Andrade-Valbuena et al., *Cogent Business & Management* (2019), 6: 1632569
https://doi.org/10.1080/23311975.2019.1632569

cogent business & management

MANAGEMENT | REVIEW ARTICLE

Mapping leading universities in strategy research: Three decades of collaborative networks

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Received: 01 April 2019
Accepted: 11 June 2019
First Published: 18 June 2019

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Abstract: This paper presents a longitudinal classification of the impact that universities have on strategy research from three decades of publications, between 1987 and 2016, by using bibliometric techniques and distance-based analysis of networks applied at the level of universities. Using the WoS database, this study proposes a general overview of three decades of strategic management research. Using these techniques we (i) categorize the last 30 years of academic production of research institutions in terms of strategy, evaluating their impact; (ii) analyze which universities are publishing the most in journals whose scope of publication covers strategic management; and (iii) map the network of collaboration structures among research organizations, determining its relationship and analyzing its evolution in those three decades. We found that the University of Pennsylvania was the most prominent institution throughout the years, showing the broadest network of citations according to our network analysis. There was also a remarkable presence of international universities from the UK, Canada, France and the Netherlands, however, the citation pattern among them is still low. We also observed evidence of

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PUBLIC INTEREST STATEMENT

The main objective of our research is to identify the main trends on strategy research as an investigation field from last 30 years of research, recognizing the most prominent universities and the evolution of collaborative network linkages to build collective knowledge. In order to present an integrated perspective, a longitudinal classification analysis was made by taking into account bibliometric indicators that are used to weigh the quality and impact of the investigations, and a graphic analysis based on visualization of similarities, which allows to detect the structure and configuration of exploration in the subject area. This kind of investigations are highly valued by people who does not know the topic in deep, or people that is new on the subject, and even for the development of university policies around research processes, allowing a quick overview of the matter by providing information based on scientific output.

inner knowledge flowing among different fields based on the deliberate multidisciplinary nature of research in strategy, as the strong coincidence with the ranking of the main journals in the marketing field when comparing the bibliometric studies of both fields. This analysis contributes to strategy research, first by delivering insights based on the impact of academic production and secondly through the evolution of collaborative network linkages in terms of strategy investigations undertaken to build collective knowledge.

Subjects: Research Methods in Management; Strategic Management; Management Education

Keywords: strategy; bibliometrics; universities analysis; Web of Science; VOS network analysis

1. Introduction

The dual character of scientific rigor and practical utility that strategic management research comprises has become a natural scenario that demands the quantity and quality of knowledge production (Nerur, Rasheed, & Pandey, 2016). All efforts to cover that demand for knowledge generate substantial volumes of scientific material and academic information each year. For instance, a basic topic search in the Web of Science (WoS) database, limiting the request to the word "strategy", can lead to more than 1.5 million academic products. Researchers from different fields have adopted bibliometric analysis to categorize all that information. Bibliometric techniques are helpful in finding trends, delimiting the existing structure of research and indicating clear potential future themes for investigation (Bar-Ilan, 2008).

When examining bibliometrics in strategy, it is evident that important studies have given greater relevance to the field. Ramos-Rodriguez and Ruiz-Navarro (2004) and Nerur, Rasheed, and Natarajan (2008), applying citation and co-citation analyses, found an increasing tendency to replace books for papers as a source of academic publication in terms of strategy and the prominence of the Resource-Based View theory of the firm as a foundation for upcoming developments. The work of Ronda-Pupo and Guerras-Martín (2010), based on a country network analysis, found that the discipline had three stages of evolution, with the current stage characterized by a stable growth of research links among countries. Based on journal co-citation analysis, Nerur et al. (2016) found a downward tendency in practitioner orientation and an increasing collaboration with fields such as finance and sociology, international business and entrepreneurship. The main assumption in these studies was that strategic management had evolved to become, of itself, a research topic; therefore, the analysis of its intellectual structure based on bibliometric techniques became a necessity. According to this requirement, these studies delineated research on strategy based on articles published in the Strategic Management Journal (SMJ), regarded as being the most relevant academic forum in the field (Hoskisson, Wan, Yiu, & Hitt, 1999).

Although SMJ represents a solid foundation for obtaining an overview of the field, the exclusion of important data misleads this representation. Essential information flowing from the increasing number of new and specialized journals in the academic network, as well as the existence of strategy and strategic management as subjects in the scope of publication in other widely-respected journals, represents a serious bias when seeking a picture of strategy research. Therefore, the aims of this investigation—by using bibliometric techniques and distance-based analysis of networks applied at the level of universities—are (i) to present a general overview of strategic management research based on the WoS database, which gathers more than 12,000 journals; (ii) categorize the last 30 years of academic production of research institutions in terms of strategy, evaluating its impact quinquennially and globally; (iii) analyze which universities are publishing the most in journals whose scope of publication covers strategic management; and

(iv) map the network of collaboration structures between research organizations, determining their relationship and analyzing the evolution across these three decades.

As noted by Daft and Lewin (2008), two kinds of "relevance" help solve particular needs, one to the practitioners' world and the other to the academic and scientific communities. This investigation is aligned with this second need, enriching the overview provided in previous works, by showing a longitudinal classification and mapping of institutions that represents research, vigilance of quality and diffusion of knowledge. This approach will be useful in research by other academics because it identifies the evolution of linkages, tendencies of research and similar profiles in investigations among institutions.

This work particularly shows the advances of science in the subject of strategy, appreciated as one of the most important and prestigious areas in the field of business due to its contribution to research. For these reasons, we conducted a bibliometric study that provided answers to the following six research questions:

RQ1. What are the most productive or influential universities in strategy research?

RQ2. How have the most influential universities evolved over 5-year periods across the last 30 years?

RQ3. What are the most influential journals in strategy research, according to their H-Index?

RQ4. Which are the leading universities in strategy research that publish in the Top 20 most influential journals in this scientific field?

RQ5. How has the citation behavior of the leading universities in strategy research evolved over the 1987–2016 period?

RQ6. How, in 5-year periods, have collaborative network linkages evolved according to the bibliographic-coupling fractional-counting analysis performed on the leading universities?

Therefore, the main objective of this article is to determine the contribution of the strategy area to scientific research and to show which have been the most influential universities and journals during the period between 1987 and 2016.

Section 2 of this paper first presents a brief review of the literature available on the different bibliometric analyses that have covered subjects related to strategy. Section 3 describes the bibliometric methods used throughout this document, presenting the most prominent and prolific institutions and their evolution arranged per quinquennial, as well as their classification based on the most prominent journals in the field. Section 4 presents the bibliometric results extracted from the WoS Core Collection, and Section 5 provides a graphical analysis of 30 years of bibliographic production in strategy, mapping the network structures of collaboration among universities by decades. Section 6 is a brief report on the main findings and conclusions of this document.

2. Literature review

Bibliometric analysis can be defined as a quantitative method based on mathematics and statistics applied to published units to understand the nature and course of development of a field of research (Broadus, 1987; Pritchard, 1969). Bibliometric explorations are appreciated as instruments that analyze and organize large amounts of historical data to identify hidden patterns, and which is highly valued by researchers during their decision-making processes (Daim, Rueda, Martin, & Gerdsri, 2006).

Bibliometric techniques allow the categorization of scientific production according to its impact on a field of knowledge. Different bibliometric studies have used different categories for their analysis, such as authors (Cancino, Merigó, Coronado, Dessouky, & Dessouky, 2017), journals (Valenzuela, Merigó, Johnston, Nicolás, & Jaramillo, 2017), universities (Linton, 2004), countries (Merigó, Cancino, Coronado, & Urbano, 2016), and even more specific areas with concepts such as Entrepreneurial Orientation (Andrade-Valbuena, Merigo-Lindahl, & Olavarrieta, 2018), which allow for the evaluation of the influence and relevance of academic products in the scientific community.

Bibliometric overviews have also been used in different scientific fields, determining the delineation of research domains through different bibliometric techniques (Hood & Wilson, 2001). From broad areas of research such as econometrics (Baltagi, 2007) or probability and statistics (Genest & Guay, 2002), to more specific domains of investigation such as New Product Development (Andrade-Valbuena & Merigo, 2018), or ant colony optimization (Deng & Lin, 2012), bibliometric techniques have been a valuable tool for identifying the configuration of the research subject area. Similar efforts have been used to analyze particular interests of investigation in business and management by using bibliometric analysis, such as mergers and acquisitions (Ferreira, Santos, de Almeida, & Reis, 2014), dynamic capabilities (Vogel & Güttel, 2013), competitive intelligence (Calof & Wright, 2008), and Nordic strategy research (Schriber, 2016).

As a quantitative methodology, bibliometric analysis is based on indicators that provide a representative and informative perspective of the data (Podsakoff, MacKenzie, Podsakoff, & Bachrach, 2008). Some of the most common indicators for measuring academic productivity are based on the number of publications and number of citations that a scientific work receives (Trieschmann, Dennis, Northcraft, & Niemi, 2000). Hirsch (2005) argues that the use of an arrangement of both indicators in one single measure is the optimal way of evaluating research, because it captures a wider perspective that the number of publications and the number of citations by themselves cannot achieve: the so-called H-Index. This indicator combines articles with citations, indicating the number of studies that have received at least the same number of citations (Hirsch, 2005). The H-index has been highly used and accepted as a bibliometric instrument to measure the relevance of a wide variety of research output from different actors, like universities, countries or even regions (Alonso, Cabrerizo, Herrera-Viedma, & Herrera, 2009).

However, since each indicator receives a different dimension of productivity and impact of academic research, choosing between one and another can mean a misrepresentation of the field (Laengle et al., 2017). In this sense, some complementary and mixed methodologies have emerged, as well as the inclusion of composite measurements, or the use of network graphs (Yan & Ding, 2012). The bibliometric mapping and clustering procedure is a bibliometric distance-based analysis of the Visualization of Similarities (Stands for VOS), by utilizing different measurement approaches as bibliographic coupling networks, citation networks, co-citation networks and co-authorship networks (Van Eck & Waltman, 2010). Studies of related subjects of research have been based on these methodologies, addressed a wide spectrum of topics, as resilience in business and management research (Linnenluecke, 2017), the revision of Human Resource Management (Markoulli, Lee, Byington, & Felps, 2017), the analysis of born global firms (Dzikowski, 2018), among others.

An interesting development to the study based on scientometrics is the bibliometric distance-based analysis based on the VOS-Viewer developed by Van Eck and Waltman (2010). This software allows the Visualization of Similarities, in which the distance between two items reflects the strength of the relation between them (Andrade-Valbuena & Merigo, 2018). An interesting particularity of this development, is that allows the use of fractional counting, assigning a fraction of the authorship of each paper based on the number of authors of each publication. In this sense, only a fraction of the authorship of each paper is assigned, depending on the number of authors included in it. For instance, in a full counting method, the publication of one single paper by two authors ascribes one paper to each author, however, in a fractional counting method, the

authorship allocation goes 50% of the paper each. Therefore, it allows to capture the knowledge structure, diffusion and influence from a more sensitive perspective (Servantie, Cabrol, Guieu, & Boissin, 2016).

