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## **Two Decades of Research on Strategic Alliances: Analysis of Citations, Co-citations and Themes Researched**

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## Resumo

A pesquisa em alianças estratégicas apresenta longa tradição nos estudos de Administração. As alianças estratégicas têm sido pesquisadas usando múltiplas lentes teóricas, da VBR à Teoria de Agência e à Teoria dos Custos de Transação, e em diversos contextos, da indústria de semicondutores à de aviação civil. Neste estudo, escrutinamos a pesquisa em alianças estratégicas em 31 periódicos de topo em Administração, num período de 20 anos, entre 1993 e 2012. Numa amostra de 866 artigos, realizamos análises de citações e cocitações empregando técnicas de redes sociais, bem como análise fatorial para identificar os principais temas de pesquisa, entender o estoque de conhecimento acumulado e as tendências teóricas. Identificamos algumas mutações da pesquisa ao longo do período — incluindo o foco no desempenho e a ênfase na teoria dos custos de transação e em preocupações de governança para o foco em perspectivas baseadas no aprendizado e transferência de conhecimento, redes sociais e colaboração. Este estudo oferece as fundações sobre as quais pesquisas futuras possam se desenvolver para colmatar lacunas conceituais e empíricas.

**Palavras-chave:** alianças estratégicas; estudo bibliométrico; análise de cocitações; pesquisa em administração; análise fatorial.

## Abstract

Research on strategic alliances has a long tradition in management studies. Strategic alliances have been investigated using multiple theoretical lenses from RBV to agency and transaction cost, and diverse contexts, from the semiconductor to airline industries. In this study we scrutinize the extant strategic alliance research in thirty-one top-ranked business/management journals, over a twenty-year period, from 1993 to 2012. In a sample of 866 articles we conducted citation and co-citation analyses employing social network techniques and factor analysis to identify research themes and make sense of the stock of accumulated knowledge and theoretical trends. We were able to identify some shifts in research over time, namely from a focus on performance and theoretical emphasis on transaction cost theory and governance concerns, moving to a learning and knowledge transfer approach, social networks and collaboration. This study provides the foundations over which future research may develop to fill conceptual and empirical gaps.

**Key words:** strategic alliances; bibliometric study; co-citation analysis; management research; factor analysis.

## Introduction

Strategic alliances are interfirm collaborative models that allow firms to create value by sharing an array of possible resources (Anand & Khanna, 2000), obtain market influence (Koza & Levin, 1998), learn (Barkema & Vermeulen, 1998; Vermeulen & Barkema, 2001), or access novel markets (Harzing, 2002). Gulati (1998) stated that alliances are voluntary agreements that involve the sharing or co-development of products, technologies or services. Recognizing the potential positive effects of alliances, including performance effects (Anand & Khanna, 2000), firms increasingly seem to enter in alliancing agreements (Day, 1995) and seek to construct stable collaborations. While the stories of successful alliances abound, there is also evidence of many failures and decreased performance (Varadarajan & Cunningham, 1995). The growth in alliances has stimulated a considerable interest in the topic by both scholars and practitioners/managers (Shah & Swaminathan, 2008).

Research on strategic alliances has grown markedly, especially during the last two decades, but is largely dispersed and fragmented (Moran, Souza, Boaventura, Marinho, & Fischmann, 2010). For instance, research has taken multiple lenses and contexts, including the process of alliancing (Doz, Olk, & Ring, 2000; Ring & Van de Ven, 1994), the transaction costs involved in an alliance (Parkhe, 1993a), or the management costs involved (Harrigan, 1986; Killing, 1983), characteristics of alliances (Borys & Jemison, 1989), complexity (Killing, 1988), partner selection (Hamel, Doz, & Prahalad, 1989; Li & Ferreira, 2008; Ring & Van de Ven, 1994; Shah & Swaminathan, 2008), performance and value creation of alliances (Das & Teng, 1998; Kogut, 1988; Parkhe, 1993a) and longevity (Park & Ungson, 1997). To make sense of the extant research, which has presumably reached some *plateaux* of maturity, it is useful to scrutinize the existing research and assess the stock of knowledge generated by the community.

In this paper we used standard bibliometric techniques on articles published in thirty-one international top-ranked management journals, over a period of twenty years, from 1993 to 2012. In a sample of 866 articles collected from Thomson-Reuter's Web of Science (ISI) database, we performed analyses of citation frequencies, co-citation networks and also a factor analysis to derive the sub-fields within strategic alliance research. Given the growing body of research on strategic alliances, it is useful to periodically take a rear view on the stock of accumulated knowledge to make sense of what is already known and from which a novel research agenda may be constructed. Our structural and longitudinal analyses permit summarizing the received wisdom and also understand how research efforts have evolved.

The results identify the most influential works over the period and how their relative influence varied over time. They also reveal the intellectual structure of extant research based on co-citation matrices and social network maps. Moreover, we found how the conceptual basis of the topic has evolved noting that strategic alliance research has been mostly driven by two theoretical lenses, the transaction cost theory and knowledge, learning and capabilities-based approaches. More recently, there has been a gradual growth in social network-based research delving into alliances.

This study complements prior research in understanding the stock of accumulated knowledge on strategic alliance research, thus setting some foundations over which both experienced and novice scholars, as well as doctoral students, may build their research agendas. By cataloging, classifying and analyzing twenty years of publications on strategic alliances we uncovered the major works and theoretical, or conceptual, perspectives taken by scholars, as well as the research shifts that have occurred. Such an extensive bibliometric study also provides validation for what an expert in the field might intuitively infer (Nerur, Rasheed, & Natarajan, 2008) on how the research on alliances has evolved. It is further worth noting that this study complements existing bibliometric studies on the topic. For instance, Moran, Souza, Boaventura, Marinho e Fischmann (2010) only delved into the authors, works and journals most cited on alliances and employed a rather extensive set of keywords that are likely capturing alternative formats of collaborations between firms beyond alliances. Lin and Cheng (2010) used a less extensive set of journals and did not conduct a longitudinal study. And, Di Guardo and Harrigan (2012) focused only on co-citation analysis to assess the joint literature on alliances and innovation.

This paper is structured in four sections. First, we briefly review literature on bibliometric studies and techniques involved. Second, we present the methodological details, including the procedures for data collection, sample and method of analysis. The results follow in the third section. The fourth section discusses the results and points out some limitations and future research avenues.

