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Can resources act as capabilities foundations? A bibliometric analysis

¿Pueden los recursos actuar como origen de capacidades? Un análisis bibliométrico

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Abstract:

The objective of this article is to record the trends of study regarding the relationships between resources and capabilities, through a review of the literature of its definitions and typologies from 1984-2016, followed by a bibliometric analysis during the period 2001-2016. For this analysis, we used records of the Web of Science. The analysis includes indicators of annual productivity, by countries and authors, most productive magazines and most cited articles. A low productivity was identified, 2010 being the year with the largest number of articles published. The United States leads in number of articles related to the topic. The most cited articles were published in 2003 and the most productive authors have 3 publications each. Thus, important academic gaps are evident, which is why future study paths are suggested.

Keywords: bibliometric analysis, capabilities, resources, competitive advantage, Web of Science.

Resumen:

El objetivo de este artículo es registrar las tendencias de estudio sobre las relaciones entre los recursos y las capacidades, a través de una revisión de la literatura de sus definiciones y tipologías desde 1984 hasta 2016, seguido de un análisis bibliométrico durante el período 2001-2016. Para este análisis, usamos registros de la Web of Science. El análisis incluye indicadores de productividad anual, por países y autores, revistas más productivas y artículos más citados. Se identificó una baja productividad, 2010 el año con la mayor cantidad de artículos publicados. Estados Unidos lidera en número de artículos relacionados con el tema. Los artículos más citados se publicaron en 2003 y los autores más productivos tienen 3 publicaciones cada uno. Por lo tanto, las brechas académicas importantes son evidentes, por lo que se sugieren caminos de estudio futuros.

Palabras clave: análisis biblimétrico, capacidades, recursos, ventaja competitiva, Web of Science.

1. Introduction

The research on Resource Based View of the Firm (RBV) is one of the most influential tendencies of strategic management, proving this in numerous studies on the relevance of resources and capabilities in terms of generating competitive advantages for companies [1], [2], [3], [4]. The literature suggests that the RBV attempts to answer the enigma of the differences in business performance, specifically: how competitive advantages are obtained? what generates them? what are their scope? and how do organizations sustain them in time?

From the contributions of Penrose (1959) the company was understood as a set of productive resources, later on, the seminal work of Wernerfelt (1984) gave way to the study of the RBV in terms of use, growth, capacity and development of resources that lead to business economic returns. From that moment this theory has been addressed by numerous authors [5], [6], [7], [8], [1], [9], [10], [4], [11], [12], who agree that

their study is relevant because it attempts to explain the development of competitive advantages based on the resources and capabilities (R&C) that companies possess or develop, and indeed, in the literature there are pieces of evidence that show that the integration and perfect combination of R&C translates into the generation of business competitiveness [13], [14], [15], [16], [12]. At this point, one question arises: what resources and what capabilities need to be working together to obtain higher yields compared to those of the competition?

Thus, the objective of this paper is to provide a theoretical basis on the different authors who have addressed the study of R&C, actual concepts and classifications of them as well as to analyze the relationships between their approach to literature. Next, there will be a consideration of certain resources that could be generating entrepreneurial skills and, under this dynamic, the companies that own them could enhance a set of capabilities to generate more competitive advantages. The result of the bibliometric review reveals an agenda to follow in future research in this area.

This document begins with the description of resources and capabilities and some classifications, the relationships found in the literature between these two elements are presented below; finishing with the conclusions of the study of this topic and a suggested agenda for researchers who want to delve into this topic.

2. Theoretical framework

The RBV tries to explain the paradigm of the differences between the organizations of the same industry in terms of performance and competitiveness. Its initial idea exposes the premise that the company is a set of productive resources that can increase and enhance its value to obtain a competitive advantage [17]. Its study is approached with force from the work of Wernerfelt (1984), who considers the company as a set of resources that are heterogeneously distributed. These differences are persistent over time [18], [19], [17], [4], [20], [69], this heterogeneity would explain the different results between companies. Based on this assumption, researchers have theorized that one of the sources of competitive advantages are the resources, when they possess VRIN attributes, that says they are valuable, rare, inimitable and non-substitutable [5], [4], [12], [20], however, these VRIN resources in dynamic market environments do not persist over time and become outdated [11], [12], additionally they are not very productive by themselves. The types, quantities, qualities and the way resources are used, is what determines the results the company could achieve [1] this is what has been called "routines" or "capabilities" of the companies.