3. Methods

Based on the bibliometric procedure proposed by Merigó, Gil-Lafuente, et al. (2015), this study uses single and composite indicators to present different results based on the same variables. Therefore, we consider that the number of citations, number of publications, the H-Index and thresholds ranking the number of documents above a number of citations, are the bibliometric measurements that best suit the objectives of this investigation (Laengle, Modak, Merigó, & Zurita, 2018; Martínez-López, Merigó, Valenzuela, & Nicolás, 2018). Furthermore, some general indicators proposed by other research institutions, such as QS Top Universities and the Academic Ranking of World Universities, are used to characterize different interests of research that allow the reader to detect strengths and opportunities (Tur-Porcar, Mas-Tur, Merigó, Roig-Tierno, & Watt, 2018).

The network mapping and clustering procedure was analyzed employing the Visualization of Similarities (VOS)-Viewer software, version 1.6.6, developed by Van Eck and Waltman (2010). This software provides a bibliometric distance-based analysis of the visualization of similarities, where the distance between two items represents the strength of the relationship between them. All the clustering analyses were based on fractional counting, which means that authorship was divided by the number of authors.

All the data in this research is available in the Web of Science (WoS) database, which is currently owned by Clarivate. This decision contributes to several objectives: first, the decision guarantees that all included material has received a critical peer review; second, it provides an ample inclusion of articles and journals; and finally, this database gathers journals that are forums of publications of different specialized fields, such as strategy (Nerur et al., 2016), thus enhancing the reliability and pertinence of the results.

Our search was based on the WoS Core Collection database for the period 1987–2016 and includes the following indexes: Social Sciences Citation Index (SSCI); Science Citation Index Expanded (SCI-EXPANDED); Emerging Sources Citation Index (ESCI); Conference Proceedings Citation Index-Social Sciences and Humanities (CPCI-SSH); Conference Proceedings Citation Index-Science (CPCI-S) and Book Citation Index-Social Sciences and Humanities (BKCI-SSH).

We integrated the results from well-known specialized journals and selected keywords validated by three different experts to ensure that no relevant work was left aside. The level of expertise was taken into account, including a minimum of 7 years of researching and teaching field-related courses. The results included the following journals: Advances in Strategic Management: A Research Annual; Business Strategy and the Environment; Global Strategy Journal; International Journal of Strategic Property Management; Journal of Family Business Strategy; Journal of Strategic Information Systems; Strategic Entrepreneurship Journal; Strategic Management Journal; Strategic Organization; Technology Analysis & Strategic Management.

A basic topic search complemented the journal results. This kind of search looks for records, which include specific words in the title and/or abstract, the author and suggested keywords within each document. We used specific keywords suggested by the experts: “strateg*” OR “SWOT” OR “competitive advantage*”, which automatically include plural or singular variations of each word. These keywords were chosen by the experts, bearing in mind their inclusion of most of the papers related to strategy, without incurring an insertion of articles that were unrelated to the field.

All results were filtered under the WoS categories Business + Management to guide research as purely as possible to the specific production of scientific knowledge in the field. Following the procedure of Merigó, Mas-Tur, et al. (2015), only the categories Article + Review + Letter + Note

were included in the study. Accordingly, 58,440 results were included in the data analysis, with 1,922,158 citations, averaging approximately 33 citations per paper per year.

4. Results

The results of the study based on bibliometric techniques focused on three main topics: (i) Leading Universities in Strategy Research, (ii) Leading Universities in Strategy Research by Quinquennials, and (ii) Journal Analysis of the Leading Universities. Each topic is reviewed as follows:

4.1. Leading universities in the field of strategy

The ranking of universities, as shown in Table 1, considers the H-index of each institution based solely on the field of strategy as the first classification item; the second classification item is the number of citations received, considering only articles published on strategy; and the third classification item is the total number of papers published in strategy research ("TPS"). Three citation thresholds are offered for analyzing the publications and citations in the field: 250, 100 and 50, which are shown in order to identify the most productive institutions and the citation structure during the 1987–2016 period. Additionally, Table 1 presents the results of comparison with two other well-known international rankings of universities: QS Business and Management World University Ranking of 2017 and the Academic Ranking of World Universities in Economics/ Business of 2015 ("ARWU"), also known as the Shanghai Ranking.

As may be seen in Table 1, the most influential institution during 30 years (1987–2016) of scientific publications in the strategy area was the University of Pennsylvania. This finding was confirmed first by the H-index, which highlighted that 133 articles had at least 133 citations each, with the total number of citations ("TCS": 72,882) that strategy papers received, as well as by the number of specialized publications (TPS: 711) in the field. The second position was Harvard University (H: 122), and the University of Texas at Austin was third (H: 104).

The proportions of the Top 50 were not the same as those of the Top 200, given that the universities of Asia and Oceania, which are considered among the Top 200, did not figure among the Top 50 in the period under study. Of the Top 200, U.S. institutions represented 50% of the most prominent universities in strategy research, followed by universities from Europe (38%), Asia (10%) and Oceania (6%) (for the complete Top 200 ranking, please see Appendix A).

It is important to note that the Institut Européen d'Administration des Affaires (acronym INSEAD), from France, provided a very important contribution to strategy research, standing out as the only institution outside the USA ranked among the Top 10 universities.

In regard to the number of papers published in the Top 200, universities in the USA garnered important proportions of production (53.76%), followed by the UK (13.25%), Canada (5.56%), Australia (5.27%), the Netherlands (4.95%) and China (3.28%). It is important to emphasize the contribution that Erasmus University Rotterdam, from the Netherlands, made, since it was as productive as those universities ranked in the Top 10, while not necessarily having the highest H-index.

Georgetown University, Stanford University, the University of Chicago and the University of Pennsylvania achieved more than 100 citations per paper published in strategy research, jointly accumulating almost 7% of all the citations made in this field, according to the Top 200 group. In fact, the first 41 universities accrued almost half of the citations made in strategic management research over three decades of publications, which explains their high impact. The London Business School also presented similar results for the number of citations per paper published in strategy research to those at the Top 10 universities.

The average global H-index (Hirsch, 2005) of the Top 200 universities was 50. This finding means that at least 50 papers received 50 citations from each paper, on average. However, the Top 50

Table 1. Top 50 Most influential universities in strategy research

R*	University	Country	H	TCS	TPS	TCS/TPS	>250	>100	>50	ARWU	QS
1	U. Penn	USA	133	72,882	711	102.5	64	169	280	8	5
2	Harvard U.	USA	122	65,831	701	93.9	56	142	149	1	1
3	U. Texas at Austin	USA	104	39,668	462	85.9	38	108	219	501–600	201–250
4	U. Michigan	USA	102	38,856	526	73.9	28	105	184	23	25
5	INSEAD	France	100	30,362	433	70.1	22	102	160	38	3
6	Michigan State U.	USA	97	35,293	631	55.9	25	94	200	114	51–100
7	U. Minnesota	USA	96	37,175	535	69.5	30	90	189	33	101–150
8	Texas A M U.	USA	95	34,373	501	68.6	28	91	165	28	51–100
9	Northwestern U.	USA	95	34,102	381	89.5	28	91	150	10	14
10	Arizona State U.	USA	94	32,762	493	66.5	27	89	173	22	101–150
11	Penn State U.	USA	93	31,908	492	64.9	26	87	160	77	51–100
12	U. Illinois	USA	93	30,660	543	56.5	28	86	146	38	51–100
13	Columbia U.	USA	92	29,724	361	82.3	30	83	152	5	19
14	Stanford U.	USA	91	46,603	397	117.4	30	86	145	7	6
15	Indiana U.	USA	91	31,872	531	60.0	25	84	164	29	51–100
16	U. Maryland	USA	91	29,770	403	73.9	20	87	137	23	51–100
17	U. N Carolina	USA	87	28,168	554	50.8	26	75	153	33	51–100
18	MIT	USA	87	27,988	389	71.9	22	72	140	3	4
19	NYU	USA	85	25,182	410	61.4	19	70	141	9	17
20	Ohio State U.	USA	81	24,779	366	67.7	22	67	111	27	101–150
21	U. Washington	USA	80	23,109	334	69.2	19	66	107	24	101–150
22	U. Wisconsin	USA	77	28,573	440	64.9	26	67	113	44	101–150
23	U. Western Ontario	Canada	77	23,526	339	69.4	21	66	113	101–150	51–100
24	Rutgers State U.	USA	75	24,412	360	67.8	15	62	108	51–75	201–250
25	U. South Calif.	USA	75	20,016	336	59.6	21	63	104	29	51–100
26	Boston U.	USA	75	19,162	244	78.5	15	65	92	45	51–100

(*Continued*)

Table 1. (*Continued*)

R*	University	Country	H	TCS	TPS	TCS/TPS	>250	>100	>50	ARWU	QS
27	London Business Sch	UK	74	25,949	311	83.4	18	59	112	43	2
28	U. S Carolina	USA	73	19,057	322	59.2	14	58	105	51–75	201–250
29	Duke U.	USA	72	16,897	313	54.0	9	52	93	17	43
30	Georgia State U.	USA	71	18,848	322	58.5	11	46	88	101–150	201–250
31	Cornell U.	USA	70	19,246	302	63.7	22	52	93	21	34
32	U. Missouri	USA	70	17,245	344	50.1	12	46	90	101–150	-
33	U. Calif Berkeley	USA	69	25,441	339	75.0	15	48	88	4	10
34	U. Calif Los Angeles	USA	68	15,714	236	66.6	13	53	81	16	16
35	U. Colorado	USA	65	18,702	297	63.0	14	41	86	51–75	251–300
36	Georgia Inst Technol	USA	65	17,082	298	57.3	14	45	86	51–75	51–100
37	Erasmus U.	Netherlands	65	15,855	514	30.8	10	37	86	29	29
38	Purdue U.	USA	63	14,097	327	43.1	6	37	84	51–75	51–100
39	Dartmouth Coll	USA	62	15,848	173	91.6	14	45	77	32	51–100
40	Emory U.	USA	62	14,738	188	78.4	17	39	73	51–75	201–250
41	U. Pittsburgh	USA	62	12,975	210	61.8	9	35	78	51–75	251–300
42	Florida State U.	USA	59	13,745	269	51.1	12	33	66	151–200	251–300
43	Temple U.	USA	59	12,463	293	42.5	9	37	68	51–75	201–250
44	Carnegie Mellon U.	USA	58	13,483	245	55.0	9	29	67	15	51–100
45	Tilburg U.	Netherlands	58	13,164	336	39.2	9	35	69	51–75	101–150
46	U. Cambridge	UK	58	11,683	356	32.8	5	28	62	18	8
47	U. Calif Irvine	USA	57	14,614	179	81.6	16	40	63	51–75	151–200
48	U. Toronto	Canada	57	12,504	307	40.7	7	26	67	25	35
49	U. Oklahoma	USA	57	11,989	204	58.8	11	26	67	101–150	-
50	U. Nottingham	UK	56	13,739	337	40.8	6	33	60	101–150	51–100

Abbreviations: R = Rank; H = h-index (only in strategy research); TPS and TCS = Total number of publications and citations (only in strategy research). ARWU: Academic Ranking of World Universities - ARWU Economics/Business 2015- . QS Ranking: QS world university rankings Business and management- 2017.

