L.C. and Alves Filho, A.G. (2015), "Almost two decades after: a bibliometric effort to map research on strategy as practice using two data sources", *European Journal of Economics, Finance and Administrative Sciences*, Vol. 73, pp. 7-31.
- Merigó, J., Gil-Lafuente, A. and Yager, R.R. (2015), "An overview of fuzzy research with bibliometric indicators", *Applied Soft Computing*, Vol. 27, pp. 420-433.
- Merigó, J., Cancino, C., Coronado, F. and Urbano, D. (2016), "Academic research in innovation: a country analysis", *Scientometrics*, Vol. 108 No. 2, pp. 559-593.
- Miller, D. (1983), "The correlates of entrepreneurship in three types of firms", *Management Science*, Vol. 29 No. 7, pp. 770-791.
- Miller, D. and Friesen, P.H. (1983), "Innovation in conservative and entrepreneurial firms > two models of strategic momentum", *Strategic Management Journal*, Vol. 3 No. 1, pp. 1-25.
- Mishra, D., Gunasekaran, A., Papadopoulos, T. and Hazen, B. (2017), "Green supply chain performance measures: a review and bibliometric analysis", *Sustainable Production and Consumption*, Vol. 10, pp. 85-99.
- Moed, H. (2000), "Bibliometric indicators reflect publication and management strategies", *Scientometrics*, Vol. 47 No. 2, pp. 323-346.
- Must, Ü. (2006), "New countries in Europe-research, development and innovation strategies vs bibliometric data", *Scientometrics*, Vol. 66 No. 2, pp. 241-248.
- Nerur, S., Rasheed, A. and Natarajan, V. (2008), "The intellectual structure of the strategic management field: an author co-citation analysis", *Strategic Management Journal*, Vol. 29 No. 3, pp. 319-336.
- Pilkington, A. and Teichert, T. (2006), "Management of technology: themes, concepts and relationships", *Technovation*, Vol. 26 No. 3, pp. 288-299.
- Podsakoff, P., MacKenzie, S., Podsakoff, N. and Bachrach, D. (2008), "Scholarly influence in the field of management: a bibliometric analysis of the determinants of university and author impact in the management literature in the past quarter century", *Journal of Management*, Vol. 34 No. 4, pp. 641-720.
- Ponzi, L. (2002), "The intellectual structure and interdisciplinary breadth of knowledge management: a bibliometric study of its early stage of development", *Scientometrics*, Vol. 55 No. 2, pp. 259-272.
- Prahalad, C. and Bettis, R. (1986), "The dominant logic: a new linkage between diversity and performance", *Strategic Management Journal*, Vol. 7 No. 6, pp. 485-501.
- Ramos-Rodríguez, A. and Ruiz-Navarro, J. (2004), "Changes in the intellectual structure of strategic management research: a bibliometric study of the strategic management journal, 1980–2000", *Strategic Management Journal*, Vol. 25 No. 10, pp. 981-1004.
- Rauch, A., Wiklund, J., Lumpkin, G. and Frese, M. (2009), "Entrepreneurial orientation and business performance: an assessment of past research and suggestions for the future", *Entrepreneurship Theory and Practice*, Vol. 33 No. 3, pp. 761-787.

- Rey-Martí, A., Ribeiro-Soriano, D. and Palacios-Marqués, D. (2016), "A bibliometric analysis of social entrepreneurship", *Journal of Business Research*, Vol. 69 No. 5, pp. 1651-1655.
- Saeed, S., Yousafzai, S. and Engelen, A. (2014), "On cultural and macroeconomic contingencies of the entrepreneurial orientation–performance relationship", *Entrepreneurship Theory and Practice*, Vol. 38 No. 2, pp. 255-290.
- Sakata, I., Sasaki, H., Akiyama, M., Sawatani, Y., Shibata, N. and Kajikawa, Y. (2013), "Bibliometric analysis of service innovation research: identifying knowledge domain and global network of knowledge", *Technological Forecasting and Social Change*, Vol. 80 No. 6, pp. 1085-1093.
- Sassmannshausen, S.P. and Volkman, C. (2013), "A bibliometric based review on social entrepreneurship and its establishment as a field of research", Schumpeter School of Business and Economics, Wuppertal University.
- Schaltegger, S., Gibassier, D. and Zvezdov, D. (2013), "Is environmental management accounting a discipline? A bibliometric literature review", *Meditari Accountancy Research*, Vol. 21 No. 1, pp. 4-31.
- Schildt, H., Zahra, S. and Sillanpää, A. (2006), "Scholarly communities in entrepreneurship research: a co-citation analysis", *Entrepreneurship Theory and Practice*, Vol. 30 No. 3, pp. 399-415.
- Servantie, V., Cabrol, M., Guieu, G. and Boissin, J. (2016), "Is international entrepreneurship a field? A bibliometric analysis of the literature (1989–2015)", *Journal of International Entrepreneurship*, Vol. 14 No. 2, pp. 168-212.
- Shafique, M. (2013), "Thinking inside the box: intellectual structure of the knowledge base of innovation research (1988–2008)", *Strategic Management Journal*, Vol. 34 No. 1, pp. 62-93.
- Shane, S. (1997), "Who is publishing the entrepreneurship research?", *Journal of Management*, Vol. 23 No. 1, pp. 83-95.
- Shilbury, D. (2011), "A bibliometric analysis of four sport management journals", *Sport Management Review*, Vol. 14 No. 4, pp. 434-452.
- Small, H. (1978), "Co-citation context analysis and the structure of paradigms", *Journal of Documentation*, Vol. 36 No. 3, pp. 183-196.
- Teixeira, A. (2011), "Mapping the (in) visible college (s) in the field of entrepreneurship", *Scientometrics*, Vol. 89 No. 1, pp. 1-36.
- Teixeira, A. (2014), "Evolution, roots and influence of the literature on national systems of innovation: a bibliometric account", *Cambridge Journal of Economics*, Vol. 38 No. 1, pp. 181-214.
- Thongpapanl, N.T. (2012), "The changing landscape of technology and innovation management: an updated ranking of journals in the field", *Technovation*, Vol. 32 No. 5, pp. 257-271.
- Toivanen, H. and Ponomarev, B. (2011), "African regional innovation systems: bibliometric analysis of research collaboration patterns 2005–2009", *Scientometrics*, Vol. 88 No. 2, pp. 471-493.
- Torraco, R. (2005), "Writing integrative literature reviews: guidelines and examples", *Human Resource Development Review*, Vol. 4 No. 3, pp. 356-367.
- Tsai, H. (2011), "Research trends analysis by comparing data mining and customer relationship management through bibliometric methodology", *Scientometrics*, Vol. 87 No. 3, pp. 425-450.
- Valenzuela-Fernández, L., Merigó, J.M. and Nicolas, C. (2018), "The most influential countries in market orientation: a bibliometric analysis between 1990 and 2016", *International Journal of Engineering Business Management*, Vol. 10, pp. 1-9.
- Van Eck, N. and Waltman, L. (2010), "Software survey: VOS viewer, a computer program for bibliometric mapping", *Scientometrics*, Vol. 84 No. 2, pp. 523-538.
- Van Leeuwen, T.N. and Wouters, P.F. (2017), "Analysis of publications on Journal Impact Factor over time", *Frontiers in Research Metrics and Analytics*, Vol. 2, p. 4.
- Voeth, M., Gawantka, A. and Chatzopoulou, G. (2006), "Impact auf die deutschsprachige marketingforschung", *Marketing ZFP*, Vol. 28 No. 1, pp. 7-20.