In the literature, numerous studies are identified on the importance of resources for companies in the development of their economic activity [21]. In fact, historically they have generated numerous definitions and classifications; perhaps the most influential is its conception as tangible and intangible assets, which are semi-permanently tied to the company and are controlled by it [5], [10], [11], [20]. Some authors argue that these assets are specific to the company, so it is difficult to imitate them or transfer trade secrets and specialized production facilities [22]. Similarly, Grant (1991) defines resources as inputs used in the production process and, the basic units of analysis, since they represent both the foundation of the company and its capabilities [12]. Table 1 shows a historical set of the different conceptions of the term "Resources".

In terms of the typology of resources, perhaps the most popular is the one that divides them into tangible and intangible [10], [20]. Tangible resources have a physical support of a material nature, they are easy to identify, count, measure and value [15]. Examples of them are: property, plant and machinery. Intangibles resources refer to things that cannot be physically perceived, and are difficult to reproduce and imitate; they are based on information and knowledge. Some examples are brand names, internal knowledge in the technology field and efficient procedures [20].

TABLE 1.
Definition of the concept "resources"

Author	Definitions
Wernerfelt (1984)	Assets (tangible and intangible) that are semi-permanently linked to the company.
Barney (1991)	Include all assets that the company owns and can control, allowing to conceive and implement strategies to improve efficiency and effectiveness.
Grant (1991)	There are inputs in the production process, these are the basic units of internally analysis within the company.
Amit&Schoemaker (1993)	Stock of available factors that are owned by the company or controlled by it. Becoming final products or services using a wide range of other assets of the company and linkage mechanisms.
Teece et al. (1997)	These are specific company assets that are difficult, if not impossible to imitate and difficult to transfer between companies due to transaction cost.
Navas &Wars (2002)	Set of factors or assets that a company has to carry out its strategy.
Helfat&Peteraf (2003)	Assets or contribution to production (tangible or intangible) an organization possess, controls or has access on a semi-permanent basis.
Ray, Barney, & Muhanna (2004)	Tangible and intangible assets that companies use to develop and implement their strategies.
Wang & Ahmed (2007)	These are the foundation of the company, fundamental for the development of the capabilities and potential sources of competitive advantage when these have VRIN attributes.
Barreto (2010)	These are stocks of available factors owned or controlled by the company.

Other categories have also been stated, for example: physical, financial, human capital, technological and organizational resources [1], [5], [10], [18]. The physical resources are those used to develop the economic activity and the achievement of goals within the company (plant, equipment, geographical location and access to raw materials); The financial ones are those necessary to cover the costs of the other resources involved (cash, stocks, credits and investments). Given their tangible nature, these resources can be identified and valued more easily through the information provided by the financial statements [1], [10], [14], [15]. The human resource does not refer to the human being as such, it refers to their knowledge, training, experience, intelligence, loyalty and reasoning skills [10], [15]. The technological resources would be constituted by the technological knowledge available that allows the development of products, being specified in patents and databases [10], [15].

Finally, organizational resources include the organizational structure, the line of authority, brand, reputation, among others. Table 2 shows the different classifications of resources found in the literature.

On the other hand, the capabilities have also been studied, and the results are well documented in the literature [23], [22], [21]. Some researchers consider that it is necessary for the capabilities to be internally and externally exploited by the organization [12], [17], [20], [23] in order to recognize, detect, identify, discover and develop opportunities that are necessary for business success [24], since the sustainability of capabilities varies with the dynamism of the market [25]. Considering that these are inherent skills of the personnel and the organization, the capabilities should be understood as organizational structures and managerial processes that support productive activity [23].

They do not come spontaneously; these are routines that are developed from the interaction between the resources and the companies [18], [23], [27], [28]. As a result, capabilities are considered a source for competitive advantage, since not all companies can have and adopt them in the same way and under the same conditions since it is not possible to buy them in the market as any resource, they are created and developed within the organization, this makes them unique, difficult to imitate, transfer and duplicate [29].

TABLE 2.
Classification of resources.

Author	Classifications
Wernerfelt (1984)	Tangible resources (qualified work force, business contacts, machinery). Intangible assets (brand name, inside knowledge of technology, efficient procedures).
Wernerfelt (1989)	Resources with long-term capacity (plant, equipment, employees with specific training, investments from suppliers or distributors). Resources with unlimited capacity (patents, brand names and reputation). Limited resources and unlimited capacity for long term.
Barney (1991)	Physical capital (physical technology, plant, equipment, geographic location and access to raw materials). human capital (training, experience, intelligence, relationships, managers understanding and employees of the company). Organizational capital (formal structure reporting, formal and informal planning systems, control, coordination, and informal relationships between internal groups) and with their environment).
Grant (1991)	Financial, physical, human, technological, reputation, organizational.
Amit & Schoemaker (1993)	Knowledge resources, financial or physical assets and human capital.
Navas & Wars (2002)	Tangible resources: Physical (land, buildings, machinery, equipment, raw materials, finished products) and financial (capital, reserves, receivables, shares). Intangible non-human resources: Technological (patents, designs, databases, know-how) and Organizational (Brand name, prestige, customer base, organizational design, reputation, corporate image) intangible human resources (knowledge, experience, loyalty, motivation, adaptability, reasoning ability and decision).