***For the complete Top 200 ranking, see Appendix A.**

universities as shown in Table 1 received an H-Index of 78. This result was expected due to the order of classification.

It is important to note that even when the Top 50 from Table 1 are compared to the Top 200 presented in Appendix A, important names and proportions from the most prominent universities continue to appear.

The last two columns show the ARWU and the QS Business and Management World University Rankings of 2017. Dissimilarities were noted, even though most of the Top 10 universities, based on the H-Index, were well positioned in these rankings. This finding is because the dimensions that each methodology captured in its measurement were also different. For instance, the prestige, size, or age of each institution were important variables for a student when searching where to study; therefore, the QS and ARWU are important indexes that capture these dimensions. However, if we wish to measure their scientific impact, these dimensions might appear as noise in the measurements. Despite the above, most of the universities listed in Table 1 were relatively well classified in those rankings.

4.2. Leading universities in strategy research by quinquennials

This section focuses on the evolution of research in strategy performed by the leading universities throughout the 1987–2016 period. This analysis is based on periods of 5 years, ranking the top 20 most prominent institutions according to their H-Index. Other indicators, such as the total number of papers, total number of citations received, and the number-of-citations/number-of-papers ratio during that period, were also shown.

The preponderance of USA institutions within the period was remarkable; however, it was noticeable that from 2000 on, the presence of universities from other parts of the world gained importance in the field, to the point that in the last quinquennial they represented almost 50% of the top 20 universities in terms of strategy research. Universities from Europe deserve special mention, where we found that the Netherlands, Finland and the UK had the same number of institutions in the ranking. This growth in the number of papers may be driven by the increasing number of journals specializing in strategy, particularly those that have emerged in Europe; this finding warrants further investigation in future studies.

In regard to productivity, the number of papers that the Top 20 institutions published in each quinquennial grew by approximately 30%; this result is clearly indicative of the relevance that strategy research has gained in the scientific arena.

Six universities figured in all the quinquennial rankings: the University of Pennsylvania, Harvard University, Indiana University and the University of Minnesota. It is remarkable that the presence of INSEAD from France, only in the last quinquennial, did not rank it in the Top 20.

Table 2 shows the most influential universities in strategy research by quinquennial, classified by their H-Index, as the first classification item. The second classification criterion is the total number of citations, and the third is the number of papers published in strategy research.

The University of Pennsylvania was the most influential during the 1987–1991 period. Its production in number of papers over the three decades was also noticeable, increasing by almost 150% between 1987 and 2016. The number of citations per paper that the University of Stanford received was also remarkable and accounts for almost 14% of all the citations obtained in this period. This finding highlights the relevance to the field of this quinquennial of academic production by such institutions.

It is important to note the academic production results for the period between1992 and 1996 and the number of citations that are recorded for the University of Pennsylvania. In fact, five universities

Table 2. Most influential universities in strategy research—Quinquennials

	1987–1991					1992–1996					1997–2001				
R	**University**	**H**	**TC**	**TP**	**TC/TP**	**University**	**H**	**TC**	**TP**	**TC/TP**	**University**	**H**	**TC**	**TP**	**TC/TP**
1	U. Penn	35	7748	59	131,32	U. Penn	61	20,273	108	187.71	Harvard U.	61	25,440	117	217.44
2	NYU	29	5651	44	128.43	Columbia U.	51	11,197	83	134.90	U. Penn	61	23,000	109	211.01
3	Columbia U.	24	3337	34	98.15	U. Michigan	49	13,013	78	166.83	U. Texas at Austin	53	11,645	122	95.45
4	Northwestern U.	24	3303	28	117.96	U. Texas at A.	49	10,248	93	110.19	U. Michigan	47	7815	75	104.20
5	U. Michigan	23	3635	30	121.17	Harvard U.	47	13,141	94	139.80	U. Minnesota	46	9241	69	133.93
6	Stanford U.	22	12,061	26	463.88	MIT	40	9398	66	142.39	Stanford U.	45	11,309	69	163.90
7	U. Texas at Austin	21	2385	37	64.46	U.S Carolina	38	5412	77	70.29	Michigan State U.	45	6673	73	91.41
8	Harvard U.	20	5858	39	150.21	Penn State U.	36	6415	56	114.55	INSEAD	44	7217	72	100.24
9	MIT	20	4653	33	141.00	NYU	36	5084	65	78.22	Columbia U.	43	7997	69	115.90
10	U. Pittsburgh	20	3092	27	114.52	Stanford U.	35	12,694	55	230.80	Northwestern U.	42	11,306	69	163.86
11	Indiana U.	19	3067	27	113.59	U. Minnesota	33	8372	49	170.86	Arizona State U.	41	9653	58	166.43
12	U. Minnesota	19	2106	26	81.00	U. Washington	33	8025	49	163.78	London B. Sch.	40	11,036	71	155.44
13	U. Illinois	19	1252	25	50.08	U. Illinois	33	5329	65	81.98	U. Calif. Los Ang.	40	6714	55	122.07
14	U.S Carolina	17	1527	20	76.35	INSEAD	31	5798	49	118.33	Texas A&M U.	39	10,865	61	178.11
15	McGill U.	16	3128	18	173.78	Indiana U.	31	5393	55	98.05	U. Maryland	39	8470	56	151.25
16	U. Maryland	16	1774	20	88.70	Northwestern U.	29	8262	48	172.13	MIT	39	5006	64	78.22
17	U. Washington	14	2330	19	122.63	U. South Calif.	29	5332	48	111.08	U. Illinois	38	8829	65	135.83
18	U. South Calif.	14	1289	16	80.56	Purdue U.	29	4612	53	87.02	U. Wisconsin	38	7169	77	93.10
19	Texas A&M U.	13	2526	14	180.43	U. Wisconsin	28	7115	55	129.36	U. North Carolina	38	6573	68	96.66
20	INSEAD	13	1988	17	116.94	Rutgers S. U.	28	6788	41	165.56	U. Western Ontario	37	8924	49	182.12
	2002–2006					**2007–2011**					**2012–2016**				
R	**University**	**H**	**TC**	**TP**	**TC/TP**	**University**	**H**	**TC**	**TP**	**TC/TP**	**University**	**H**	**TC**	**TP**	**TC/TP**
1	U. Texas at Austin	65	13,782	174	79.21	Arizona State U.	52	7617	147	51.82	Indiana U.	27	2642	168	15.73
2	Michigan State U.	64	14,511	140	103.65	U. Penn	51	8141	157	51.85	Harvard U.	25	2213	146	15.16
3	U. Penn	59	12,270	132	92.95	Michigan State U.	50	7348	190	38.67	Copenhagen Business Sch.	24	2114	217	9.74

(*Continued*)

Table 2. (*Continued*)

4	U. Minnesota	59	10,602	108	98.17	Texas A&M U.	49	8925	162	55.09	U. Warwick	23	1677	189	8.87
5	Harvard U.	58	12,430	135	92.07	U. North Carolina	48	6202	149	41.62	Texas A&M U.	23	1630	146	11.16
6	INSEAD	51	9848	94	104.77	Indiana U.	45	7323	159	46.06	U. Minnesota	23	1462	140	10.44
7	U. North Carolina	51	9312	104	89.54	Harvard U.	45	6788	170	39.93	Michigan State U.	22	1871	166	11.27
8	Arizona State U.	51	9177	84	109.25	Erasmus U.	43	6756	170	39.74	Penn State U.	22	1821	155	11.75
9	Penn State U.	50	8437	89	94.80	U. Illinois	43	6390	142	45.00	Arizona State U.	22	1802	146	12.34
10	U. Maryland	47	10,853	69	157.29	U. Minnesota	40	5407	143	37.81	Erasmus U.	21	1850	207	8.94
11	Indiana U.	47	7102	76	93.45	Penn State U.	40	5260	125	42.08	U. Penn	21	1492	146	10.22
12	U. Wisconsin	44	9083	89	102.06	U. Michigan	40	4472	132	33.88	Hong Kong P. U.	20	1898	179	10.60
13	U. Michigan	44	8909	87	102.40	U. Maryland	38	4385	109	40.23	Aalto U.	20	1642	196	8.38
14	U. Illinois	44	7677	89	86.26	INSEAD	37	4622	99	46.69	Tilburg U.	20	1353	140	9.66
15	U. Western Ontario	44	6836	73	93.64	U. Western O.	37	3659	107	34.20	Bocconi U.	20	1331	129	10.32
16	London B. Sch.	42	7824	71	110.20	York U.	36	4368	96	45.50	Ohio State U.	20	1262	99	12.75
17	Texas A&M U.	42	5662	76	74.50	U. Missouri	36	3783	108	35.03	Hanken Sch. Econ.	20	1261	103	12.24
18	Ohio State U.	41	7322	66	110.94	Stanford U.	35	4212	92	45.78	U. North Carolina	19	1456	177	8.23
19	Northwestern U.	40	6175	62	99.60	Bocconi U.	35	3743	91	41.13	U. Illinois	19	1202	157	7.66
20	NYU	39	5175	63	82.14	Georgia S. U.	35	3708	96	38.63	City U. London	19	1184	111	10.67

Abbreviations: R = Rank; THS = h-index (only in strategy research); TPS and TCS = Total number of publications and citations (only in strategy research).

accumulated almost one-third of the number of citations in this period: the University of Pennsylvania, Harvard University, the University of Michigan, Stanford University and Columbia University.

Considering the number of citations per paper between 1997 and 2001 (on average, 134% of the citations received per paper in this period), the relevance of this quinquennial in the construction of knowledge and learning in the field cannot be understated. This kind of citation structure is also evident in different subjects, such as biology and physics, where what are known as "leaders of the field" are identified, thus setting the foundations for the formation of future knowledge. In this period, the Top 3 most productive institutions also had the most impact on the field measured in the number of citations, led by the University of Texas at Austin and followed by Harvard University and the University of Pennsylvania.

