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# Analysis of scientific production on interorganizational networks study field

Analysis of scientific production

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## Abstract

**Purpose** – The present study seeks to answer the following research question: what is the profile of the academic production related to the interorganizational networks in the period between 2006 and 2016? Thus, this study aims to characterize the academic production about the subject interorganizational networks available in national journals with Concept “A” (Qualis Capes), in the period between 2006 and 2016.

**Design/methodology/approach** – This paper uses national journals with Concept “A” of the Qualis classification (2016) for journal selection. In total, 12 “A” concept journals were identified. However, it was decided to analyze ten of them. The procedures suggested by Crossan and Apaydin (2010) for conducting bibliometric studies were adopted. It has been identified that 77 articles were published in eight journals. The R 3.3.2 and R Studio 1.0.136 software were used. The IGRAPH 0.5.5-2 extension (package) was used to analyze graphs and co-authorship networks (Csárdi and Nepusz, 2006). This extension is able to manipulate networks with millions of vertices and edges and provides a series of functions to analyze the properties of social networks, such as subnetworks, intermediation, centrality, among other characteristics (Csárdi and Nepusz, 2006). Correspondence analysis (CA) was also performed. CA is a multivariate exploratory technique that converts a data matrix into a graphical representation, so that rows and columns are represented by points in a graph (Greenacre and Hastie, 1987). This extension is dedicated to the multivariate analysis of data and allows the manipulation of different types of variables (quantitative or categorical). In the present research, multiple CA (MCA) was applied – indicated when the elements are described as categorical variables (Lê et al., 2008). The characteristics considered for carrying out MCA were the “main term”, “research approach”, “type of research”, “constructs” and “research strategies”. By using the FactoMineR 1.34 extension, the hierarchical clustering on principal components (HCPC) function was used (Husson et al., 2007; Lê et al., 2008). This function allows creating clusters from the characteristics of the articles analyzed and highlights the justifications for the groupings created. The function allows forming as many clusters the researcher wishes, being of its attribution to analyze a division that best represents the characteristics of the data (Husson, Josse, and Pagès, 2010). Husson et al. (2010) suggest that an analysis should be performed from the hierarchical tree, thus the number of clusters can be defined considering the overall appearance (or shape) of the tree formed. At last, a word cloud was created using the Wordcloud 2.5 extension (Fellows, 2013). The noticed advantage of using this extension is that it does not separate the terms that form a keyword when generating the cloud. It has been used for the keywords of the 77 articles analyzed; however, it has been decided to keep those that presented frequency greater than or equal to two. By avoiding occasional terms, a more intelligible cloud was obtained.

**Findings** – The present study was not able to verify if the journals analyzed by Andrighi et al. (2011) have influenced others to publish on the subject, as suggested by the Bradford’s Law. The standard “success breeds success”, suggested by the Bradford’s Law, was not confirmed. The so-called nuclear zone (Brookes, 1969; Novaretti et al., 2015) is composed of the journals *Brazilian Administration Review (BAR)*, *Revista de Administração Contemporânea (RAC)*, *Revista de Administração Pública (RAP)* and *Revista Brasileira de*