Several experts agree that the capabilities are different constructs integrated in the companies to generate competitive development, there is a set of skills and knowledge of a company to deploy a team of resources working and interacting together achieving a desired end [1], [12], [18]. For example, Teece et al. (1997) argue that the term refers to the key role of strategic management in adapting, integrating and reconfiguring internal and external organizational skills, resources and functional competencies to meet the needs of a changing environment. However, they have been defined as a set of routines that imply the stability and repeatability of the behaviors and processes of an organization [1], [2], [28], [30], [31], this indicates that for the execution and development of a capability, a process of integration and combination of resources is required and its effectiveness will be achieved through repetition, becoming routine [1], [25]; therefore, a routine is necessary for operational efficiency [24] and the creation of tacit knowledge [28], [32]. Scholars who have addressed the issue suggest that the traditional conception of routines applies to relatively static, stable or predictably changing environments, whose process relies on existing knowledge [12], [24], [25]; In contrast, for high-speed exchange environments, a distinctive type of capability is required to respond to the dynamism of the market, these are called dynamic capabilities and they are based on the generation of new knowledge [11], [12], [23], [25], [33]. Table 3 presents different conceptions of the term capabilities over time.

Capabilities, just like resources, have been the subject of numerous classifications throughout academic history, suggesting that they can go from basic and common to advanced, scarce and strategically important capabilities [16]. The literature distinguishes a considerable variety of capabilities that operate in stable and dynamic environments [22], [25], [33], [2], [37]. Recently research has identified and categorize capabilities in three levels [32], [38], level zero or ordinary (allowing the company to earn its livelihood), first level or dynamic capabilities, related to the ability of a company to adapt, create, develop and modify the resources

base in response to environmental changes [25], [33], [39]; and the higher order capabilities that result in modification of the previous level.

In the same way Wang & Ahmed (2007) proposed three levels. In level one, the company's capabilities are found, in level two there are the basic, essential or central capabilities, and level three the dynamics or organizational capacities can be found. However, Alarcón *et al.* (2013) distinguish technological capabilities (technological knowledge, trade secrets, the know-how generated by R&D and specific technological intellectual capital) and marketing (corporate image, reputation and social recognition), considered important to obtain competitive advantages, since they increase the ability to discover and exploit existing opportunities. Table 4 shows the classifications of capabilities offered by the literature in detail Despite the fact that most studies on RBV highlight a strong connection between the set of R&C and the increases in productivity or economic and financial results [45], [46], [11], [47], or between the R&C and the generation of competitive advantages [5], [6], [48], [49], [50], [51], [52], [53], [54], [55], [56] [57], [20], [58], [59], comparatively there are very few empirical studies on the relations between resources and capabilities themselves. In this sense, there are investigations that propose a direct influence of resources in the generation and improvement of capabilities. Helfat&Peteraf (2003) state that capabilities have an evolutionary life cycle inherent to a work team and that they form the basis of competitive advantage. They consider that the capability starts in a group of individuals (resources), with different attributes or characteristics and an objective that implies generating a skill, then it evolves to a stage of development where it is combined with the accumulated experience. The development of capability depends on what individuals can achieve with the available resources. Finally, it enters a phase of maturity in which it is maintained through its regular execution and is incorporated into the memory of the organization.

TABLE 3.
Definition of the term "capacity"

Author	Concepts
Barney (1991)	These are a resource type.
Grant (1991)	It is the ability of a set of resources to perform some task or activity. It is what can be done as a result of resource teams working together. They are the main source of competitive advantage. These are routines that interact.
Amit&Schoemaker (1993)	Ability of a company to deploy resources, usually in combination, using organizational processes, to achieve the desired purpose. Processes based in information, tangible or intangible that are specific of the company and develop over time through complex interactions between resources.
Teece et al. (1997)	Role of strategic management in appropriately adapting, integrating and reconfiguring internal and external organizational skills, resources and functional skills to meet the needs of a changing environment.
Helfat&Peteraf (2003)	Set of routines that involve doing an activity repeatedly or routinely.
Ray et al. (2004)	Tangible and intangible assets that companies use to develop and implement their strategies.
Wang & Ahmed (2007)	Ability of a company to deploy resources and processes encapsulate both explicit and tacit knowledge incorporated in the processes.
Ismail, Rose, Uli, &Abdullah (2012)	Skills necessary for resource development in the organizations.
Dávila (2013)	Integration of past experiences to solve current problems and guiding future decisions.
Alarcon Parra, &Garcia (2014)	Skills coming from the collective learning of the organization, related to how to coordinate the various production techniques that integrate multiple chnology flows.