## Literature Review

Broadus (1987) defined bibliometry as the measurement of science, scientists, or scientific activity. Pritchard (1969) proposed that bibliometry is “the application of mathematics and statistical methods to books and other media of communication” (p. 349). Hence, we may sum up that the purpose of bibliometric studies is to catalog, classify and quantify knowledge in a given discipline. In some instances, these bibliometric studies delve into the research trends (Acedo, Barroso, & Galan, 2006; Furrer, Tomas, & Goussevskaia, 2008; Shafique, 2013; White & McCain, 1998), networks of scholars (Shane, 1997) and their productivity, an author (Ferreira, 2011), the themes investigated (Furrer *et al.*, 2008; Schildt, Zahra, & Silanpää, 2006) or the track record of publications in a journal (Phelan, Ferreira, & Salvador, 2002; Ramos-Rodríguez & Ruíz-Navarro, 2004).

Bibliometric studies may use several techniques. The more common techniques are based on citations and co-citations analyses to assess scientific relevance and influence. Citation analysis is based on counting frequencies - the frequency with which a given work is cited by other scholars. The underlying assumption is that scholars cite other works that are relevant to their own research and, hence, that highly cited works have a greater influence on the direction of the research (Culnan, O'Reilly, & Chatman, 1990), shaping future literature (McCain, 1986, 1990). Co-citation analysis is often used to understand the intellectual structure of a discipline or topic (Leydesdorff, 1987; Ramos-Rodríguez & Ruíz-Navarro, 2004; Subramanyam, 1983). Co-citation is a form of document coupling that measures how frequently a pair of documents is cited together and the clusters of co-cited papers permits identifying the structure of science (Small, 1973) in a discipline or topic. That is, because as the same pairs of works (scientific articles or other source documents) are co-cited by many scholars, clusters start to emerge (Small & Garfield, 1993). The assumption is that the papers in these clusters share content commonalities.

Management scholars are not strangers to bibliometrics research (McCain, 1991). For instance, Acedo, Barroso, and Galan's (2006) bibliometric study examined the dissemination and main trends of the RBV. Ramos-Rodríguez and Ruíz-Navarro (2004) conducted a bibliometric study in a single journal, the Strategic Management Journal, to identify the works with the greatest impact on strategic management research and analyze the changes in the intellectual structure of the discipline over time. Nerur, Rasheed and Natarajan (2008) traced the evolution of the intellectual structure of the field of strategic management. Shafique (2013) studied innovation as a field of research among four major social science disciplines (economics, sociology, psychology and management) through citation and co-citation matrices. In international Business, Ferreira (2011) examined the impact of a scholar, Sumantra Ghoshal, on the research conducted in the discipline. In entrepreneurship, Schildt, Zahra and Silanpää (2006) identified the communities of scholars through co-citations. In information science, White and McCain (1998) conducted an author co-citation analysis to visualize the discipline.

## Method

### Data collection procedures

This study focuses exclusively on articles published in top business/management peer-reviewed journals. To collect the sample, we started by selecting thirty-one top-ranked management journals and

defining the time span for the study: 1993 to 2012 (see Table 1). The journal selection criteria rested on journal impact factors complemented with Ann-Will Harzing's (2014) journal quality list. We further considered journals more likely to publish papers on strategic alliances, which encompassed journals with a broad management emphasis, journals on strategy and international business. Moreover, we included journals with a more practitioner orientation, such as Harvard Business Review and Sloan Management Review. While there is wide variation in the selection criteria in prior bibliometric studies, several authors have selected just one journal – for instance, Ramos-Rodríguez and Ruíz-Navarro (2004) and Nerur *et al.* (2008) used only the Strategic Management Journal to study the changes that have taken place in the intellectual structure of the discipline of strategic management. Other scholars used multiple journals. For instance, Acedo *et al.* (2006) selected several journals using impact factor, and Shafique (2013) resorted to the top 20 ISI-listed journals in each of the four disciplines: economics, sociology, psychology and management. Using a wider sample of articles, collected from multiple journals, has the advantage of broader coverage but also of avoiding potential bias or editorial shifts that a study conducted in a single journal could entail.

Table 1

**Journals Selection and Sample**

<b>Journals</b>	<b>Founding year (First year available in ISI)</b>	<b>2012 Impact factor (a)</b>	<b>5-year impact factor</b>	<b>Papers on strategic alliances</b>	<b>Number of papers published: 1993-2012</b>	<b>% (c)</b>
Strategic Management Journal	1980 (1980)	3.367	6.393	130	1,162	11.2
Technovation	1981 (1981)	3.177	3.449	65	856	7.6
Journal of Business Research	1973 (1973)	1.484	2.203	64	2,376	2.7
Research Policy	1972 (1974)	2.850	4.387	61	1,682	3.6
Organization Science	1990 (1990)	3.351	5.506	61	1,044	5.8
Journal of Management Studies	1964 (1966)	3.799	4.744	61	1,055	5.8
Long Range Planning	1968 (1968)	3.667	2.885	57	865	6.6
J. of International Business Studies	1970 (1976)	3.062	5.183	49	965	5.1
Academy of Management Journal	1958 (1958)	5.906	10.031	42	1,213	3.5
Journal of World Business	1966 (1997)	2.617	3.330	33	524	6.3
Journal of Management	1975 (1983)	6.704	7.754	26	853	3.1
International Business Review	1992 (2005)	1.849	2.330	24	377	6.4
Management Science	1954 (1954)	1.733	3.057	21	2,581	0.8
Organization Studies	1980 (1981)	2.190	3.229	19	1,023	1.9
British Journal of Management	1990 (2000)	2.044	2.391	18	485	3.7
Journal of International Management	1995 (2007)	2.200	2.781	17	163	10.0
Academy of Management Review	1976 (1983)d	7.895	11.578	17	703	2.4
California Management Review	1958 (1958)	1.667	2.559	15	555	2.7

Continues

**Table 1 (continued)**

<b>Journals</b>	<b>Founding year (First year available in ISI)</b>	<b>2012 Impact factor (a)</b>	<b>5-year impact factor</b>	<b>Papers on strategic alliances</b>	<b>Number of papers published: 1993-2012</b>	<b>% (c)</b>
Harvard Business Review	1956 (1956)	1.519	1.998	12	1,821	0.7
Asia Pacific Journal of Management	1984 (2008)	4.089	n.a.	11	185	6.0
Administrative Science Quarterly	1956 (1956)	4.182	7.693	10	405	2.5
Academy of Management Executive <sup>a</sup>	1990 (2000)	n.a	n.a	10	218	4.6
Strategic Organization	2003 (2007)	1.769	3.630	7	81	8.6
European Management Journal	1982 (2009)	0.566	n.a	7	160	4.4
Sloan Management Review	1959 (1970)	1.413	1.704	6	241	2.5
MIS Quarterly	1977 (1981)	4.659	7.474	6	594	1.0
Omega -Int. Jrl of Management Science	1973 (1974)	3.024	3.474	5	1,190	0.4
Business History	1958 (1958)	0.474	0.638	5	584	0.9
Academy of Management Perspectives	1987 (2006)	3.174	3.318	4	205	1.9
Int. Journal of Management Reviews	1999 (2001)	3.333	4.981	2	194	1.0
Organization	1994 (1995)	2.356	2.593	1	653	0.1
<b>Total</b>				<b>866</b>	<b>25.397</b>	