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*Gestão de Negócios* (RBGN). The journal *RAC* stands out for having been the one that has increased its annual average of publication in relation to the theme, when compared with the findings of [Andrighi et al. \(2011\)](#). The journals *BAR* and *RBGN* stand out because they are in the nuclear zone, even though they were not considered in the work of [Andrighi et al. \(2011\)](#). It should be noted that all the analyzed journals have in common the fact of addressing the themes of management and administration and, more specifically, making room for the “competitiveness” and “cooperation” constructs. These constructs are related to the theme of networks and were the most recurrent in the articles analyzed. “Cooperation” (29), “competitiveness” (27), “knowledge” (12), “learning” (6) and “trust” (3) were the “constructs” used to compose the 77 articles analyzed. In turn, “network” (49), “alliance” (18) and “cluster” (9) were the “main term” most used in the articles. This implies that the topic of cooperation is more linked to a vision of strategy. As occurred in the research of [Andrighi et al. \(2011\)](#), the term “network” is the most recurrent; in addition, the growth of space obtained by the term “alliance” stands out. The terms “network” and “alliance” were the most used by the articles, being predominant in 87 per cent of the research. In the present research, the predominance of the term “network” may have occurred because its concept is broader and it is used in the literature in different ways, even in contradictory ways ([Andrighi et al., 2011](#); [Schommer, 2001](#)). In turn, the term “alliance” may have been recurrent because it has a wide dispersion of published issues, such as governance structure, cooperation, knowledge transfer and trust ([Lima and Campos Filho, 2009](#)). By using the HCPC function of the FactoMineR extension, the articles were grouped according to their characteristics, and then three clusters were formed. By analyzing the generated results, it is assumed that the division into three clusters was the one that best represented the data. Cluster 1 is characterized by descriptive, quantitative, half documentary and half survey research studies, being “cluster” the main term. Cluster 2 is characterized by exploratory case studies with qualitative–quantitative analyzes. Cluster 3 is characterized by theoretical tests. The Zipf’s law points out that a small group of words occurs many times; however, when considering the most recurrent words Networks (9), Strategic Alliances (8), Cooperation (8), Interorganizational Networks (8) and Alliances (6) show that they were present in only about 10 per cent of the works. Lotka’s Law, which states that few authors publish much and many authors publish little, was not confirmed. The authors who presented the highest number of publications, T. Diana L. v. A. de Macedo-Soares (6); Jorge Renato Verschoore (6); Alsones Balestrin (5); Douglas Wegner (4); Humberto Elias Garcia Lopes (4), participated in less than 10 per cent of the works. Thus, the authorship was characterized by many researchers publishing few works, what can be an effect of the behavior of these authors, who prefer to publish in network. The centrality of the relations between the authors was analyzed and, in addition, the intermediation points of the network were identified. The present study also analyzed all the references used by the 77 articles that compose the study. The main author of each of the references used was identified. Among the 30 identified authors, Yin and Hair Jr. stand out for books related to fundamentals and research methodologies. Borgatti and Eisenhardt developed research on the topic of interorganizational networks and also created works for methodological foundations. Powell was the most frequently mentioned author (28) and had more different works referenced (9). Powell stands out for the production of articles published in periodicals, not books. Porter’s situation is the opposite. Most of the quotations made to the author come from his books, especially the work “Competitive strategy” ([Porter, 1980](#)). All authors identified are foreigners, with the exception of Balestrin. Marshall, Polanyi, Granovetter and Williamson are authors of works considered seminal, being them, respectively, “Principles of economics” ([Marshall, 1890](#)), “Personal knowledge: towards a post critical philosophy” ([Polanyi, 1958](#)) and “The strength of weak ties” ([Granovetter, 1973](#)) and “Markets and hierarchies, analysis and antitrust implications” ([Williamson, 1975](#)).

**Research limitations/implications** – Like all research, it has limitations. The first one derives from the selection criteria of the periodicals to be analyzed. The cut referring to the journals of greater impact excludes most of the national articles. These studies may contain important contributions to the knowledge of the national publication profile. In addition, the choice to analyze the journals disregards other types of work, such as books, scientific events, dissertations and thesis and reports. The choice of articles published in journals is based on the fact that these are a “certified knowledge”, as the studies are peer-reviewed, and in the case of the Qualis “A” stratum, a review of exogenous quality is supposed on this production. Despite its flaws, this system can be considered reliable to evaluate scientific knowledge ([Bedeian, 2004](#); [Shugan, 2007](#)). The analysis of the most recent articles may have been hampered by a temporal issue. In addition, the choice of keywords, a necessary step, leaves out other studies. Another limitation refers to the fact that the articles have been analyzed and classified by the authors, which presupposes the use of their value judgments, at least to some extent. Other limitations refer to the bibliometric techniques employed. The main authors referenced in the studies were demonstrated, that is, those authors who have been used as a theoretical reference for studies of interorganizational networks. However, the circumstances under which these citations occurred

were not analyzed. For example, an author may be quoted to use the contribution of his/her study, to be criticized or just to be another reference in the text. The lack of this analysis can be considered a fragility of the study.

**Practical implications** – This text was started talking about the dispersion of the studies on networks in the country. Previous work has been used, theoretically and empirically demonstrating this fact. Zipf's Law applied to bibliometrics, as described by [Guedes and Borschiver \(2005\)](#), [Novaretti et al. \(2015\)](#) and [Pao \(1978\)](#), was not confirmed in this study, which seems to be an indicative fact that the research on this theme in Brazil presents fragmentation as an intrinsic characteristic. That is, it must remain fragmented, as this would be its own way to evolve. This is evident especially when comparing the study of [Andrighi et al. \(2011\)](#) and its results. With several but continuous temporal cut-outs, and the same keywords, the maintenance of this dispersion is evident. This is also a contribution of this study.

**Social implications** – The study contributed to updating the research profile, mainly after the triennium 2013-2015 of Qualis Capes' evaluations. It also added to the mapping of recent Brazilian academic production related to interorganizational networks, completing studies by [Alves et al. \(2013\)](#), [Andrighi et al. \(2011\)](#), [Balestrin et al. \(2010\)](#), [Cunha and Carrieri \(2003\)](#) and [Mascena et al. \(2013\)](#). Thus, it is believed that the research reached the proposed objectives, despite its limitations.