The development of capabilities involves learning activities, integration and coexistence among the members of the company, resources and allied companies. These interactions generate new knowledge

which adopted by organizations along with the knowledge acquired from past experiences, give way to new capabilities or can improve existing ones, allowing to develop competitive advantages [60], [61], [62].

TABLE 4.
Classification of capabilities.

Author	Concepts
Barney (1991)	These are a resource type.
Grant (1991)	It is the ability of a set of resources to perform some task or activity. It is what can be done as a result of resource teams working together. They are the main source of competitive advantage. These are routines that interact.
Amit&Schoemaker (1993)	Ability of a company to deploy resources, usually in combination, using organizational processes, to achieve the desired purpose. Processes based in information, tangible or intangible that are specific of the company and develop over time through complex interactions between resources.
Teece et al. (1997)	Role of strategic management in appropriately adapting, integrating and reconfiguring internal and external organizational skills, resources and functional skills to meet the needs of a changing environment.
Helfat&Peteraf (2003)	Set of routines that involve doing an activity repeatedly or routinely.
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Wang & Ahmed (2007)	Ability of a company to deploy resources and processes encapsulate both explicit and tacit knowledge incorporated in the processes.
Ismail, Rose, Uli, &Abdullah (2012)	Skills necessary for resource development in the organizations.
Dávila (2013)	Integration of past experiences to solve current problems and guiding future decisions.
Alarcon Parra, &Garcia (2014)	Skills coming from the collective learning of the organization, related to how to coordinate the various production techniques that integrate multiple chnology flows.

3. Method

This study explores existing literature on the relationships between resources and capabilities in themselves. To achieve this, a complete bibliometric analysis was done. This is a discipline that applies mathematical and statistical methods to examine activity and productivity. Scientifically saying it evaluates the development of knowledge on a specific topic, scientific quality and the influence of different works and sources [63], [64], [65]. This type of analysis is completed through indicators that measure the bibliographic material in terms of productivity and impact of the publications.

The first step was choosing the Web of Science (WOS) from Thomson Reuters, since it is one of the most used databases for this type of analysis due to the quality of its scientific information. WOS journals have impact factors in the Journal Citation Report (JCR), providing academic validation to the research. The areas of knowledge included are: economy, administration and business. The indicators to be used are of quantity and quality [63], [64], [66]. The first one's measures productivity through the number of publications, the second, measures the impact of a publication in relation to the number of citations received, with this it is intended to determine how interest has grown in knowing the relationship between resources and capabilities in the last years.

4. Results

The search generated 258 documents hosted by the WOS that consider the existence of a relationship between resources and capabilities. 237 articles, 7 working documents, 17 reviews of literature, 4 categorized

as editorial material, and 1 publication retracted (a public statement about a paper that is drawn). Only the number of published research articles were considered because these are the types of documents used to communicate the results of research in a clear and concise manner in scientific journals. For the period 2001 - 2016, the following items were analyzed:

- Number of articles per year.
- Countries with higher productivity.
- More productive authors.
- Magazines with the highest number of publications.
- Most cited articles.

4.1. Articles per year

The study of the relations between R&C becomes visible to the academic community since 2001, this is contrasted in two databases (WOS and Scopus), verifying that in previous years a maximum of two articles per year were published, making the period 2001 – 2016 of feasible study. Figure 1 present the number of publications per year, there is evidence that in 2001 only 6 articles were published in the WOS, a figure that increased in the following 15 years, however, its growth did not keep a clear trend. The largest number of studies was concentrated in 2010, when 27 documents were published. Between 2014 and 2015 the number of publications remained stable, while in 2016 there was again a decrease.