**Note.** Founding years collected from the journals' webpages. (a) Data collected from the 2012 JCR Social Sciences Edition. (b) Number of articles, review articles and research notes published in the journal in the period of 1993 to 2012. (c) Sample as % of articles published.

<sup>a</sup> Journal discontinued in 2005.

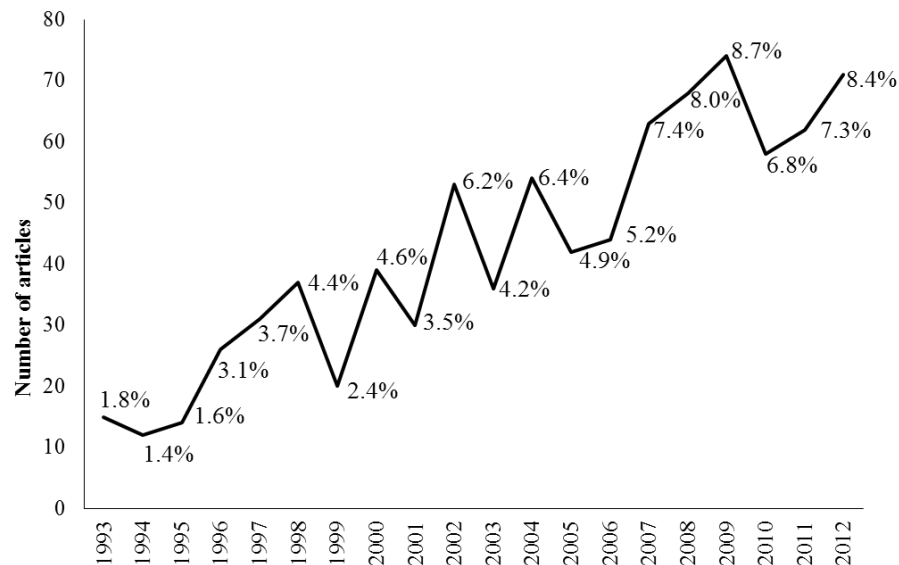
Using ISI web of knowledge, and restricting the search to the journals and the time frame defined, we conducted a keyword search in the option **topic** for articles using the following parameters: **strategic\* alliance\***. The asterisk, when applied to a keyword search, permits us to capture possible variations of the wording. We did not include an explicit search for joint ventures, albeit many papers will refer to JVs as a form of alliances and some authors refer to JVs as equity alliances. The software searches every document in the title, abstract and keywords. While apparently narrow, this search assures a return comprising only articles that actually deal with alliances, rather than, for example, briefly referring to alliances. In any instance, each article was examined to guarantee it actually dealt with alliances as intended.

## Sample

Employing the procedures explained above we identified 866 articles that comprise our final sample. Figure 1 shows the evolution of publications on strategic alliances over the period 1993 to 2012, a twenty-year period. We observe a rising trend, with more than 70 papers published in 2012, from a meager 15 in 1993. Examining Table 1, we observe how the sample is distributed among the journals selected. The journals that have published more articles on alliances were the Strategic Management Journal (almost 10% of the papers published dealt with strategic alliances), Technovation, Journal of Business Research, Research Policy, Organization Science, Journal of Management Studies, Long



Range Planning, Journal of International Business Studies and Academy of Management Journal. It is worth noting that there was also an increase in the overall number of papers published over time, namely as new journals emerged. In fact, four journals were founded after 1993.



**Figure 1.** Evolution of Publications on Strategic Alliances.

Source: Data retrieved from Web of Science. (n.d.). *Faça login para acessar o Web of Science*. Retrieved from [http://apps.webofknowledge.com/WOS\\_GeneralSearch\\_input.do?product=WOS&SID=Q2VSSC8ChkihDbZkvFR&search\\_mode=GeneralSearch](http://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&SID=Q2VSSC8ChkihDbZkvFR&search_mode=GeneralSearch)

## Procedures of analyses

The study comprises analyses of citations, co-citations and factor analysis, for both the entire period and in 5-year periods to enable a longitudinal outlook. First, we conducted citation analysis. Examining citations is relevant not only because we may identify who the main scholars and works driving the intellectual development of the research topic were, but also because it is an initial signal of the topics and theories delved into. The citation analysis involved collecting all references from the 866 articles in the sample, adjusting, classifying, ranking and summarizing the data. We report only the forty most-influential, or highly-cited, articles as determined by the citation counts (see Table 2). Moreover, we also identify the most influential works longitudinally, in 5-year periods.

The second procedure involved identifying the main topics or theories in strategic alliance research and we conducted a factor analysis. Using the co-citation matrices, we performed factor analyses with **varimax** rotation (see Acedo *et al.*, 2006; Lin & Cheng, 2010). Albeit we considered alternatives, such as the **oblimin** rotation, an orthogonal rotation, such as **varimax**, returns more easily interpretable results (Fabrigar, Wegener, MacCallum, & Strahan, 1999). In a factor analysis, the articles that are conceptually proximate, or that deal with a certain theme, tend to load on the same factor. The loads indicate how well the article belongs to the factor. Then, we may interpret the factor and infer the theme of the factor by examining the articles that compose it (Lin & Cheng, 2010). Following Shafique (2013), we considered values greater than 0.4 as a prerequisite for the variable to be loaded in a factor. Each factor thus represents a sub-theme of research on strategic alliances as derived from the co-citations in the sample.