Academic production in strategy research during the 2002–2006 period highlights the role that institutions, in a global context, begin to have in the academic discussion of strategy. A total of 23% of the Top 20 institutions are from outside the USA. Note that the Erasmus University Rotterdam increased its production of papers on strategy through the three following quinquennials, by almost 132% between 2002 and 2016, receiving an average of 33.6 in the H-Index.

Table 2 indicates that between 2007 and 2011 the number of publications of universities outside the USA was approximately 30% of the academic production; however, the number of citations received was still low (approximately 3% of all citations received during the period). Traditional names from the following institutions in the UK were relevant to the analysis: Manchester University, Nottingham University, Cambridge University and the London Business School.

In the last period of strategy research, from 2012 to 2016, half of the institutions that participated in the Top 20 were outside the USA, led by the UK and the Netherlands. Copenhagen Business School, Erasmus University Rotterdam and Aalto University produced almost 15% of the papers from the Top 20 universities, which suggests a remarkable contribution to the research of the field. The presence of the Hong Kong Polytechnic University was also notable, as it produced almost 4% of the papers and received a similar percentage of citations during this period, highlighting the relevance that China will achieve in the academic conversation.

4.3. Journal analysis of the leading universities

To analyze the relationship between research institutions and publishing institutions in strategy research, this section first applies bibliometric analysis to find the Top 20 most prominent journals according to their H-Index and integrates these results with those obtained in Table 1. This approach will allow for incorporating the representation of scientific vigilance of rigorousness to demarcate the academic space, evidencing a potential flow of knowledge among the different fields of knowledge.

Table 3 presents a ranking according to the H-Index, based on material published in strategy research. Some influential names that are specialized in the field were expected, such as the Strategic Management Journal and the Academy of Management Journal. The relevance that other journals from other specialties have on strategy research is noteworthy, as among them the Journal of Marketing, Research Policy and Journal of Operations Management. This outcome was foreseeable based on the deliberative and multidisciplinary nature of research in strategy. In general, the results from Table 3 show eight fields of research and interests of publication: Strategy, Management, Innovation, Operations, Human Resources, Marketing and Organizational Behavior, evidencing strong collaborative ties and flow of knowledge among these disciplines. There was a notable presence of publishers from the USA, constituting almost 60% of the institutions from this country. The second most represented country in the Top 20 journals was the Netherlands (25%), followed by the UK (10%).

Table 3. Most influential journals in strategy research, according to its H-Index

R	Journal	Country	H
1	Strategic Management Journal	USA	241
2	Academy of Management Journal	USA	182
3	Academy of Management Review	USA	154
4	Journal of Marketing	USA	135
5	Organization Science	USA	129
6	Journal of Management	USA	123
7	Management Science	USA	120
8	Journal of International Business Studies	UK	114
9	Journal of Operations Management	Netherlands	99
10	Journal of Management Studies	UK	95
11	Research Policy	Netherlands	95
12	Harvard Business Review	USA	94
13	Administrative Science Quarterly	USA	92
14	Journal of Business Venturing	Netherlands	91
15	MIS Quarterly	USA	83
16	European Journal of Operational Research	Netherlands	82
17	Journal of Business Research	Netherlands	76
18	Journal of Marketing Research	USA	76
19	Journal of Product Innovation Management	UK	74
20	Organization Studies	USA	74

Abbreviations: R = Rank; H = h-index (only in strategy research).

4.3.1. Cross-analysis of journals and institutions

To analyze the relationship between universities and journals more deeply, we looked at the Top 20 journals from Table 3 to see which universities published the most in each one. Tables 4 and 5 present the Top 20 leading universities that publish in the Top 20 most influential journals regarding strategy research.

Note that the institutions that ranked as leading universities in Table 1 are also those that published the most in these journals. The University of Texas at Austin leads in 11 of the Top 20 journals; Harvard University, the University of North Carolina and the University of Pennsylvania lead in 10; and Indiana University, the INSEAD Business School, Michigan State University and Pennsylvania State University are among the leaders in 9 of the Top journals in strategy.

Of the institutions outside the USA, INSEAD was the one that was the most present in most of the Top 20 Journals (9 Journals), followed by Erasmus University Rotterdam (8 Journals, the Netherlands), and London University (5 Journals, United Kingdom).

Some institutions that were not ranked in Table 1 of the university ranking are represented in Tables 4 and 5, such has the University of Mannheim, which had a significant number of papers published in subjects related to strategy in the Journal of Marketing.

There is evident leadership of the University of Pennsylvania. The number of papers published in strategy from this institution was outstanding. The number of papers published by INSEAD in both journals was also remarkable.

The Journal of International Business Studies (**"JIBS"**) is more diverse, and many universities, not just from the UK, USA or the Netherlands, regularly publish their research there. This outcome

Table 4. Leading universities in strategy publishing in Top 20 most influential Journals in strategy research. Ranking 1 to 10

	Strategic Management Journal		Academy of Management Journal		Academy of Management Review		Journal of Marketing		Organization Science	
R	University	TP	University	TP	University	TP	University	TP	University	TP
1	U. Penn	126	Arizona State U.	32	U. Washington	13	U. Texas at Austin	18	U. Penn	48
2	INSEAD	89	Penn State U.	30	U. Wisconsin	13	U. North Carolina	18	Harvard U.	32
3	U. Michigan	78	Texas A&M U.	27	Ohio State U.	12	Texas A&M U.	17	INSEAD	31
4	Harvard U.	76	U. Penn	25	Arizona State U.	11	U. Wisconsin	15	U. Michigan	22
5	U. Minnesota	74	U. Michigan	23	Columbia U.	11	U. Mannheim	14	U. Minnesota	21
6	NYU	72	U. Texas at Austin	21	U. Illinois	11	U. South Calif.	13	U. Illinois	21
7	U. Illinois	65	U. Washington	19	U. Texas at Austin	11	Penn State U.	13	Stanford U.	21
8	Purdue U.	59	U. Minnesota	18	NYU	10	Michigan State U.	13	Duke U.	19
9	Indiana U.	54	Indiana U.	18	U. Minnesota	10	Georgia State U.	13	Northwestern U.	18
10	Texas A&M U.	50	Columbia U.	18	U. Penn	10	U. Maryland	12	Penn State U.	17
11	U. North Carolina	48	U. Wisconsin	17	Boston U.	9	Duke U.	12	NYU	16
12	Arizona State U.	48	U. South Calif.	16	Penn State U.	9	Arizona State U.	12	U. South Calif.	15
13	Northwestern U.	46	U. Maryland	16	Texas A&M U.	9	U. Virginia	11	U. Calif. Irvine	15
14	Michigan State U.	42	Hong Kong U. Sci. T	16	U. Michigan	9	U. Notre Dame	11	Washington U.	14
15	U. Western Ontario	41	NYU	15	U.S Carolina	9	U. Illinois	11	Ohio State U.	13
16	Penn State U.	40	Michigan State U.	15	Harvard U.	8	Indiana U.	11	MIT	13
17	Duke U.	40	INSEAD	15	U. Maryland	8	Emory U.	11	Erasmus U.	13
18	U. Texas at Austin	38	Harvard U.	15	U. South Calif.	8	U. Washington	10	Bocconi U.	13
19	Columbia U.	37	Dartmouth Coll.	15	U. Western Ontario	8	U.S Carolina	10	Arizona State U.	13
20	U. Washington	36	U.S Carolina	13	Indiana U.	7	U. Penn	10	U. Toronto	12
	Journal of Management		**Management Science**		**Journal of International Business Studies**		**Journal of Operations Management**		**Journal of Management Studies**	
R	University	TP	University	TP	University	TP	University	TP	University	TP
1	Texas A&M U.	33	U. Penn	90	Chinese U. Hong Kong	23	Michigan State U.	46	Indiana U.	22

(*Continued*)

Table 4. (*Continued*)

2	Indiana U.	25	INSEAD	50	U. Western Ontario	22	U. Minnesota	30	U. Illinois	19
3	U.S Carolina	24	Columbia U.	49	Rutgers State U.	21	Arizona State U.	25	Erasmus U.	19
4	Arizona State U.	20	Duke U.	48	Indiana U.	20	Ohio State U.	23	U. Warwick	17
5	U. Wisconsin	18	NYU	46	Temple U.	19	U.S Carolina	16	U. Bath	15
6	U. Illinois	17	Stanford U.	43	Michigan State U.	18	Indiana U.	15	U. Nottingham	13
7	Penn State U.	17	Harvard U.	43	INSEAD	18	U. Western Ontario	14	Texas A&M U.	13
8	U. Connecticut	15	U. Michigan	40	U. Texas at Austin	16	U. North Carolina	13	U. Birmingham	12
9	U. Texas at Austin	14	Carnegie Mellon U.	40	U.S Carolina	16	Georgia Inst. Tech.	13	Copenhagen B. Sch.	11
10	Rutgers State U.	13	U. Maryland	39	U. Reading	15	Clemson U.	13	U. Texas at Austin	10
11	Ohio State U.	13	U. Calif. Berkeley	37	U. Hong Kong	15	Texas A&M U.	12	U. Leeds	10
12	U. Oklahoma	11	Northwestern U.	36	York U.	14	U. Toledo	11	Vrije U. Amsterdam	9
13	U. North Carolina	11	U. South Calif.	31	Ohio State U.	13	U. Arkansas	10	U. Minnesota	9
14	Florida State U.	11	U. Calif. Los Angeles	30	Georgia State U.	13	Texas Christian U.	10	U. Lancaster	9
15	U. Tennessee	10	MIT	30	City U. Hong Kong	13	Rensselaer Pol. Inst	9	U. Connecticut	9
16	U. Kentucky	10	Georgia Inst. Tech.	28	U. Missouri	11	U. Notre Dame	8	U. Colorado	9
17	Texas Christian U.	10	U. Toronto	26	U. Miami	11	London B. Sch.	8	U. Alberta	9
18	Michigan State U.	10	Purdue U.	26	U. Leeds	11	Hong Kong Pol. U.	8	Temple U.	9
19	Cornell U.	10	Washington U.	25	Tilburg U.	11	Emory U.	8	Rutgers State U.	9
20	U. St. Gallen	9	U. Texas at Austin	24	Natl. U. Singapore	11	Penn State U.	7	HEC Montreal	9

Abbreviations: R = Rank; TP = Total papers published in strategy research.