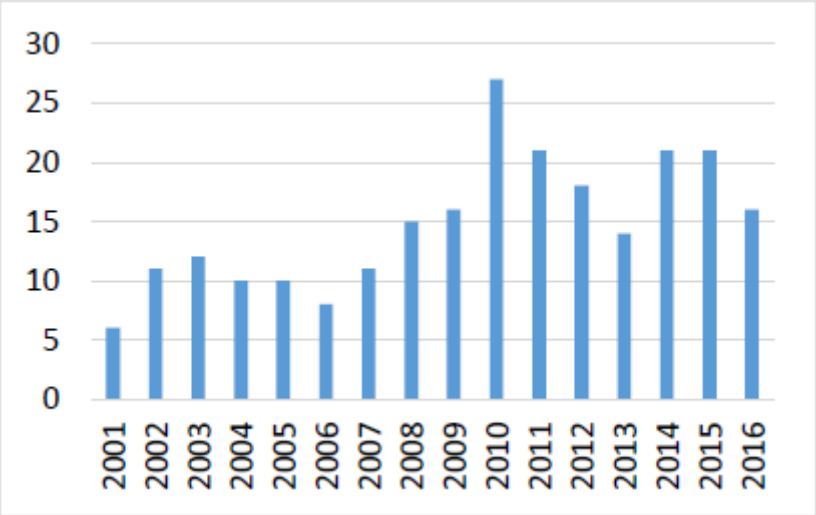

FIGURE 1.
Trend in the study of the relationship between R&C.

4.2. Countries with higher productivity

Productivity is valued through the number of published research articles (TP), the total number of citations received per published article (TC), the average citations per published article (C/P) and the H index that measures the quality of research production based on the number of citations received. Table 5 contains the 20 countries with the highest productivity in the subject under study. The United States ranks as the country with the highest number of publications (100 documents) with the highest number of citations (5,122) and the highest H index (33), however, the average citations per article is led by Belgium with 95,67, data that is interesting because it only counts with 3 publications; which could reflect the quality of their

studies. The position of the United States may be due to factors such as the investment that the country devotes to research and the better access to scientific journals and databases by its academics compared with theoreticians from other nations. England and Spain occupy the second and third position with 24 and 18 studies respectively. Belgium, Malaysia and Portugal have the same number of publications, however, Belgium has a number of average citations per article and the highest H index.

The number of citations from Malaysia and Portugal could be explained by the recent of their publication, since they are found between 2011 and 2016 or because of the lower academic value of their studies.

Table 6 shows the number of studies published in the ten most productive countries between 200-2016. It is evident that the majority of articles visible in the WOS were published in the United States; however, during 2016 this figure significantly decreased, while in England, China and Australia increased (p.e. Table 6).

4.3. Authors with higher productivity

Table 7 presents the countries where the authors executed their research activity, together with their bibliometric indicators. The first six authors (Bowman Cliff, Hartmann Evi, Kaufmann Lutz, Duysters G, Lengnick-Hall CA and Lengnick-Hall ML) have 3 publications each. Although they are the most productive, it is still a small number compared to studies that analyze the impact of resources and capabilities on competitive advantage (these reach, for example, 3,187 documents in the WOS). On the other hand, the most productive authors do not necessarily have the most citations, the analysis reflects that authors with lower productivity are positioned with a high number of citations as in the case of Duysters, G (408 citations), Kale Prashant (344 citations) and Hartmann Evi (245 citations). It should be noted that for this analysis the number of academics working in the European continent more precisely in Germany is remarkable (p.e. Table 7).

TABLE 5.
Countries with the highest rate of productivity.

Rank	Country	TP	TC	C / P	H-index
1	U.S	100	5,122	51.22	33
2	England	24	596	24.83	11
3	Spain	18	273	15.17	7
4	Australia	15	217	14.47	7
5	China	14	248	17.71	7
6	Taiwan	14	310	22.14	9
7	Germany	13	700	53.85	10
8	South Korea	11	110	10.00	7
9	France	10	514	51.40	9
10	Netherlands	9	693	77.00	9
11	Italy	8	202	25,25	3
12	Sweden	8	305	38.12	6
13	Glen	6	83	13.83	4
14	Denmark	6	304	50.67	3
15	Brazil	5	22	4.40	2
16	Singapore	4	192	48,00	3
17	Turkey	4	2 3	5,75	4
18	Belgium	3	287	95.67	3
19	Malaysia	3	2	.67	1
20	Portugal	3	8	2,67	2

Web of Science.

Table 6 shows the number of studies published in the ten most productive countries between 200-2016. It is evident that the majority of articles visible in the WOS were published in the United States; however, during 2016 this figure significantly decreased, while in England, China and Australia increased (p.e. Table 6).

TABLE 6.
The 10 countries with the highest annual productivity.

Year	U.S	England	Spain	Australia	China	Taiwan	Germany	South Korea	France	Netherlands
2001	3	0	0	2	1	0	0	0	0	0
2002	8	0	0	1	0	0	0	0	0	2
2003	6	0	0	0	0	1	0	0	2	1
2004	5	1	0	0	0	1	0	1	0	0
2005	8	1	0	0	0	1	0	0	0	0
2006	1	1	0	0	0	0	1	0	1	3
2007	2	2	0	0	0	2	0	0	1	0
2008	8	1	2	2	0	1	0	0	1	1
2009	10	1	1	2	1	0	1	1	2	0
2010	8	4	2	0	0	4	5	1	0	1
2011	7	2	3	0	1	0	2	2	1	0
2012	6	2	1	1	3	2	1	1	0	0
2013	8	1	1	1	2	1	0	2	1	1
2014	10	2	5	3	0	1	0	2	1	0
2015	9	1	1	0	2	0	3	0	0	0
2016	1	5	2	3	4	0	0	1	0	0

Vantage Point Software from WOS data.