- 
- Vogel, R. (2012), "The visible colleges of management and organization studies: a bibliometric analysis of academic journals", *Organization Studies*, Vol. 33 No. 8, pp. 1015-1043.
- Vogel, R. and Güttel, W. (2013), "The dynamic capability view in strategic management: a bibliometric review", *International Journal of Management Reviews*, Vol. 15 No. 4, pp. 426-446.
- Volery, T. and Mazzarol, T. (2015), "The evolution of the small business and entrepreneurship field: a bibliometric investigation of articles published in the international small business journal", *International Small Business Journal*, Vol. 33 No. 4, pp. 374-396.
- Wales, W., Monsen, E. and McKelvie, A. (2011), "The organizational pervasiveness of entrepreneurial orientation", *Entrepreneurship Theory and Practice*, Vol. 35 No. 5, pp. 895-923.
- Wan, K., Anyi, U., Anuar, N. and Zainab, A. (2009), "Bibliometric studies on single journals: a review", *Malaysian Journal of Library and Information Science*, Vol. 14 No. 1, pp. 17-55.
- Watts, R., Porter, A. and Newman, N. (1998), "Innovation forecasting using bibliometrics", *Competitive Intelligence Review*, Vol. 9 No. 4, pp. 11-19.
- Wiklund, J. and Shepherd, D. (2005), "Entrepreneurial orientation, and small business performance: a configurational approach", *Journal of Business Venturing*, Vol. 20 No. 1, pp. 71-91.
- Xing, D., Zhao, Y., Dong, S. and Lin, J. (2018), "Global research trends in stem cells for osteoarthritis: a bibliometric and visualized study", *International Journal of Rheumatic Diseases*, Vol. 21 No. 7, pp. 1372-1384.
- Zahra, S., Neilson, A. and Bogner, W. (1999), "Corporate entrepreneurship, knowledge and competence development", *Entrepreneurship Theory and Practice*, Vol. 23 No. 3, pp. 169-186.
- Zahra, S.A., Sapienza, H.J. and Davidsson, P. (2006), "Entrepreneurship and dynamic capabilities: a review, model and research agenda", *Journal of Management Studies*, Vol. 43 No. 4, pp. 917-955.
- Zhai, Q., Su, J. and Ye, M. (2014), "Focus on China: the current status of entrepreneurship research in China", *Scientometrics*, Vol. 98 No. 3, pp. 1985-2006.
- Zhang, Q. and Xu, X. (2008), "On discovering the structure map of knowledge management research abroad – integration of a bibliometric analysis and visualization analysis", *Journal of Industrial Engineering and Engineering Management*, Vol. 4, pp. 30-35.
- Zhang, Y., Guo, Y., Wang, X., Zhu, D. and Porter, A.L. (2013), "A hybrid visualisation model for technology roadmapping: bibliometrics, qualitative methodology and empirical study", *Technology Analysis & Strategic Management*, Vol. 25 No. 6, pp. 707-724.
- Zhu, W. and Guan, J. (2013), "A bibliometric study of service innovation research: based on complex network analysis", *Scientometrics*, Vol. 94 No. 3, pp. 1195-1216.

### Further reading

- Merigó, J.M., Blanco-Mesa, F., Gil-Lafuente, A.M. and Yager, R.R. (2016), "A bibliometric analysis of the first thirty years of the international journal of intelligent systems", 2016 IEEE Symposium Series on Computational Intelligence (SSCI), IEEE, pp. 1-6.

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