The third procedure entailed a co-citation analysis. Co-citations have been used to infer the intellectual structure of a discipline and how scholars and theories are inter-connected (Lin & Cheng, 2010; McCain, 1986; Ramos-Rodríguez & Ruíz-Navarro, 2004). We created a co-citation matrix using only the top 30 most-cited papers, by counting the frequency with which a given pair of works was jointly used by other authors. We conducted this analysis for the entire time span and for each 5-year period (the latter not shown here). Using **Ucinet** we mapped the social networks, permitting a visual

identification of the relative strength of the ties binding works. In the two dimensional figure, each node is a work, connected to other works by lines of different lengths and thickness that represent the frequency of co-citation between a given pair of works. Moreover, the works are positioned in a space according to their relative importance to the overall network.

## Results

### Citation analyses

Table 2 displays the most-cited works, both during the entire period (1993 to 2012) and each 5-year period. The columns reveal both the absolute frequency and a relative measure of how often each work is cited in the period. For instance, Hamel (1991) was cited 251 times over the entire time span, or by about 30% of the 866 articles in the sample, and the citations to this work have been increasing over time. The list is organized by the last column, referring to the entire period.

Table 2

#### Raw and Relative Citation Frequency Per Period

Document	1993-1997 ( <i>n</i> = 98)		1998-2002 ( <i>n</i> =179)		2003-2007 ( <i>n</i> = 241)		2008-2012 ( <i>n</i> = 348)		1993-2012 ( <i>n</i> = 866)	
	n	%	n	%	n	%	n	%	n	%
Hamel (1991)	28	28.6	70	39.1	71	29.7	82	24.6	251	29.0
Cohen and Levinthal (1990)	10	10.2	36	20.1	67	28.0	111	33.3	224	25.9
Dyer and Singh (1998)	-	-	30	16.8	75	31.4	96	28.8	201	23.2
Gulati (1995a)	11	11.2	46	25.7	57	23.8	83	24.9	197	22.8
Kogut (1988)	28	28.6	54	30.2	50	20.9	55	16.5	187	21.6
Powell, Koput and Smith-Doerr (1996)	2	2.0	32	17.9	52	21.8	86	25.8	172	19.9
Williamson (1985)	19	19.4	39	21.8	49	20.5	60	18.0	167	19.3
Mowery, Oxley and Silverman (1996)	0	0.0	30	16.8	55	23.0	76	22.8	161	18.6
Parkhe (1993a)	14	14.3	37	20.7	43	18.0	63	18.9	157	18.1
Doz (1996)	1	1.0	43	24.0	57	23.8	51	15.3	152	17.6
Gulati (1998)	-	-	28	15.6	56	23.4	60	18.0	144	16.6
Barney (1991)	7	7.1	30	16.8	39	16.3	63	18.9	139	16.1
Lane and Lubatkin (1998)	-	-	18	10.1	44	18.4	76	22.8	138	16.0
Hagedoorn (1993)	22	22.4	35	19.6	38	15.9	42	12.6	137	15.9
Nelson and Winter (1982)	8	8.2	23	12.8	43	18.0	58	17.4	132	14.9
Ring and Van de Ven (1994)	11	11.2	30	16.8	39	16.3	48	14.4	128	14.8
Kogut and Zander (1992)	5	5.1	17	9.5	38	15.9	61	18.3	121	14.3
Kale, Singh and Perlmutter (2000)	-	-	7	3.9	36	15.1	74	22.2	117	13.8

Continues



**Table 2 (continued)**

Document	1993-1997 ( <i>n</i> = 98)		1998-2002 ( <i>n</i> =179)		2003-2007 ( <i>n</i> = 241)		2008-2012 ( <i>n</i> = 348)		1993-2012 ( <i>n</i> = 866)	
	n	%	n	%	n	%	n	%	n	%
Williamson (1975)	18	18.4	15	8.4	32	13.4	51	15.3	116	13.7
Khanna, Gulati and Nohria (1998)	-	-	21	11.7	40	16.7	54	16.2	115	13.5
Granovetter (1985)	10	10.2	24	13.4	28	11.7	53	15.9	115	13.5
Uzzi (1997)	1	1.0	15	8.4	26	10.9	68	20.4	110	13.0
Gulati (1995b)	4	4.1	19	10.6	32	13.4	53	15.9	108	12.7
Hamel and Prahalad (1989)	23	23.5	31	17.3	27	11.3	27	8.1	108	12.7
Burt (1992)	1	1.0	23	12.8	26	10.9	55	16.5	105	12.4
Anand and Khanna (2000)	-	-	8	4.5	42	17.6	55	16.5	105	12.4
Pfeffer and Salancik (1978)	14	14.3	29	16.2	27	11.3	33	9.9	103	12.1
Hennart (1988)	14	14.3	30	16.8	30	12.6	28	8.4	102	12.0
Eisenhardt and Schoonhoven (1996)	3	3.1	25	14.0	32	13.4	41	12.3	101	11.9
Williamson (1991)	13	13.3	26	14.5	33	13.8	28	8.4	100	11.8
Gulati and Singh (1998)	-	-	9	5.0	30	12.6	59	17.7	98	11.5
Inkpen and Beamish (1997)	-	-	34	19.0	29	12.1	33	9.9	96	11.3
March (1991)	4	4.1	10	5.6	26	10.9	54	16.2	94	11.1
Parkhe (1991)	17	17.3	34	19.0	21	8.8	20	6.0	92	10.8
Koza and Lewin (1998)	-	-	17	9.5	34	14.2	37	11.1	88	10.4
Teece, Pisano and Shuen (1997)	-	-	14	7.8	23	9.6	51	15.3	88	10.4
Ring and Van de Ven (1992)	10	10.2	28	15.6	25	10.5	21	6.3	84	9.9
Ariño and Torre (1998)	-	-	21	11.7	27	11.3	33	9.9	81	9.5
Kale, Dyer and Singh (2002)	-	-	-	-	26	10.9	55	16.5	81	9.5
Baum, Calabrese and Silverman (2000)	-	-	8	4.5	21	8.8	52	15.6	81	9.5

**Note.** Source: Authors' computations.

*n* = number of articles in the sample in each period.

The most cited, and thus most influential, articles were published prior to the 2000's, and the majority were published between 1986 and 1998. Examining the citation data is also interesting in order to identify which works have seen a relative decrease in citations. The shaded cells highlight some more notable shifts. Table 3 depicts only the top most-cited per period. Hamel (1991) is the only work that appeared in the top 5 in all periods. While Cohen and Levinthal's (1990) work increases in influence, Williamson's work lost some impact, which may be evidence for a decreased emphasis on transaction costs. Moreover, there seems to be a jolt between the period 1998-2002 and 2003-2007, denoting a conceptual shift – further examined below.