4.4. Authors with higher productivity

Table 7 presents the countries where the authors executed their research activity, together with their bibliometric indicators. The first six authors (Bowman Cliff, Hartmann Evi, Kaufmann Lutz, Duysters G, Lengnick-Hall CA and Lengnick-Hall ML) have 3 publications each. Although they are the most productive, it is still a small number compared to studies that analyze the impact of resources and capabilities on competitive advantage (these reach, for example, 3,187 documents in the WOS). On the other hand, the most productive authors do not necessarily have the most citations, the analysis reflects that authors with lower productivity are positioned with a high number of citations as in the case of Duysters, G (408 citations), Kale Prashant (344 citations) and Hartmann Evi (245 citations). It should be noted that for this analysis the number of academics working in the European continent more precisely in Germany is remarkable (p.e. Table 7).

TABLE 7.
Influential authors in the literature on relationship between R & C.

Authors	Country	TP	TC	C / P	H
Bowman C	England	3	42	14,00	3
Hartmann E	Germany	3	245	81.67	3
Kaufmann L	Germany	3	75	25,00	3
Duysters G	Netherlands	3	408	136	3
Lengnick-Hall CA	U.S	3	113	37.67	2
Lengnick-Hall ML	U.S	3	122	40.67	3
Ambrosini V	England	2	25	12,50	2
blome C	Germany	2	221	110.50	2
Collier N	England	2	24	12,00	2
Foerstl K	Germany	2	221	110.50	2
Grimpe C	Germany	2	164	82.00	2
Hervas-Oliver JL	Spain-United States	2	53	26,50	2
Hyland P	Australia	2	3. 4	17,00	2
Kale P	U.S	2	344	172.00	2
Lau A	China	2	80	40.00	2
Ruby Lee P	China-US	2	15	7.50	1
Lin BW	Taiwan	2	89	44.50	2
Manning S	U.S	2	21	10,50	2
Reuter C	Germany	2	221	110.50	2
Sofka W	Germany	2	164	82.00	2

Web of Science.

4.5. Most productive magazines

We identified 102 journals that published articles exploring the relationships between resources and capabilities. Table 8 presents the most productive journals in this sense together with its impact factor (used to know the importance of a journal within a research area). The two journals with the highest number of publications are: Strategic Management Journal and Technovation, with 12 documents each. Subsequently, three journals with 7 publications each are placed, among them: Journal of International Business Studies, R & D Management and Technological Forecasting and Social Change. Although most publications focus on certain types of journals, it does not mean that they have the highest impact factor (p.e. Table 8).

TABLE 8.
Magazines with more publications.

Rank	Number of publications	Magazine	2016 impact factor
1	12	Strategic Management Journal	4.461
2	12	Technovation	3.265
3	7	Journal of International Business Studies	5.869
4	7	R& D Management	2.444
5	7	Technological Forecasting and Social Change	2.625
6	6	IEEE Transactions on Engineering Management	1.188
7	6	International Journal of Technology Management.	1.036
8	5	Industrial and Corporate Change	1.777
9	5	Journal of International Marketing	3.725
10	5	Journal of Supply Chain Management	5.789
11	5	Journal of World Business	3.758
12	5	Organization Science	2.691
13	5	Research Policy	4.495
14	4	Asian Journal of Technology Innovation	0.698
15	4	British Journal of Management	2.982
16	4	Industrial Marketing Management	3.166
17	4	Innovation Management Policy &Practice	0.950
18	4	International Journal of Human Resource Management	1.650
19	4	Journal of Management Studies	3.962
20	4	Asian Business& Management	1.133

Web of Science.

4.6. Most cited articles

The most relevant article has received 993 citations, it was published in 2003 by Helfat and Peteraf, and is entitled: The dynamic resource-based view: capability lifecycles. It should be noted that the documents found indicate different internal and external sources that generate capabilities, study the relationship between resources and capabilities, the influence of resources on capabilities and analyze the relationship of some type of resource or capacity with competitive advantage or performance of the company. Complete trends are shown in Table 9.

TABLE 9.
Most cited above relations R & C Studies.