Table 5. Leading universities in strategy publishing in Top 20 most influential Journals in strategy research. Ranking 11 to 20

	Research Policy		Harvard Business Review		Administrative Science Quarterly		Journal of Business Venturing		Mis Quarterly	
R	**University**	**TP**	**University**	**TP**	**University**	**TP**	**University**	**TP**	**University**	**TP**
1	U. of Manchester	22	Harvard U.	194	Stanford U.	73	Indiana U.	18	U. Maryland	19
2	U. of Sussex	21	U. of London	33	U. Michigan	51	Iu Kelley School of Business	18	U. of British Columbia	12
3	Maastricht U.	19	London B. Sch.	31	Harvard U.	46	U. Colorado	16	Georgia State U.	11
4	Harvard U.	18	INSEAD	23	Columbia U.	39	Case Western Reserve U.	13	Southern Methodist U.	11
5	U. of London	17	U. Penn	22	Northwestern U.	36	Georgia State U.	13	U. Texas at Austin	11
6	Eindhoven U. of Technology	15	Mckinsey Co Inc	29	U. Calif. Berkeley	35	Imperial College London	12	Carnegie Mellon U.	9
7	Erasmus U.	15	Bain Co	20	U. Penn	34	Georgia Inst. Technol.	11	Mcgill U.	8
8	MIT	14	Stanford U.	16	Cornell U.	30	Syracuse U.	11	U. of Arizona	8
9	Copenhagen Business Sch.	13	Boston Consulting Grp Inc	15	U. Texas at Austin	30	York U.	11	U. of Georgia	8
10	Bocconi U.	11	Columbia U.	15	MIT	22	Ohio State U.	10	Clemson U.	7
11	Fraunhofer Gesellschaft	11	U. Michigan	15	Penn State U.	21	U.S Carolina	10	Harvard U.	7
12	Imperial College London	11	MIT	12	U. Illinois	20	George Mason U.	9	Michigan State U.	7
13	Technical U. of Munich	11	Northwestern U.	12	U. Toronto	19	U. Nottingham	9	Temple U.	7
14	U. Warwick	11	Babson College	11	NYU	18	U. Penn	9	City U. Hong Kong	6
15	Polytechnic U. of Milan	10	Sorbonne Universites Comue	10	INSEAD	17	Babson College	8	Erasmus U.	6
16	U. Calif. Berkeley	10	U. Toronto	9	U. of Chicago	16	Jonkoping U.	8	U. South Calif.	6
17	U. Nottingham	10	Boston U.	8	U. North Carolina	15	Rensselaer Polytech Inst	8	MIT	5
18	Utrecht U.	10	Dartmouth Coll.	7	Emory U.	14	Texas Christian U.	8	U. Arkansas	5
19	Aalto U.	9	U. Calif. Berkeley	7	U. Calif. Irvine	14	U. Washington	7	U. North Carolina	5
20	U. of Cambridge	9	Duke U.	6	Carnegie Mellon U.	13	Erasmus U.	6	U. of Pittsburgh	5
	European Journal of Operational Research		**Journal of Business Research**		**Journal of Marketing Research**		**Journal of Product Innovation Management**		**Organization Studies**	
R	**University**	**TP**	**University**	**TP**	**University**	**TP**	**University**	**TP**	**University**	**TP**
1	U. of Montreal	37	Incae Business School	37	U. Penn	18	Michigan State U.	36	U. of London	21

(*Continued*)

Table 5. (*Continued*)

2	City U. Hong Kong	33	Feng Chia U.	26	Northwestern U.	16	Delft U. of Technology	29	U. of Alberta	17
3	Erasmus U.	30	U. Valencia	24	U. Michigan	15	U. North Carolina	21	U. Warwick	17
4	Natl. U. Singapore	26	City U. Hong Kong	21	U. Texas at Austin	15	Erasmus U.	19	Erasmus U.	15
5	Hong Kong Polytech U.	23	U. North Carolina	20	U. Calif. Los Angeles	13	Northeastern U.	19	U. of Manchester	14
6	U. of Florida	23	Michigan State U.	18	U. South Calif.	13	U. Missouri	18	U. of Montreal	12
7	CNRS France	22	Florida State U.	17	Penn State U.	12	North Carolina State U.	16	U. Nottingham	12
8	HEC Montreal	19	Georgia State U.	16	U. Maryland	12	Polytechnic U. of Milan	14	U. Leeds	11
9	Hong Kong U. Sci. Technol.	19	U. of New South Wales Sydney	16	Duke U.	11	U. of Twente	14	Aalto U.	10
10	Purdue U.	19	Cardiff U.	15	Stanford U.	11	Eindhoven U. of Technology	13	U. Lancaster	10
11	U. North Carolina	19	Concordia U. Canada	15	Tilburg U.	11	U. of Groningen	13	U. Bath	10
12	Chinese Academy of Sciences	18	U. Leeds	15	Columbia U.	10	Rensselaer Polytech Inst	12	U. of Cambridge	10
13	Ku Leuven	18	U. of Montreal	14	U. Calif. Berkeley	10	Stockholm School of Economics	12	Copenhagen Business Sch.	9
14	National Cheng Kung U.	18	Yonsei U.	14	U. of Chicago	10	Tilburg U.	12	HEC Montreal	9
15	Ohio State U.	18	Boston College	13	NYU	9	Mcmaster U.	10	Maastricht U.	9
16	Aalto U.	17	HEC Montreal	13	Yale U.	9	U. of Cambridge	10	Aston U.	8
17	Tilburg U.	17	U. of Mississippi	13	INSEAD	8	Concordia U. Canada	9	Cardiff U.	8
18	Universidade De Lisboa	17	Monash U.	12	U. of Florida	8	Ku Leuven	9	INSEAD	8
19	U. Warwick	17	U. of London	12	U. North Carolina	8	U. of Manchester	9	City U. London	7
20	U. of London	16	U. of Melbourne	12	Harvard U.	7	U. of Utah	9	U. of Oxford	7

Abbreviations: R = Rank; TP = Total papers published in strategy research.

was expected due to the nature of the specialization in IB. The role the Chinese University of Hong Kong plays in strategy research is noticeable, and it is the institution that is most published in the JIBS. Moreover, the presence of Chinese institutions was remarkable in these journals, evidencing the upward trend of research in strategy in that country.

The multiplicity of international institutions that regularly publish in the Journal of Management Studies **("JMS")** related to strategy was remarkable, with 50% of the institutions coming from outside the USA, demonstrating the inclusive spirit and the openness to different methodological approaches that underpin this journal. Furthermore, the presence only of institutions from the USA in the JMS is evidence that this field is one of the strong areas of research in this country.

5. Network analysis of the leading universities based on VOS viewer

In order to map the leading publication and citation links from a general perspective, this work used VOS viewer software (Van Eck & Waltman, 2010) based on the fractional counting of bibliographic coupling, co-authorship and citation analysis. This software allows for a distance-based bibliometric analysis of the Visualization of Similarities (VOS). This approach means that the distance between two items reflects the strength of the relation between them, since the shortest distance represents the strongest relationship and *vice versa*. Moreover, the size of the vertices in the network represent the most prominent institutions in citations, co-authorship or bibliographic-coupled variables, depending on the type of analysis that is performed.

Figure 1 presents a bibliographic data network based on citation analysis with a threshold of one hundred citations and one hundred of the most representative citing connections. The University of Pennsylvania was the most cited institution (20,244 citation links) and had the broadest network. Texas A&M University (citation links: 15,983), Harvard University (citation links: 15,368) and Michigan State University (citation links: 14,477) were also highly cited. The strongest relationships were evident at Harvard University, the University of Pennsylvania and Stanford University, which belong to the same blue cluster. The dispersion of the variables showed a stronger relationship among the universities located in the USA, which was not the case for the universities in the UK, Canada and China. This finding is based on the relatively recent weighting that these institutions are giving to strategy research, which is congruent with the results from Table 2.

Figure 2 shows a bibliographic data map based on a co-authorship and fractional counting analysis, with a threshold of one hundred co-authorships and one hundred co-authorship links. The co-authorship map revealed the most important collaborative partners among the institutions. Five general clusters were evident in the network in accordance with the geographic positioning, shown in different colors. From the USA, there were three noticeable universities that were essential collaborators in the field: Michigan State University (co-authorship links: 279), the University of Pennsylvania (co-authorship links: 274), and the University of North Carolina (co-authorship links: 257), each conforming a different center and periphery cluster of scientific collaboration. Another cluster was formed by universities from the Netherlands, with the center at the Erasmus University of Rotterdam. From the UK, the University of Warwick played a principal role in collaboration in terms of strategy research. Finally, an Asian cluster was led by the Hong Kong Polytechnic University, which was the institution with the highest number of publications authored jointly in this cluster; however, the distance between vertices revealed dissimilar preferences in research.

Based on bibliographic coupling, Figure 3 shows a bibliographic map, with a threshold of three hundred institutions and three hundred bibliographic coupling relations. Bibliographic coupling helps find related research in different universities. This approach shows the intensity of relationships, given by the number of documents cited in common by two different papers. Affinity was inferred among bibliographic sources, revealing a similarity of thought. The dispersion among institutions in the map reveals the wide spectrum of investigation preferences based on strategy research. This network showed similar results to the co-authorship analysis; clusters were related

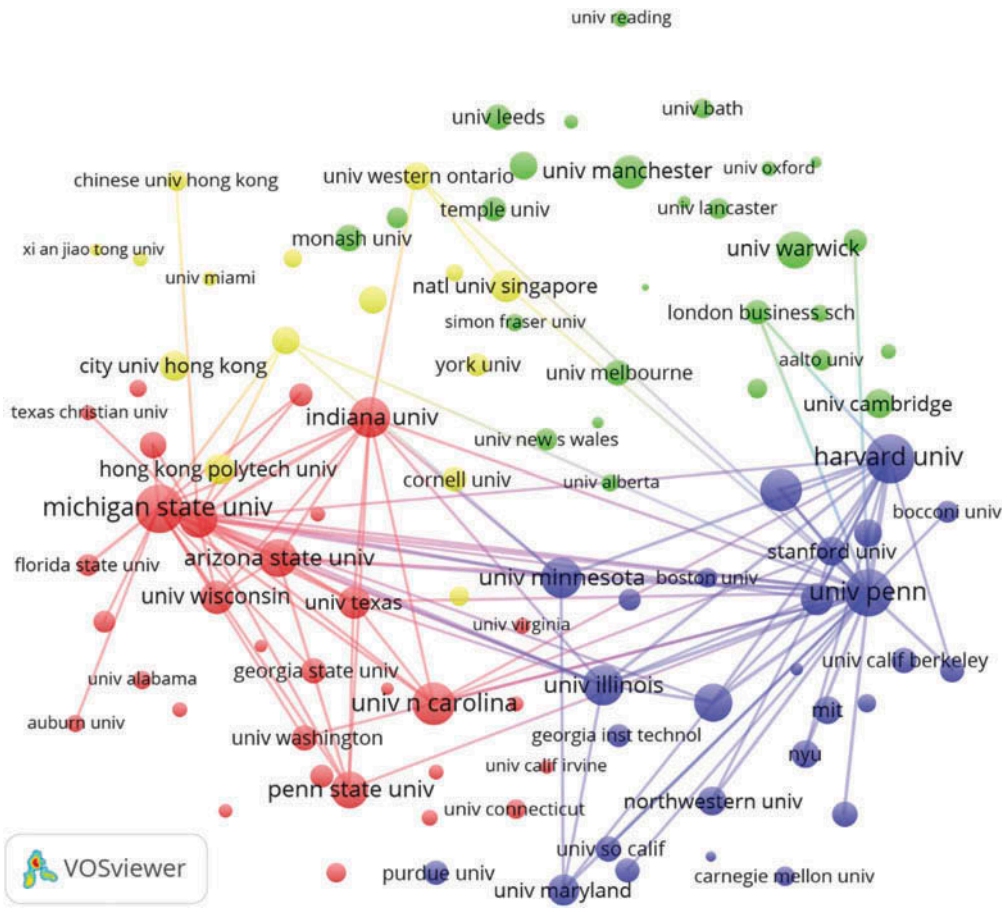

Figure 1. Bibliographic data map, based on citation analysis from leading universities (1987–2016). Size variation-network visualization.