**Originality/value** – The present research is also justified by helping to understand the subject being useful for researchers, educators and students, in general, in the task of demonstrating gaps and opportunities of future researches and collaborating with the elaboration of a research agenda ([Baumgartner and Pieters, 2003](#)). The work has updated bibliometrics on the subject and allows comparisons with previous bibliometric studies ([Alves et al., 2013](#); [Andrighi et al., 2011](#); [Balestrin et al., 2010](#); [Cunha and Carrieri, 2003](#); [Ferreira et al., 2014](#); [Lima and Campos Filho, 2009](#); [Mascena et al., 2013](#)). It is believed that the present study differs from the others because of the analysis performed, the way the data were treated, with techniques that are rarely used simultaneously, going beyond the descriptive statistics.

**Keywords** Network, Bibliometrics, Cluster, Alliance, Interorganizational relationship

**Paper type** Research paper

## 1. Introduction

The theme of interorganizational networks gained prominence in the 1970s, with studies by economists and sociologists based on the analysis of the relationship between companies and the formation of strategic business networks ([Powell and Smith-Doerr, 1994](#)). Subsequently, the need to develop studies in the business area was noticed, as there was dissonance between the terms adopted by sociologists and economists and those businesses ([Halinen and Törnroos, 1998](#)). Many studies demonstrate the importance of companies seeking interorganizational networks as a way to gain competitive advantage in the market ([Atouba and Shumate, 2010](#); [Balestrin et al., 2010](#); [Carter et al., 2015](#); [Kunzler and Bulgacov, 2011](#); [Lai et al., 2012](#); [Müller-Seitz, 2011](#); [Turrini et al., 2010](#)).

Although the number of research studies has increased, especially in the past two decades, academic production has been dispersed and fragmented ([Borgatti and Foster, 2003](#); [Ferreira et al., 2014](#); [Möller and Rajala, 2007](#); [Moran et al., 2010](#)). On this issue, [Ferreira et al. \(2014\)](#) affirm that the theme has been analyzed from different lenses and contexts, to mention its formation process, transaction and management costs, the general characteristics, complexity, selection of partners, performance, the creation of value and longevity. The same fragmentation and dispersion of academic production can be observed in the Brazilian scenario ([Balestrin et al., 2010](#), [Cunha and Carrieri, 2003](#), [Mascena et al., 2013](#)), in which the subject can be considered current and, despite increasing interest, with theoretical development still not significant ([Balestrin et al., 2010](#)).

Even with the advances promoted by the literature, it can still be affirmed that there is a lack of knowledge about the way in which the field has been developed ([Vale and Lopes, 2010](#)) and, moreover, this gap is most evident when the research carried out in Africa and South America ([Alves et al., 2013](#)). Polysemy, a feature of the theme ([Jarillo, 1988](#); [Powell,](#)

1990; Ring and Van De Ven, 1992), is another factor that emphasizes the importance of analyzing how the subject is being studied. Although previous bibliometric works (Alves *et al.*, 2013; Balestrin *et al.*, 2010; Cunha and Carrieri, 2003; Ferreira *et al.*, 2014; Lima and Campos Filho, 2009; Mascena *et al.*, 2013) have demonstrated the attributes of the analyzed productions, they did not point out how their epistemological characteristics were related, what can be seen as a research opportunity. In addition, considering that the theme in the national scenario is recent, it can be affirmed that there is a structured field of studies in Brazil that needs to be studied, so that even new research problems may arise (Balestrin *et al.*, 2010; Ferreira *et al.*, 2014). In this context, the present study seeks to answer the following research question:

*RQ:* What is the profile of the academic production related to the interorganizational networks in the period between 2006 and 2016?

Thus, this study aims to characterize the academic production about the subject interorganizational networks available in national journals with Concept "A" (Qualis Capes), in the period between 2006 and 2016.

The study will be conducted through the application of bibliometrics. The use of this technique is justified by collaborating with the appreciation of the profile and the pattern of growth of research on the subject, besides demonstrating methodological and conceptual aspects used to discuss the subject in Brazil. Studies that analyze the profile of academic production and the epistemological foundations of a certain area of knowledge help in the development of scientific production, even if the subject already has legitimacy and maturity (Coelho *et al.*, 2009; Meirelles and Gonçalves, 2005). In addition, bibliometrics allow the comparison between the production of different social sciences (Dias *et al.*, 2013).

The present research is also justified by helping to understand the subject being useful for researchers, educators and students, in general, in the task of demonstrating gaps and opportunities of future researches and collaborating with the elaboration of a research agenda (Baumgartner and Pieters, 2003). The work has updated bibliometrics on the subject and allows comparisons with previous bibliometric studies (Alves *et al.*, 2013; Andriighi *et al.*, 2011; Balestrin *et al.*, 2010; Cunha and Carrieri, 2003; Ferreira *et al.*, 2014; Lima and Campos Filho, 2009; Mascena *et al.*, 2013). It is believed that the present study differs from the others because of the analysis performed, the way the data were treated, with techniques that are rarely used simultaneously, going beyond the descriptive statistics.