Rank	TC	Authors	Title
1	993	Helfat & Peteraf (2003)	The dynamic resource-based view: Capability lifecycles.
2	380	Vorhies & Morgan (2005)	Benchmarking marketing capabilities for sustainable competitive advantage.
3	332	Habbershon, Williams, & MacMillan (2003)	A unified systems perspective of family firm performance.
4	320	Ethiraj, Kale, Krishnan, & Singh (2005)	Where do capabilities come from and how do they matter? A study in the software services industry.
5	247	Zahra & Nielsen (2002)	Sources of capabilities, integration and technology commercialization.
6	239	Hagedoorn & Duysters (2002)	External sources of innovative capabilities: The preference for strategic alliances or mergers and acquisitions.
7	223	Florin, Lubatkin, & Schulze (2003)	A social capital model of high-growth ventures.
8	178	Hoffmann (2007)	Strategies for managing a portfolio of alliances.
9	167	Verona & Ravasi (2003)	Unbundling dynamic capabilities: an exploratory study of continuous product innovation
10	163	Gold, Seuring, & Beske (2010)	Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review

TABLE 9.
Most cited above relations R & C Studies. (continuación)

11	159	Vanhaverbeke, Duysters, & Noorderhaven (2002)	External technology sourcing through alliances or acquisitions: An analysis of the application-specific integrated circuits industry.
12	157	Anand & Delios (2002)	Absolute and relative resources as determinants of international acquisitions.
13	156	Levina & Vaast (2008)	Innovating or doing as told? Status differences and overlapping boundaries in offshore collaboration.
14	140	Mezias (2002)	Identifying liabilities of foreignness and strategies to minimize their effects: The case of labor lawsuit judgments in the United States.
15	137	Fey & Birkinshaw (2005)	External sources of knowledge, governance mode, and R&D performance.
16	134	Kor & Mahoney (2005)	How dynamics, management, and governance of resource deployments influence firm-level performance.
17	122	Reuter, Foerstl, Hartmann, & Blome (2010)	Sustainable global supplier management: the role of dynamic capabilities in achieving competitive advantage.
18	122	Sole & Edmondson (2002)	Situated knowledge and learning in dispersed teams.
19	117	Easterby-Smith & Prieto (2008)	Dynamic capabilities and knowledge management: ¿an integrative role for learning?
20	100	Sheu (2010)	Dynamic relief-demand management for emergency logistics operations under large-scale disasters.
21	99	Foerstl, Reuter, Hartmann, & Blome (2010)	Managing supplier sustainability risks in a dynamically changing environment-Sustainable supplier management in the chemical industry.
22	96	Grimpe & Sofka (2009)	Search patterns and absorptive capacity: Low-and high-Technology sectors in European countries.
23	95	Wang, Hong, Kafouros, & Wright (2012)	Exploring the role of government involvement in outward FDI from emerging economies.
24	82	Jones, Lanctot, & Teegen (2001)	Determinants and performance impacts of external technology acquisition.
25	79	Dehning & Stratopoulos (2003)	Determinants of a sustainable competitive advantage due to an IT-enabled strategy.
26	73	Yam, Lo, Tang, & Lau (2011)	Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries.
27	73	Kolk & Pinkse (2008)	A perspective on multinational enterprises and climate change: Learning from an inconvenient truth?
28	69	Chadwick & Dabu (2009)	Human Resources, Human Resource Management, and the Competitive Advantage of Firms: Toward a More Comprehensive Model of Causal Linkages.
29	69	Lengnick-Hall, Lengnick-Hall, & Abdinnour-Helm (2004)	The role of social and intellectual capital in achieving competitive advantage through enterprise resource planning (ERP) systems.
30	68	Sofka & Grimpe (2010)	Specialized search and innovation performance - evidence across Europe.
31	66	West & Noel (2009)	The Impact of Knowledge Resources on New Venture Performance.
32	63	Matear, Gray, & Garrett (2004)	Market orientation, brand investment, new service development, market position and performance for service organizations.
33	60	Simsek, Veiga, & Lubatkin (2007)	The impact of managerial environmental perceptions on corporate entrepreneurship: Towards understanding discretionary slack's pivotal role.
34	60	Wynstra, Axelsson, & Van Der Valk (2006)	An application-based classification to understand buyer-supplier interaction in business services.