Table 3

**Top-Cited Works Per Period**

<b>1993-1997</b>	<b>1998-2002</b>	<b>2003-2007</b>	<b>2008-2012</b>	
Hamel (1991)	28 Hamel (1991)	70 Dyer and Singh (1998)	75 Cohen and Levinthal (1990)	111
Kogut (1988)	28 Kogut (1988)	54 Hamel (1991)	71 Dyer and Singh (1998)	96
Hamel and Prahalad (1989)	23 Gulati (1995a)	46 Cohen and Levinthal (1990)	67 Powell <i>et al.</i> (1996)	86
Killing (1983)	23 Doz (1996)	43 Gulati (1995a)	57 Gulati (1995a)	83
Hagedoorn (1993)	22 Williamson (1985)	39 Doz (1996)	57 Hamel (1991)	82
Williamson (1985)	19 Parkhe (1993a)	37 Gulati (1998)	56 Mowery <i>et al.</i> (1996)	76
Harrigan (1985)	19 Cohen and Levinthal (1990)	36 Mowery <i>et al.</i> (1996)	55 Lane and Lubatkin (1998)	76
Williamson (1975)	18 Hagedoorn (1993)	35 Powell <i>et al.</i> (1996)	52 Kale <i>et al.</i> (2000)	74
Parkhe (1991)	17 Inkpen and Beamish (1997)	34 Kogut (1988)	50 Uzzi (1997)	68

**Note.** Values are citation frequencies. Source: Computations by the authors.

**Factor analysis**

Factor analysis may be conducted using the co-citation matrix to derive sub-fields (Lin & Cheng, 2010). Each factor identified constitutes a subfield that reveals the intellectual topic or theory, as defined by the content of the articles that load on that factor (Nerur *et al.*, 2008). The factor loadings show how well a given article truly belongs to a factor. The factors that have greater impact will account for a larger number of works, and variance explained. It is worth noticing that each work was selected to the factor in which it had a higher load, albeit it is conceptually possible that a specific work may contribute to more than one research stream. The load is an indication of the extent to which the work belongs to that factor. We conducted the analysis for the entire period and for each of the four sub-periods identified previously. The works that appear in more than one period are likely to be hold greater impact on strategic alliance research.

The first factor analysis pertained to the entire time frame (1993 to 2012) and used the co-citation matrix of the 40 most-cited works. Table 4 summarizes the results arranged by factor (loadings in parenthesis) and shows the extraction of four factors, jointly explaining 65% of the variance. Factor 1 – which we termed **Governance and transaction costs** - comprises 16 works. These works focus on transaction costs, namely those emerging from opportunism and firms' self-interest behaviors (Hennart, 1988; Williamson, 1975, 1985, 1991) that are involved when firms decide to form alliances. Parkhe (1993a) advances governance forms to minimize the potential costs, combining a game-theory perspective, while Ring and Van de Ven (1994) treat opportunism. Hence, several of these works deal with conditions pertaining to how to make alliances successful, how they emerge and evolve, their scope, and how partners are selected (Khanna, Gulati, & Nohria, 1998; Parkhe, 1991).

Table 4

**Summary of Factor Analysis: 1993-2012**

<b>Governance and transaction costs</b>	<b>Learning, knowledge and capabilities</b>	<b>Social networks</b>	<b>Alliance formation and coordination</b>
Hennart (1988) – 0.84	March (1991) – 0.85	Burt (1992) – 0.75	Gulati (1998) - 0.87
Inkpen and Beamish (1997) – 0.84	Kogut and Zander (1992) – 0.82	Baum <i>et al.</i> (2000) – 0.71	Gulati and Singh (1998) – 0.86
Ring and Van de Ven (1992) – 0.83	Lane and Lubatkin (1998) – 0.81	Uzzi (1997) – 0.67	Gulati (1995a) - 0.84
Parkhe (1991) - 0,82	Mowery <i>et al.</i> (1996) – 0.77	Granovetter (1985) – 0.67	Gulati (1995b) - 0.83
Ring and Van de Ven (1994) – 0.82	Nelson and Winter (1982) – 0.77	Eisenhardt and Schoonhoven (1996) – 0.65	
Ariño and Torre (1998) – 0.81	Kale <i>et al.</i> (2000) – 0.75		
Parkhe (1993a) – 0.78	Teece <i>et al.</i> (1997) – 0.72		
Williamson (1991) – 0.76	Barney (1991) – 0.66		
Doz (1996) – 0.70	Cohen and Levinthal (1990) – 0.61		
Williamson (1985) – 0.69	Powell <i>et al.</i> (1996) – 0.60		
Williamson (1975) – 0.68	Koza and Lewin (1998) – 0.56		
Pfeffer and Salancik (1978) – 0.65	Anand and Khanna (2000) – 0.55		
Hamel and Prahalad (1989) – 0.65	Kale <i>et al.</i> (2002) – 0.53		
Khanna, Gulati and Nohria (1998) – 0.61	Hagedoorn (1993) – 0.51		
Kogut (1988) – 0.60	Dyer and Singh (1998) – 0.49		
Hamel (1991) – 0.45			

**Note.** Values are the loadings in the factor. Source: Authors computations.

The second factor – Learning, knowledge and capabilities – comprises 15 works. This factor includes works such as March (1991), Kogut and Zander (1992), Lane and Lubatkin (1998), Mowery *et al.* (1996), Nelson and Winter (1982), Kale *et al.* (2000), Teece *et al.* (1997), Barney (1991) and Cohen and Levinthal (1990) discussing how firms may learn from partners and the challenges involved. Specifically, we observe a focus on firms' absorptive capacity, and how knowledge may be transferred in an alliance, taking on a Resource-based view approach. For instance, Mowery *et al.* (1996) noted that equity-based partnerships are better suited for knowledge transfer. March (1991) dealt with exploration and exploitation which, when applied to alliances, may entail understanding the strategic purpose of the alliance. Lane and Lubatkin (1998) treated interfirm differences in absorptive capacity (Cohen & Levinthal, 1990) noting that the similarity of knowledge held by partners, and other organizational factors are positively related to interorganizational learning.

The third factor – **Social networks** - includes works focusing on multiple facets of the social aspect, or interactions, of alliances. Baum *et al.* (2000) argue that firms improve the chances of success by engaging in alliances and constructing effective networks. Uzzi (1997) complements Granovetter's (1985) on **social embeddedness** noting that embedded ties provide trust, information and joint problem-solving. Eisenhardt and Schoonhoven (1996) reveal the importance of ties for entrepreneurial firms in accessing a variety of resources. Specifically, they argue that transaction-cost based explanations fail to consider the strategic and social motivations underlying why firms form alliances.