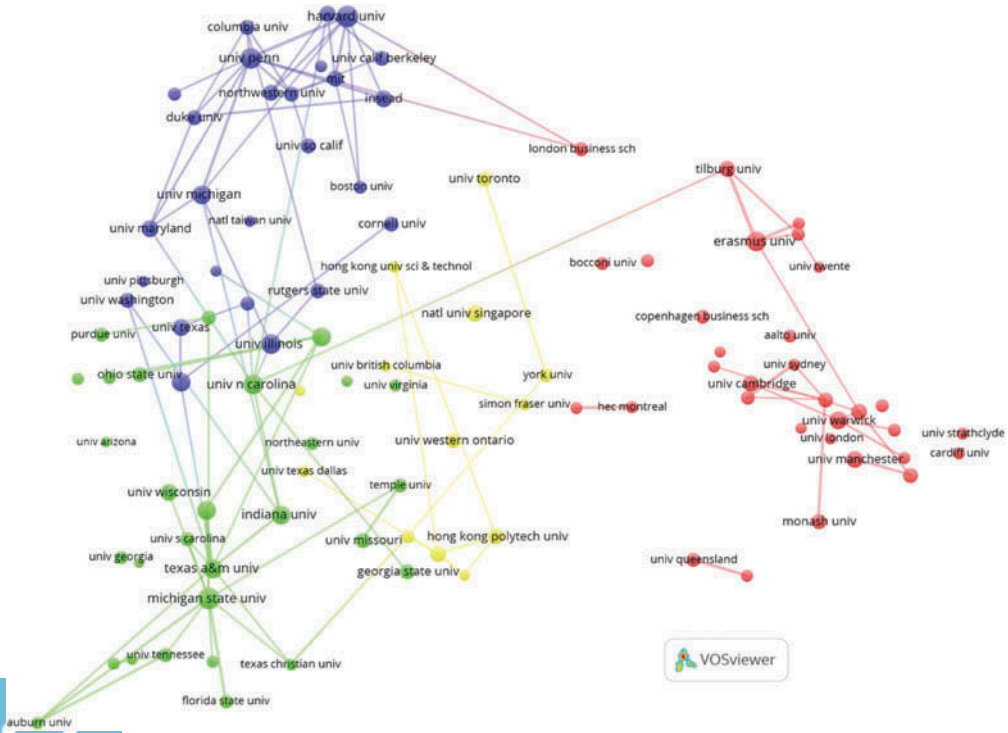

Figure 2. Bibliographic data map, based on co-authorship and fractional counting analysis from leading universities (1987–2016). Size variation network visualization.

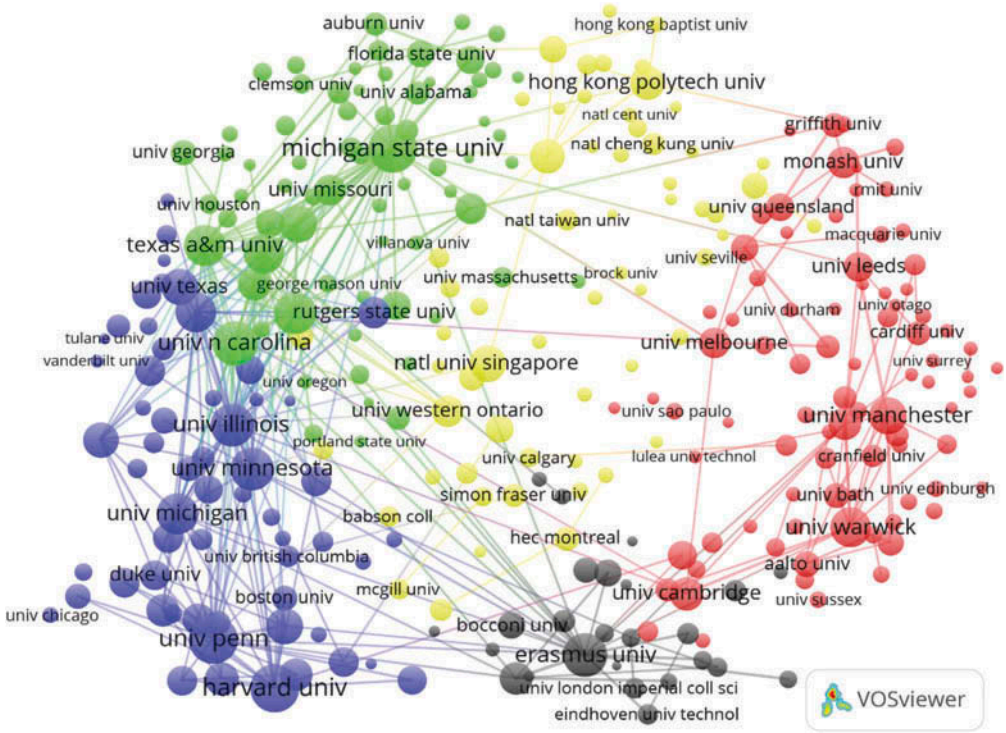

Figure 3. Bibliographic data map, based on global bibliographic coupling and fractional counting analysis from leading universities from the last 30 years of research (1987–2016). Size variation network visualization.

to geographical locations, and similar variables played a central and peripheral role. The difference here is that the network shows how the leading institutions are connected.

Several linkages emerge despite geographic distances. From the USA, Michigan State University had the highest bibliographic-coupled links (34,084 links), followed by Texas A&M University (28,977 links), Indiana University (28,577 links), University of Illinois (28,311 links) and the University of North Carolina (27,278 links). The Erasmus Rotterdam University (27,118 links) was the institution with most bibliographic-coupled links outside the USA, highlighting its relevance to strategy research and evidencing strong relationships with other leading institutions in similar topics of investigation regarding strategy.

Figure 4 illustrates the first decade of research in strategy, based on bibliographic coupling analysis, with a threshold of one hundred institutions. Due to the novelty of research to the field, there were no clear roles in the collaboration networks. The graph shows dissimilar preferences in research, without a clear structure among the topics of investigation. The University of Texas at Austin had the highest strength in bibliographic-coupled links (2,302.45), followed by Columbia University (2,041), the University of Illinois (1,727.23) and the University of Pennsylvania (1,624.10). Note that most of the universities were in the USA, which is in line with the findings in Tables 1 and 2.

Figure 5 shows the second decade of research in strategy, with a threshold of one hundred institutions and one hundred bibliographic-coupling relations. Institutions with the highest link strength were the University of Texas at Austin (12,584.19), Michigan State University (9,203.25), the University of Pennsylvania (8,349.16) and the University of North Carolina (8,191.86). Compared to the previous decade, Figure 5 shows a clearer structure among institutions, forming a comprehensive configuration of research, with defined central and peripheral roles and more demarcated preferences in investigation. Some institutions outside the USA are now connected to the different clusters, such as INSEAD, London Business School, University of Western Ontario and

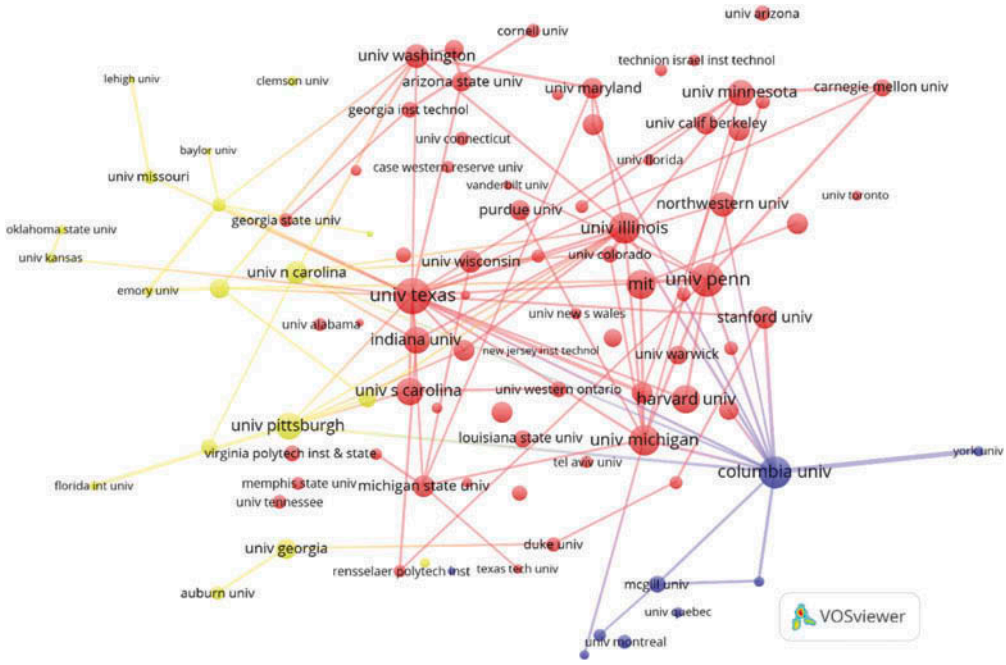

Figure 4. Bibliographic data map, based on bibliographic coupling and fractional counting analysis from leading universities (1987–1996), first decade. Size variation network visualization.