TABLE 9.
Most cited above relations R & C Studies. (continuación)

35	56	Di Gregorio, Musteen, & Thomas (2009)	Offshore outsourcing as a source of international competitiveness for SMEs.
36	55	Lin (2003)	Technology transfer as technological learning: a source of competitive advantage for firms with limited R&D resources.
37	54	Huggins & Johnston (2010)	Knowledge flow and inter-firm networks: The influence of network resources, spatial proximity and firm size.
38	53	Ehrgott, Reimann, Kaufmann, & Carter (2011)	Social Sustainability in Selecting Emerging Economy Suppliers.
39	52	Walsh, Boylan, McDermott, & Paulson (2005)	The semiconductor silicon industry roadmap: Epochs driven by the dynamics between disruptive technologies and core competencies.
40	50	Luo, Sivakumar, & Liu (2005)	Globalization, marketing resources, and performance: Evidence from China.
41	49	Mikkola (2007)	Management of product architecture modularity for mass customization: Modeling and theoretical considerations.
42	48	Petit (2012)	Project portfolios in dynamic environments: Organizing for uncertainty.
43	48	McKelvie & Davidsson (2009)	From Resource Base to Dynamic Capabilities: an Investigation of New Firms.
44	44	Wu, Melnyk, & Flynn (2010)	Operational Capabilities: The Secret Ingredient.
45	44	Lengnick-Hall & Lengnick-Hall (2003)	HR's role in building relationship networks.
46	43	Saxton & Dollinger (2004)	Target reputation and approvability: Picking and deploying resources in acquisitions.
47	41	Macher & Mowery (2009)	Measuring Dynamic Capabilities: Practices and Performance in Semiconductor Manufacturing.
48	39	Koufteros, Vickery, & Dröge (2012)	The Effects of Strategic Supplier Selection on Buyer Competitive Performance in Matched Domains: Does Supplier Integration Mediate the Relationships.
49	38	DeSarbo, Di Benedetto, Jedidi, & Song (2006)	Identifying sources of heterogeneity for empirically deriving strategic types: A constrained finite-mixture structural-equation methodology.
50	36	Kogut & Zander (2003)	A memoir and reflection: knowledge and an evolutionary theory of the multinational firm 10 years later.

5. Research agenda

This bibliometric analysis concludes that the research on the impact of resources on capabilities is still scarce in the literature. The research is focused on the study of the impact of resources and capabilities on the competitive advantage or performance of companies. 25 articles out of the 50 most cited indeed, address this issue. On the other way, 18 articles studied capabilities as sources of other capabilities.

Although the theoretical literature is clear about the approach that resources are generating capabilities, and these might turn into competitive advantages [18], [23], [27], [28], [67], [68], empirical research on resources as antecedents of capabilities is still scarce. It is considered that the research agenda derived from this paper should focus on the role of resources as an important source in the development of capabilities, given that this issue has not been addressed in depth and is relevant for companies. In a concrete way, it is suggested to approach the empirical study by dividing into the resources and capabilities by their typologies, for example: tangible or intangible resources and organizational or dynamic capabilities, as well as to initiate a study about what type of resources are precursors of what kind of capabilities. It might be considered that, in companies of different sectors, the results might not be the same, therefore, an appropriate strategy would be to aggregate by industrial activity.

6. Conclusions

This research reveals the results of previous works on the relationship between resources and capabilities between 2001 and 2016, available in the Web of Science. The results provide an overview of the evolution of the study of the subject, which serve as a guide for future researchers who wish to delve into the analysis of the relationship between resources and capabilities of companies. The document analyzes in detail the trends in the study period. It is noted that the predominant documents types in the WOS are articles (237). The findings reveal that for the year 2010 productivity in this particular area of knowledge experienced an increase (27 published documents), a figure that decreased in the following six years. It is also evident that 100 articles were published in the United States during the study period, ranking as the most productive country with the highest number of citations (5,122). The authors maintain a homogeneous productivity level (2 to 3 publications) and a fairly similar H-index (2 to 3). The journals with the highest number of publications are Strategic Management Journal and Technovation with 12 documents each, however these publications do not have the greatest impact factor. The most cited article was published in 2003 and has 993 citations. Finally, this analysis points out that research on the relationships between resources and capabilities have not been adequately explored, and this subject is indeed, in its initial stages, considering the importance of resources as generators of capabilities and the potential of them as sources of business competitiveness. It is suggested that for future studies impact or causality relationships be explored among different types of resources and capabilities making a sectorial distinction, since it is foreseen that for different sectors, the impact that resources may have on capabilities varies significantly.

7. Limitations

This study presents a series of limitations, on the one hand, a single database was used, excluding other bases with indexed journals, and even, with non-indexed publications that could contain related articles. Future analyzes of this type could take into account additional databases such as Scopus and Google Scholar, since they also have valuable research content. However, when defining the specific areas of the study, other areas that could possibly address the issue were not taken into account. Finally, it should be noted that the high citation figures that an author receives give him certain status so that other scholars may cite his work without prior review of the content. In the same sense, recent publications have little or no citation, giving them less relevance, since they require time to value themselves and become influential in the field.

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