The fourth factor includes only four works by Ranjay Gulati on alliance formation and coordination of the relationships between partners both in a dyadic situation and in a network of repeated ties. Gulati (1995a) specifically delves into how the interfirm trust that emerges in repeated alliances decreases coordination costs.

We also conducted a factor analysis for each 5-year period (Table 5 summarizes the factors and the works loading on each factor per period). We only extracted factors that had eigenvalues greater than 1 and all works had loadings greater than 0.4 (see Nerur *et al.*, 2008). The factors are reported in tables 4 and 5, exactly as the statistical output, and they were not manipulated. Albeit we identify many commonalities concerning the use of three main conceptual approaches – Transaction Costs Theory, Knowledge and Learning-based view and Social networks – across the periods, there are notable shifts over time that are worth noting. For instance, there was an emphasis on Performance and competitive strategy effects and on International joint ventures during the period 1993 to 1997, and on aspects of interfirm coordination and alliance formation in three periods (1993-1997, 2003-2007, 2008-2012) albeit with slight differences among the periods. Joint ventures were a recurring theme in the first two periods. Although conceptually different, alliances and joint ventures are often contrasted or used to distinguish between equity-based and non-equity based agreements.

Table 5

### Summary of the Factor Analyses Per Period

<b>1993-1997</b>	<b>Performance and competitive strategy</b>	Porter (1990) - 0.85; Harrigan (1985) - 0.72; Harrigan (1986) - 0.72; Hamel and Prahalad (1989) - 0.69; Killing (1983) - 0.59; Geringer (1989) - 0.58; Reich and Mankin (1986) - 0.57; Hennart (1988) - 0.56; Ring and Van de Ven (1994) - 0.50; Pfeffer and Salancik (1978) - 0.49; Hamel (1991) - 0.48; Contractor and Lorange (1988) - 0.46; Harrigan (1988) - 0.43
	<b>International JVs</b>	Kogut (1988) - 0.66; Parkhe (1991) - 0.66; Hladik (1985) - 0.65; Parkhe (1993a) - 0.63; Geringer (1991) - 0.62; Kogut (1989) - 0.61; Parkhe (1993b) - 0.59; Buckley and Casson (1988) - 0.58; Porter (1986) - 0.53; Osborn and Baughn (1990) - 0.48
	<b>Governance and transaction costs</b>	Porter (1985) - 0.79; Axelrod (1984) - 0.72; Powell (1990) - 0.72; Williamson (1991) - 0.70; Williamson (1975) - 0.63; Porter (1980) - 0.62; Williamson (1985) - 0.59; Borys e Jemison (1989) - 0.56
<b>1998-2002</b>	<b>Transaction costs</b>	Yan and Gray (1994) – 0.82; Killing (1983) – 0.79; Parkhe (1991) – 0.79; Hennart (1988) – 0.77; Ring and Van de Ven (1994) – 0.77; Inkpen and Beamish (1997) – 0.77; Parkhe (1993a) – 0.74; Hamel and Prahalad (1989) – 0.64; Borys and Jemison (1989) – 0.63; Doz (1996) – 0.61; Hamel (1991) – 0.56; Harrigan (1985) – 0.51; Williamson (1985) – 0.46
	<b>Learning, networks and access resources</b>	Granovetter (1985) - 0.80; Burt (1992) - 0.78; Hagedoorn (1993) - 0.73; Dyer and Singh (1998) - 0.72; Powell <i>et al.</i> (1996) - 0.71; Eisenhardt and Schoonhoven (1996) - 0.71; Williamson (1991) - 0.65; Nelson and Winter (1982) - 0.63; Pfeffer and Salancik (1978) - 0.58; Cohen and Levinthal (1990) - 0.54; Mowery <i>et al.</i> (1996) - 0.50; Barney (1991) - 0.46
	<b>JVs: structure and reciprocity</b>	Kogut (1988) - 0.81; Kogut (1989) - 0.64; Ring and Van de Ven (1992) - 0.53
	<b>Interfirm coordination</b>	Gulati (1995a) - 0.82; Gulati (1998) - 0.75

Continues

Table 5 (continued)

2003-2007	<b>Learning and collaboration</b>	Nelson and Winter (1982) - 0.79; Hagedoorn (1993) - 0.77; Powell <i>et al.</i> (1996) - 0.74; Lane and Lubatkin (1998) - 0.74; Mowery <i>et al.</i> (1996) - 0.71; Anand and Khanna (2000) - 0.71; Kale <i>et al.</i> (2002) - 0.67; Kogut and Zander (1992) - 0.65; Barney (1991) - 0.62; Cohen and Levinthal (1990) - 0.62; Koza and Lewin (1998) - 0.55; Eisenhardt and Schoonhoven (1996) - 0.50; Khanna <i>et al.</i> (1998) - 0.49; Hamel (1991) - 0.48
	<b>Governance and transaction costs</b>	Oxley (1997) - 0.78; Parkhe (1993a) - 0.78; Ring and Van de Ven (1994) - 0.72; Doz (1998) - 0.72; Hennart (1988) - 0.71; Williamson (1975) - 0.68; Inkpen and Beamish (1997) - 0.66; Williamson (1985) - 0.64; Williamson (1991) - 0.61; Kogut (1988) - 0.55; Doz (1996) - 0.51
	<b>Alliance formation and coordination</b>	Gulati (1995a) - 0.90; Gulati (1998) - 0.88; Gulati (1995b) - 0.87; Gulati and Singh (1998) - 0.78; Zaheer, Gulati and Nohria (2000) - 0.67
	<b>Social networks</b>	Dyer and Singh (1998) - 0.69
2008-2012	<b>Knowledge transfer and learning</b>	Grant and Baden-Fuller (2004) - 0.875; March (1991) - 0.859; Kogut and Zander (1992) - 0.763; Teece <i>et al.</i> (1997) - 0.698; Lane and Lubatkin (1998) - 0.688; Mowery <i>et al.</i> (1996) - 0.681; Kale <i>et al.</i> (2000) - 0.653; Hamel (1991) - 0.603; Barney (1991) - 0.588; Nelson and Winter (1982) - 0.581; Khanna <i>et al.</i> (1998) - 0.544; Cohen and Levinthal (1990) - 0.418
	<b>Governance and transaction costs</b>	Parkhe (1993a) - 0.779; Williamson (1975) - 0.741; Doz (1996) - 0.735; Williamson (1985) - 0.712; Kale <i>et al.</i> (2002) - 0.665; Kogut (1988) - 0.635; Anand and Khanna (2000) - 0.626
	<b>Social networks</b>	Burt (1992) - 0.772; Baum <i>et al.</i> (2000) - 0.745; Ahuja (2000) - 0.673; Granovetter (1985) - 0.633; Uzzi (1997) - 0.604
	<b>Alliance formation and coordination</b>	Gulati (1995a) - 0.914; Gulati and Singh (1998) - 0.903; Gulati (1998) - 0.878; Gulati (1995b) - 0.749