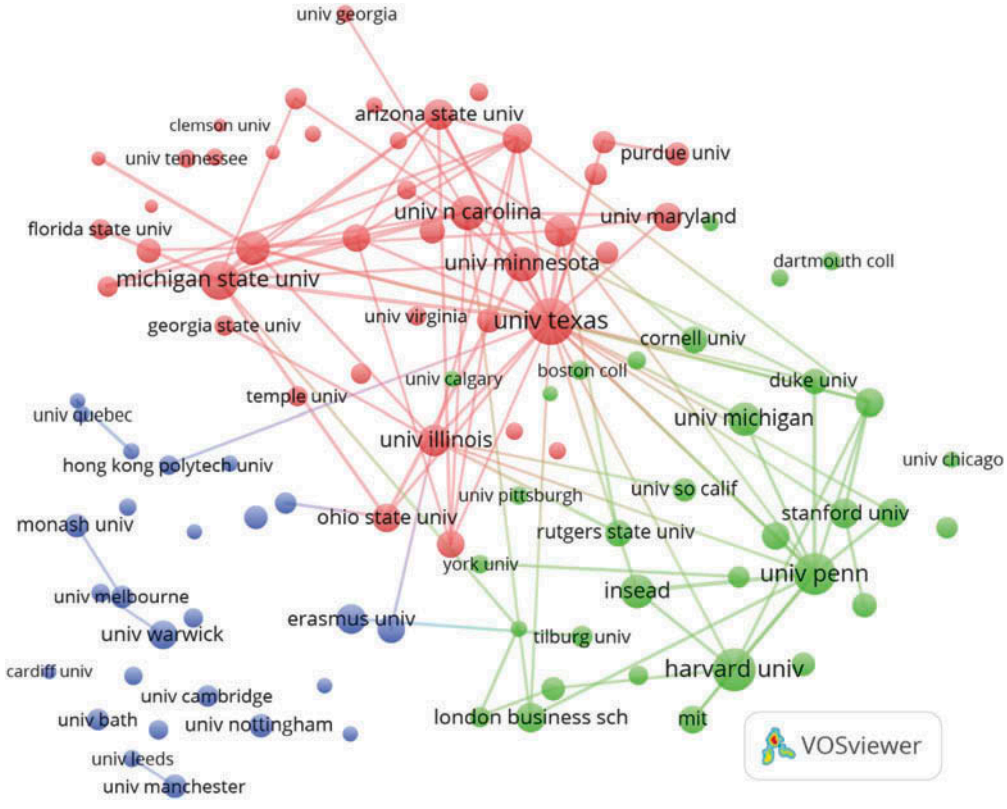

Figure 5. Bibliographic data map, based on bibliographic coupling fractional counting analysis from leading universities (1997–2006), second decade . Size variation network visualization.

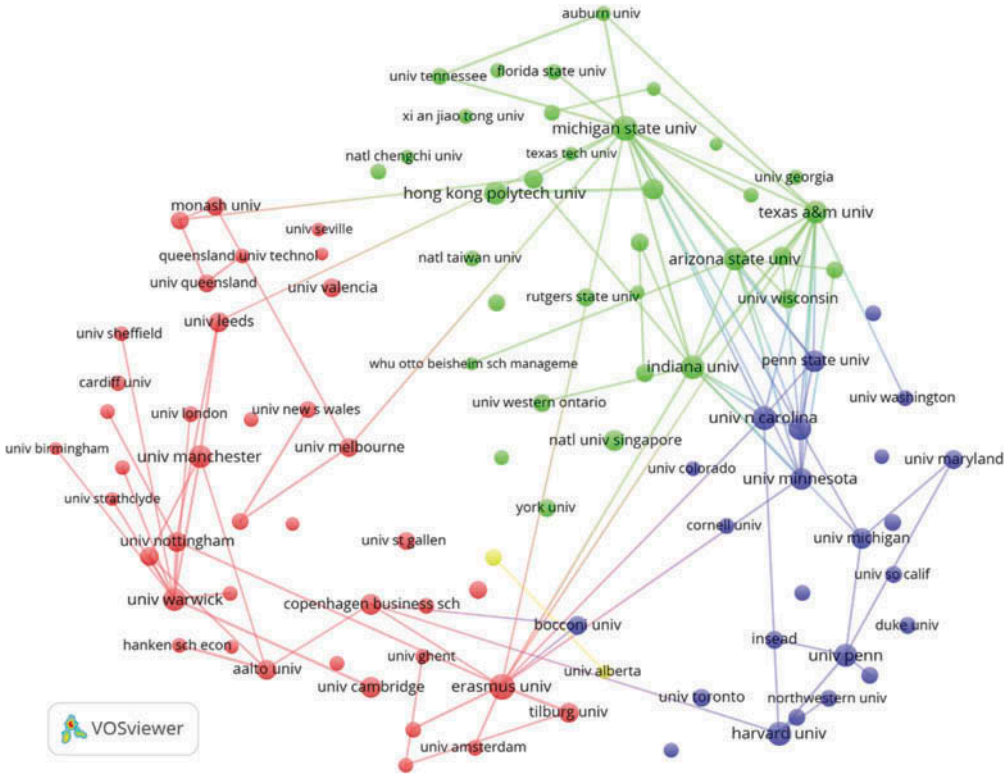

Figure 6. Bibliographic data map, based on bibliographic coupling fractional counting analysis from leading universities (2007–2016), third decade. Size variation network visualization.

National University of Singapore. Note the emerging cluster from the UK, with its particular patterns of research in strategy; however, strong links of collaboration are not yet obvious.

Figure 6 shows the last decade in research, with a threshold of one hundred institutions and one hundred bibliographic-coupling relations. Michigan State University exhibited the highest strength in bibliographic-coupled links (23,483.2), followed by the Erasmus University Rotterdam (21,718.75), Indiana University (20,856.25), Texas A&M University (20,495.02) and the University of Illinois (18,788.37). Note that the bibliographic links were less condensed in the USA, and stronger links among English universities have become clearer. Several international institutions are now central actors in some clusters, such as Warwick University (UK), Copenhagen Business School (Denmark), Tilburg University (the Netherlands), Aalto University (Finland) and the City University of Hong Kong (China). This result reinforces previous findings and tendencies seen in the bibliometric analysis in Table 2.

6. Discussion

The aim of this research is to achieve a longitudinal classification of the impact that universities have on strategy research based on three decades of publications, between 1987 and 2016. The more specific objectives of this investigation, using bibliometric techniques and distance-based analysis of networks, applied at the level of universities, are to (i) present a general overview of strategic management research based on the WoS database; (ii) categorize the last 30 years of academic production of research institutions in terms of strategy, evaluating its impact quinquennially and globally; (iii) analyze which universities are publishing the most in journals whose scope of publication covers strategic management; and (iv) map the network of collaboration structures between research organizations, determining their relationship and analyzing the evolution over those three decades.

This study finds that the most productive and influential university is the University of Pennsylvania (H = 133), which had the broadest network of citations according to the network analysis (Table 1). There was also a remarkable presence of international universities from the UK, Canada, France and the Netherlands. However, the citation pattern among them is low. We also find that the most influential journals in strategy research are the Strategic Management Journal (H = 241), Academy of Management Journal (H = 182), and the Academy of Management Review (H = 154). An interest finding is that the main universities that publish in them are also between the most influential institutions: University of Pennsylvania, Arizona State University, University of Washington. Another interesting finding is that some universities in the UK, France, Denmark, China, Finland and the Netherlands are new relevant actors based on publications in European journals that specialize in strategy research, which highlights the importance of incorporating a wider spectrum of journals to define the academic domain of strategy.

Our longitudinal analysis demonstrated an evolution towards concentrating scattered subjects of research, which confirms the construction of common knowledge as shown in different subjects, such as biology, computing or physics. This outcome can be compared with the stages of evolution that the study of Ronda-Pupo and Guerras-Martín (2010), based on a country level analysis. The expansion/transformation stage proposed in their work almost a decade ago is more evident when the analysis is made based on institutions and journals, which allows a deeper comprehension of advancement in the field.

We also find an evolution of collaborative partners among institutions. If the perspective was focused on geographic relations, four clusters were evident in the networks in most cases: two from the USA, one from Europe (including the UK), and one from Southeast Asian countries. This seems to suggest that today's boundless knowledge flow and the globalization of management education have not weakened the location-specific interest in identifying and studying locally important phenomena, contributing positively to the development of the different currents in strategy research. In this sense, three noticeable universities were found as central collaborators in the field from the USA: Michigan State University, the University of Pennsylvania, and the University of North Carolina, each conforming a different center and periphery cluster of scientific collaboration. The second cluster was led by universities from the Netherlands, with a center in the Erasmus University of Rotterdam, INSEAD from France and the University of Warwick from the UK. Finally, the Southeast Asian cluster was led by the Hong Kong Polytechnic University, which is the institution that had the highest number of publications authored jointly in this cluster. However, the distance between vertices revealed dissimilar preferences in research.

We find under a different perspective, more evidence from the flow of knowledge with other fields, as found in the study of Nerur et al. (2016). Based on institutions and their classifications in the Top 10 most relevant journals in strategy research, as well as the growing collaboration among universities with strengths in different disciplines, we observed that the stream of information among different fields that cover strategy tended to grow. This finding is beneficial to the field because it uses new approaches and perspectives to solve similar problems. Additionally, we find evidence of the inner knowledge that flows among different fields based on the deliberate multi-disciplinary nature of research in strategy. For instance, there was a strong coincidence with the ranking of the main journals in the marketing field when comparing bibliometric studies in this field. In Martínez-López et al. (2018), it was observed that some journals relevant to marketing research matched with those among the most influential in strategy research, as shown in Table 3. Among these journals are the Journal of Marketing, Journal of Business Research, Journal of Marketing Research, and the Journal of Product Innovation Management. When also comparing the results of leading universities in strategy publishing in the Top 20 most influential journals (Table 5) with the results of Valenzuela et al. (2017), we saw commonalities between both areas, given that both studies ranked influential journals such as the Harvard Business Review, Journal of Marketing and Journal of Marketing Research. These similarities demonstrate the strong connection between both areas.

Some limitations in our study arise from the very characteristics of the methodology addressed here. For instance, when calculating the H-index and other indicators, the assignment of authorship considers a full counting that gives one unit to each co-author instead of fractional authorship. Despite fractional counting consideration in the network analysis, there is an evident lack of methodological procedures that would allow its introduction in one index following bibliometric processes. Another restriction in this paper is the exclusion of some variables that could have led us to a better description of the field, such as authors, or data gathered from another source of information accepted by scholars, such as specialized associations or conferences. Finally, despite our efforts to cover the largest and most representative sample of the articles, there is a possibility that some were not captured by our filters. Therefore, future research should include different variables, such as authors, and a wider variety of journals to identify tendencies in research and different perspectives and relationships that have contributed to the construction of the structures of collaboration and knowledge in strategic management research.

This article offers several contributions. First, this work allows for the inclusion of institutions in the academic discussion, thus enriching the overview provided in previous works. Second, the addition of prominent journals to the overview allows for the incorporation of the representation of rigorous scientific vigilance to demarcate the scholarly space. Third, mapping the research network of cooperation is valuable in identifying connections and similar profiles in research among institutions. Finally, the longitudinal network representation throughout 30 years of academic production is advantageous for understanding the dynamic that peripheral and central actors have played in the creation of the present strategic management network of knowledge and collaboration.