**Note:** The values are the factor loadings. Source: Authors' computations.

For the first period, years 1993 to 1997, three factors were extracted, with 51% of the variance explained. For the remaining periods, four factors were extracted, explaining between 60% and 65% of the variance. During the first period, the focus on **International JVs** is clearly an international business/strategy concern to which IB scholars have dedicated much attention (Beamish & Lupton, 2009). Firms enter JVs to create new products and services, enter new and foreign markets, or both. International JVs (IJVs) enable firms to overcome legal barriers to foreign property restrictions but are also a mean to access the partner to learn, attain economies of scale and scope, develop new products, and avoid making large investments alone. Moreover, using IJVs, firms capture the local partner's help in navigating unfamiliar business environments. However, the choice for IJVs must be compared against alternative entry modes, and given their high failure rates it is important to understand what drives JVs' success (Beamish, 1988; Geringer, 1998; Harrigan, 1985, 1986; Killing, 1983).

The theme **Performance and competitive strategy** that appears highly connected to IB-related research (1993-97), links alliances and equity forms of interfirm collaboration, because of the attention to outcomes of managers' actions. Performance effects are an important aspect of partnering, including the very rationale for entering into an alliance. Hence, this research involves identifying effects and measures of performance, struggling to find conclusive results due to lack of reliable objective data for empirical tests. The competitive strategy component derives from the choice for collaborating and the impact on firms' long-term strategy. Hamel (1991) specifically noted that international competition between firms denotes asymmetries in firms' skill endowments, and alliances are a means to internalize the skills of others.

Although an extensive analysis of the factors is not possible in this paper, it is worth noting some major shifts (Table 6). For instance, it was in the period 2003-2007 that issues pertaining to learning and

knowledge became the leading conceptual background for studying strategic alliances. Nonetheless, the stream on learning and knowledge has also changed from focusing on networks and knowledge access to emphasize knowledge transfer – with works on the hazards involved in the transfer, the types of knowledge, and so forth. Nonetheless, much of this research stream still delves into the importance of effectively managing firms' knowledge and capabilities that are conceptualized as the most valuable source of competitive advantage (Beamish & Lupton, 2009). Recognizing that alliances create value, Anand and Khanna (2000) examined what drives value-creation in alliances, finding evidence of learning effects in managing collaboration.

Table 6

### Evolution of Themes Researched

1993-1997	1998-2002	2003-2007	2008-2012
1. Performance and competitive strategy	1. Transaction costs	1. Learning and collaboration	1. Knowledge transfer and learning
2. International JVs	2. Learning, networks and access resources	2. Governance and transaction costs	2. Governance and transaction costs
3. Governance and transaction costs	3. JVs: Structure and reciprocity	3. Alliance formation and coordination	3. Social networks
	4. Interfirm coordination	4. Social networks	4. Alliance formation and coordination

Moreover, social network-based explanations and a variety of related concepts such as trust between partners emerged more clearly in the period 2003-2007 to become one of the prevailing conceptual foundations of much of the research conducted thereafter. In the last period, 2008-2012, there is a clear decrease in the **governance and transaction costs** factor that is superseded by knowledge, knowledge transfer, learning and capabilities-based studies.

### Co-citation analyses

Co-citation analyses rely on examining the frequency with which a given pair of works is referenced by other authors. Using the social networks software *Ucinet* we drew a co-citation network for the entire period. To better read the figure, notice that the thickness of the line connecting a pair of works is a measure of the strength of the tie, as assessed by the co-citation frequency. Hence, the thicker the line connecting a pair the larger the number of co-citations. Also, the works are shown in their relative positions such that more central works are more often cited relative to those in the periphery. All works are placed on a roughly circular space.







caution for possible opportunistic behaviors of partners. Alliances are thus a manner to minimize total transaction costs.

In the period 2003 to 2007 three works are at the core of the network: Hamel (1991), Cohen and Levinthal (1990) and Dyer and Singh (1998). This is a substantial change over the previous period and marks the emergence of the focus on learning sought in alliances among firms. Hamel (1991) emphasizes how firms are increasingly competing for knowledge-based advantages and form alliances to jointly augment their competences by learning with the partners. Dyer and Singh (1998) also posit that alliances are better seen as cooperative strategies for competitive advantage. Cohen and Levinthal (1990) delve into the hazards involved in learning and the interfirm transfer of knowledge.

Finally, the last period, 2008 to 2012, shows a co-citation network having at the center a set of works focused on the learning dynamics in alliances, such as absorptive capacity (Cohen & Levinthal, 1990), how firms may learn and yet protect their proprietary assets (Kale, Singh, & Perlmutter, 2000), learning from partners to achieve a knowledge-based competitive advantage (Hamel, 1991), knowledge transfer in alliances (Mowery, Oxley, & Silverman, 1996), and the mechanisms for learning (Lane & Lubatkin, 1998).

## Discussion

In this paper we sought to examine and make sense of the extant research on strategic alliances. We defined top-ranked journals in management, strategy and international business to select a sample of 866 articles that deal specifically with strategic alliances, published in the past twenty years. Methodologically we conducted a bibliometric study based on the well-accepted techniques of citation and co-citation analyses and conducted a factor analysis. The data and results permitted identify the most influential works and their related conceptual approaches, thus better understanding intellectual ties and evolution over time.

This paper complements existing research, both literature reviews and other bibliometric studies. For example, it complements the findings by Lin and Cheng (2010) whose analysis uncovered similar research themes, albeit they failed to perform a longitudinal analysis. It is also a complement to Di Guardo and Harrigan's (2012) bibliometric study, albeit they classified the research themes into network approach, industrial organizational approach, economics of strategy approach, and learning and knowledge transfer approach. It further complements Moran *et al.*'s (2010) review on strategic alliances. Through a bibliometric analysis, we identified the most influential works on the topic and the intellectual evolution by noting changes in citations over the twenty years considered. Moreover, we traced the evolution of research using a factor analysis, which at least in part permits identifying subfields or intellectual themes. Used together, citation, co-citation and factor analyses help in better understanding the stock of knowledge produced. The core assumption is that research on the topic has matured enough to warrant an examination of the extant literature.

The results, for both the entire period and broken down in 5-year periods, show that strategic alliance research has been built mainly on the back of three theoretical streams: transaction costs, knowledge-based and learning arguments, and social networks. While at the origin the Transaction Cost Theory prevailed, perhaps more notably in international business studies (see Table 5) it has gradually moved to the Resource-Based View and its variants (capability and knowledge-based explanations). The transaction-cost studies concern the governance models adopted by firms, and perhaps more notable was the work by Ranjay Gulati in calling attention to the value of trust in reducing transaction costs, namely those emerging from potential opportunistic behaviors and market uncertainties. Nonetheless, the social structure of the topic, as identified in the co-citation network (Figure 2) and factor analyses (Tables 4 and 5) are clear in showing that learning, knowledge transfer between partners and the development of capabilities has been at the core of much of the research conducted on strategic alliances. This trend has become even clearer in the more recent periods, although we also observe that the two

latter periods (2003-2007 and 2008-2012) further show a relative increase in the emphasis given to social network arguments and the importance of firms' social embeddedness in networks of alliances. Through alliance ties firms may access not only an array of physical, financial and informational resources, but also social resources such as reputation.

The data and results further denote that the most-cited papers vary over the period which is *prima facie* evidence of the conceptual shifts taking place. Research on the topic of alliances has thus evolved from a somewhat phenomenon-oriented focus, and mostly in an international business context – where performance effects and the contrast between equity and non-equity based collaborative governance models prevailed – to a topic well-embedded in theoretical lenses. Moreover, we also noted how within the stream of research on learning and knowledge has been changing over time and seems to more recently focus on the actual learning that may occur. Moreover, it is salient that scholars have been able to bring in concepts from other disciplines, perhaps more from sociology, contrasting with the topic's original roots founded in economic and market-power based explanations of why firms seek to form alliances and the potential benefits. In any instance, the main theoretical approaches have not changed markedly and alliance research has been constructed using transaction-cost, resource, knowledge and capabilities-based views and social network concepts. Perhaps more surprising is the relative stability in the citation patterns. Specifically, older papers tend to accumulate a larger number of citations, older papers seem to be the most cited and only a handful of more recent papers reach the top of the most cited.

### Limitations and future research avenues

This study has some limitations worth reviewing. The first concerns our choice of keywords, that while capturing at least most of the research on the topic, may leave out some articles. Perhaps more significant is that even though we used a large pool of journals to draw our sample from (thirty-one journals) these do not cover the entire range of published research. Nonetheless, our selection of only top-ranked journals probably captures the most influential articles and leaves us confident that we captured the most significant papers, but future research may enlarge even more the sample examined and delve into the papers published in such disciplines as finance and human resources.

Other limitations are specific to the bibliometric techniques employed. For instance, we counted citations and co-citations but we fail to uncover the context in which these are made. That is, we are unaware of the purpose of the citations and an author may cite another work to build upon it or to criticize its approach or methods. Future research may seek to use specific content analysis software to uncover the content of the papers and the context in which citations are made.

We also have the limitation of using only articles published. Bibliometric studies may be based on an array of written documentations beyond papers published in scientific journals such as books, dissertations and theses, reports, news in the media, and so forth. By using on articles published we are using what has been termed as **certified knowledge** since these documents went through a peer review process. Although the review process may not be a perfect system (Bedeian, 2004; Frey, 2003), it is a reliable procedure for the advancement of scientific knowledge (Shugan, 2007). Notwithstanding, future research may extend our analyses to other source documents and perhaps find empirical relationships and conceptual ideas that have not made it to mainstream top management journals.

Research on strategic alliances has been fairly absent from Brazilian scholars' attention. It seems reasonable to note that much of the national research has focused on theoretical approaches, such as Eiriz (2001) on the typologies of strategic alliances, and examining the learning and interorganizational learning potential of alliances (Klotzle, 2002; Mozzato & Bitencourt, 2014). However, there is a wide array of theoretical perspectives to further explore, that may also find an empirical context with Brazilian firms. For instance, discussing internationalization, how do firms decide on partner selection and how do they assess governance and transaction costs that may be involved? How do Brazilian multinationals coordinate their portfolio of alliances? In fact, what the motivations underlying internationalization are and whether these are better attained using alliances or acquisitions, for instance, is still unclear. The

field of international business, in specific, may find that studying alliance selection, formation and coordination is a munificent arena with practical implications for multinationals' strategies.

Perhaps in developing future research it is useful to build on the existing stock of knowledge that we identified. This also means that an initial set of bibliography probably needs to comprise the most influential works (see Table 2 and Figure 2). Testing the theories in an emerging economy context, with the institutional inefficiencies and voids that are well known (Cuervo-Cazurra & Genc, 2008), is likely to uncover novel insights with theory development potential. For example, the literature emphasized the role of trust (Gulati, 1995a, 1995b) on alliance formation, but it is reasonable to suggest that trust is especially relevant when formal institutions fail. The social, cultural, economic and institutional environment that characterizes countries and interfirm interactions are likely to impact on not only how alliances are formed and managed, but also on their longevity.

## Concluding Remarks

Bibliometric studies provide a quantitative analysis of the past research on a given discipline or topic, and are a good complement to other types of literature review. Using the data and results of studies based on bibliometric techniques, experienced scholars may identify opportunities for future research in the field, while newcomers, young scholars, and doctoral students may use these studies to better understand the scope of the field, its seminal works, main trends, evolutions, theories, context and prevailing paradigms.

Bibliometric studies do not provide an account for the state of the art of knowledge on a topic but rather they examine the knowledge that has accumulated. In this study we identified the most influential works, examined the intellectual ties binding works, and scrutinized the theoretical evolution of research on strategic alliances over the past twenty years. To some extent our findings corroborate Ramos-Rodríguez and Ruíz-Navarro (2004) and Shafique's (2013) observation of the increasing importance of resource-based explanations, including knowledge and capabilities. We also found that the social interactions, as examined in social network literature, is prominent when studying interfirm collaborations. Moreover, while the most influential works have been to some extent classic or seminal pieces, there is an emergence of scholars that bring to the forefront of research novel approaches to study strategic alliances. Future studies on the topic will reveal whether the structures we identified are enduring or more driven by specifics that have marked much of the management research during the past decades or whether insightful avenues will emerge to broaden scholars and practitioners' views on strategic alliances.

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