7. Conclusions

The aim of this research is to achieve a longitudinal classification of the impact that universities have on strategy research based on three decades of publications, between 1987 and 2016. This study finds that the most productive and influential universities have the broadest network of citations, where the presence of international universities from USA, the UK, Canada, France and the Netherlands are leading institutions, publishing in different journals across the globe. This highlights the importance of incorporating a wider spectrum of journals to define the academic domain of strategy.

Our longitudinal analysis demonstrated an evolution towards concentrating scattered subjects of research, which allows a deeper comprehension of advancement in the field. We also find an evolution of collaborative partners among institutions based on geographic relations, which show location-specific interests in identifying and studying locally important phenomena. We also find evidence from the flow of knowledge with other fields, as marketing and logistics.

As noted by Daft and Lewin (2008), two kinds of "relevance" help solve particular needs, one to the practitioners' world and the other to the academic and scientific communities. This investigation is aligned with this second need, enriching the overview provided in previous works, by showing a longitudinal classification and mapping of institutions that represents research, vigilance of quality and diffusion of knowledge. This approach will be useful in research by other academics because it identifies the evolution of linkages, tendencies of research and similar profiles in investigations among institutions.

Funding
The authors received no direct funding for this research.

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Citation information
Cite this article as: Mapping leading universities in strategy research: Three decades of collaborative networks, Nelson A. Andrade-Valbuena, José M. Merigó-Lindahl, Leslier Valenzuela Fernández & Carolina Nicolas, *Cogent Business & Management* (2019), 6: 1632569.

Correction
This article was originally published with errors, which have now been corrected in the online version. Please see Correction (https://doi.org/10.1080/23311975.2019.1648976)

References

Alonso, S., Cabrerizo, F. J., Herrera-Viedma, E., & Herrera, F. (2009). H-Index: A review focused in its variants, computation and standardization for different scientific fields. *Journal of Informetrics*, *3*(4), 273–289. doi:10.1016/j.joi.2009.04.001

Andrade-Valbuena, N. A., & Merigo, J. M. (2018). Outlining new product development research through bibliometrics: Analyzing journals, articles and researchers. *Journal of Strategy and Management*, *11*(3), 328–350. doi:10.1108/JSMA-08-2017-0061

Andrade-Valbuena, N. A., Merigo-Lindahl, J. M., & Olavarrieta, S. (2018). Bibliometric analysis of entrepreneurial orientation. *World Journal of Entrepreneurship, Management and Sustainable Development*. doi:10.1108/WJEMSD-08-2017-0048

Baltagi, B. H. (2007). Worldwide econometrics rankings: 1989–2005. *Econometric Theory*, *23*(5), 952–1012. doi:10.1017/S026646660707051X

Bar-Ilan, J. (2008). Informetrics at the beginning of the 21st century—A review. *Journal of Informetrics*, *2*(1), 1–52. doi:10.1016/j.joi.2007.11.001

Broadus, R. N. (1987). Toward a definition of "Bibliometrics". *Scientometrics*, *12*, 373–379. doi:10.1007/BF02016680

Calof, J. L., & Wright, S. (2008). Competitive intelligence: A practitioner, academic and inter-disciplinary perspective. *European Journal of Marketing*, *42*(7/8), 717–730. doi:10.1108/03090560810877114

Cancino, C., Merigó, J. M., Coronado, F., Dessouky, Y., & Dessouky, M. (2017). Forty years of Computers & Industrial Engineering: A bibliometric analysis. *Computers & Industrial Engineering*, *113*, 614–629. doi:10.1016/j.cie.2017.08.033

Daft, R. L., & Lewin, A. Y. (2008). Rigor and relevance in organization studies: Idea migration and academic journal evolution. *Organization Science*, *19*, 177–183. doi:10.1287/orsc.1070.0346

Daim, T. U., Rueda, G., Martin, H., & Gerdsri, P. (2006). Forecasting emerging technologies: Use of bibliometrics and patent analysis. *Technological Forecasting & Social Change*, *73*, 981–1012. doi:10.1016/j.techfore.2006.04.004

Deng, G. F., & Lin, W. T. (2012). Citation analysis and bibliometric approach for ant colony optimization from 1996 to 2010. *Expert Systems with Applications*, *39*(6), 6229–6237. doi:10.1016/j.eswa.2011.12.001

Dzikowski, P. (2018). A bibliometric analysis of born global firms. *Journal of Business Research*, *85*, 281–294. doi:10.1016/j.jbusres.2017.12.054

Ferreira, M. P., Santos, J. C., de Almeida, M. I. R., & Reis, N. R. (2014). Mergers & acquisitions research: A bibliometric study of top strategy and international business journals, 1980–2010. *Journal of Business Research*, *67*(12), 2550–2558. doi:10.1016/j.jbusres.2014.03.015

Genest, C., & Guay, M. (2002). Worldwide research output in probability and statistics: An update. *Canadian Journal of Statistics*, *30*(2), 329–342. doi:10.2307/3315955

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences of the United States of America*, *102*, 16569–16572. doi:10.1073/pnas.0507655102

Hood, W., & Wilson, C. (2001). The literature of bibliometrics, scientometrics, and informetrics. *Scientometrics*, *52*(2), 291–314. doi:10.1023/A:1017919924342

Hoskisson, R. E., Wan, W. P., Yiu, D., & Hitt, M. A. (1999). Theory and research in strategic management: Swings of a pendulum. *Journal of Management*, *25*(3), 417–456. doi:10.1177/014920639902500307

Laengle, S., Merigó, J. M., Miranda, J., Slowinski, R., Bomze, I., Borgonovo, E., … Teunter, R. (2017). Forty years of the European Journal of Operational Research: A bibliometric overview. *European Journal of Operational Research*, *262*, 803–816. doi:10.1016/j.ejor.2017.04.027

Laengle, S., Modak, N. M., Merigó, J. M., & Zurita, G. (2018). Twenty-five years of Group Decision and Negotiation: A bibliometric overview. *Group Decision and Negotiation*, *27*(4), 505–542. doi:10.1007/s10726-018-9582-x

Linnenluecke, M. K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, *19*(1), 4–30. doi:10.1111/ijmr.2017.19.issue-1

Linton, J. D. (2004). Perspective: Ranking business schools on the management of technology. *Journal of Product Innovation Management*, *21*, 416–430. doi:10.1111/j.0737-6782.2004.00095.x

Markoulli, M. P., Lee, C. I., Byington, E., & Felps, W. A. (2017). Mapping Human Resource Management: Reviewing the field and charting future directions. *Human Resource Management Review*, *27*(3), 367–396. doi:10.1016/j.hrmr.2016.10.001

Martínez-López, F. J., Merigó, J. M., Valenzuela, L., & Nicolás, C. (2018). Fifty years of the European Journal of Marketing: A bibliometric analysis. *European Journal of Marketing*, *52*(1/2), 439–468. doi:10.1108/EJM-11-2017-0853

Merigó, J. M., Cancino, C. A., Coronado, F., & Urbano, D. (2016). Academic research in innovation: A country analysis. *Scientometrics*, *108*(2), 559–593. doi:10.1007/s11192-016-1984-4

Merigó, J. M., Gil-Lafuente, A. M., & Yager, R. R. (2015). An overview of fuzzy research with bibliometric indicators. *Applied Soft Computing*, *27*, 420–433. doi:10.1016/j.asoc.2014.10.035

Merigó, J. M., Mas-Tur, A., Roig-Tierno, N., & Ribeiro-Soriano, D. (2015). A bibliometric overview of the Journal of Business Research between 1973 and 2014. *Journal of Business Research*, *68*(12), 2645–2653. doi:10.1016/j.jbusres.2015.04.006

Nerur, S., Rasheed, A. A., & Pandey, A. (2016). Citation footprints on the sands of time: An analysis of idea migrations in strategic management. *Strategic Management Journal*, *37*(6), 1065–1084. doi:10.1002/smj.2377

Nerur, S. P., Rasheed, A. A., & Natarajan, V. (2008). The intellectual structure of the strategic management field: An author co-citation analysis. *Strategic Management Journal*, *29*(3), 319–336. doi:10.1002/(ISSN)1097-0266

Podsakoff, P. M., MacKenzie, S. B., Podsakoff, N. P., & Bachrach, D. G. (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*, *34*, 641–720. doi:10.1177/0149206308319533

Pritchard, A. (1969). Statistical bibliography or bibliometrics?. *Journal of Documentation*, *25*, 348–349.

Ramos-Rodriguez, A., & 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*, *25*, 981–1004. doi:10.1002/smj.397

Ronda-Pupo, G. A., & Guerras-Martín, L. Á. (2010). Dynamics of the scientific community network within the strategic management field through the Strategic Management Journal 1980–2009: The role of cooperation. *Scientometrics*, *85*(3), 821–848. doi:10.1007/s11192-010-0287-4

Schriber, S. (2016). Nordic strategy research—Topics, theories, and trends. *Scandinavian Journal of Management*, *32*(4), 220–230. doi:10.1016/j.scaman.2016.10.001

Servantie, V., Cabrol, M., Guieu, G., & Boissin, J. P. (2016). Is international entrepreneurship a field? A bibliometric analysis of the literature (1989–2015). *Journal of International Entrepreneurship*, *14*(2), 168–212. doi:10.1007/s10843-015-0162-8

Trieschmann, J. S., Dennis, A. R., Northcraft, G. B., & Niemi, A. W. (2000). Serving multiple constituencies in business schools: MBA program versus research performance. *Academy of Management Journal*, *43*, 1130–1141.

Tur-Porcar, A., Mas-Tur, A., Merigó, J. M., Roig-Tierno, N., & Watt, J. (2018). A bibliometric history of the Journal of Psychology between 1936 and 2015. *Journal of Psychology*, *152*, 199–225. doi:10.1080/00223980.2018.1440516

Valenzuela, L., Merigó, J. M., Johnston, W., Nicolás, C., & Jaramillo, J. F. (2017). Thirty years of the Journal of Business & Industrial Marketing: A bibliometric analysis. *Journal of Business & Industrial Marketing*, *32*(1), 1–18. doi:10.1108/JBIM-04-2016-0079

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. doi:10.1007/s11192-009-0146-3

Vogel, R., & Güttel, W. H. (2013). The dynamic capability view in strategic management: A bibliometric review. *International Journal of Management Reviews*, *15*(4), 426–446.

Yan, E., & Ding, Y. (2012). Scholarly network similarities: How bibliographic coupling networks, citation networks, cocitation networks, topical networks, coauthorship networks, and coword networks relate to each other. *Journal of the American Society for Information Science and Technology*, *63*(7), 1313–1326. doi:10.1002/asi.v63.7

Cogent Business & Management **(ISSN: 2331-1975) is published by Cogent OA, part of Taylor & Francis Group.**