Referring to the delimitation, it is important to highlight the conceptual, temporal and spatial aspects of the research (Marconi and Lakatos, 2010). The study will address 77 scientific articles, published in eight journals in the area of administration, accounting and tourism classified with the Concept "A" (Qualis Capes). The years from 2006 to 2016 will be analyzed, and the central theme of the research is interorganizational networks.

## 2. Theoretical reference

This chapter presents the theoretical basis of the main concepts addressed in the study. The chapter deals with the issues of interorganizational networks and bibliometrics, which together form the heart of the study.

### 2.1 Interorganizational networks

The search for efficiency and the globalization of markets interfere in the competitiveness of companies, causing them to look for new ways of organizing themselves (Casarotto and Pires, 1998; Puffal and Puffal, 2014; Sacomano Neto and Truzzi, 2004). Current competitive circumstances require companies to often operate at low cost, being able to innovate and

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meeting market needs, delivering quality products and adapting quickly to changes in their environment (Mitrega and Pfajfar, 2015). Often, traditional companies are too rigid and fail to adapt to changes in time (Jarillo, 1993; Raposo *et al.*, 2014).

Faced with this rapidly changing scenario, companies can work together – networking – to improve the performance of all those involved in relationships (Gnyawali and Madhavan, 2001; Gulati, 2007; Mitrega and Pfajfar, 2015). The development of the concept of interorganizational networks was highlighted when authors like Aldrich and Williamson began to develop studies focused on the analysis of interorganizational relationships (Martes *et al.*, 2006). Since then, once the changes in the market and the new forms of relationships between companies had already been perceived, networks became a strategic option to compete and a possible source of competitive advantage for its members (Dyer and Singh, 1998; Prim *et al.*, 2016; Verschoore *et al.*, 2016).

There are many types of interorganizational networks, such as joint ventures, strategic alliances, industrial districts and local productive arrangements (Magalhães *et al.*, 2009; Powell, 1990). These types have different concepts, but similar characteristics, as they are arrangements formed voluntarily by several agents (Gulati, 1998; Lastres and Cassiolato, 2003), which have strategic relevance for those involved (Gulati *et al.*, 2000), aiming at obtaining or maintaining long-term competitive advantages (Gulati *et al.*, 2000; Jarillo, 1988); there is consistency between business goals (Jarillo, 1988). It is also emphasized that the established relationships are, at the same time, dynamic and complex (Ring and Andrew, 1994).

There are many advantages that can be gained by companies that participate in networks, such as a combination of information and skills (Amato Neto, 2000; Casarotto and Pires, 1998; Kraatz, 1998; Powell, 1987); use of know-how of other companies (Amato Neto, 2000; Gulati *et al.*, 2000; Kraatz, 1998); division of the burden when carrying out technological research (Amato Neto, 2000); sharing of the risks and costs of exploring new or complex opportunities (Amato Neto, 2000; Prahalad and Ramaswamy, 2004); reduction of costs of production, transaction, information and conflict resolution (Casarotto and Pires, 1998; Ebers and Grandori, 1997; Jarillo, 1988); resource sharing, improved procurement and resource generation (Amato Neto, 2000; Balestrin and Vargas, 2004; Barkema and Vermeulen, 1998; Barney, 1999; Casarotto and Pires, 1998; Human and Provan, 1997; Vermeulen and Barkema, 2001); strengthening of purchasing power by scale gain (Amato Neto, 2000; Koza and Lewin, 1998; Waarden, 1992); closer relationship with universities and state agencies (Human and Provan, 1997); adaptation to new scenarios (Casarotto and Pires, 1998); the achievement of objectives that could not be achieved in isolation (Dyer and Singh, 1998); and, finally, increased organizational learning and innovation, because of the dissemination of information and knowledge (Balestrin and Vargas, 2004; Barkema and Vermeulen, 1998; Dyer and Singh, 1998; Human and Provan, 1997; Powell, 1990; Vermeulen and Barkema, 2001).

Despite their benefits, interorganizational networks present risks, difficulties and disadvantages. From the empirical point of view, there is evidence of a significant number of companies that fail to participate in this type of organization (Pereira *et al.*, 2010; Sadowski and Duysters, 2008; Varadarajan and Cunningham, 1995). The strategic idiosyncrasies of each company can cause incompatibility between their actions, so there is the challenge of bringing together the interests of different entrepreneurs, so that the network helps each company to achieve its specific objectives, in addition to allowing everyone to participate in decision-making processes (Bóhe and Silva, 2004). Although there are authors who point out that being involved in a network does not necessarily mean that companies lose their managerial and financial autonomy Ribault *et al.* (1995), for Burt (2004) there is an ideal



position in the network in which an actor obtains structural autonomy, which suggests that if this position is not achieved, this autonomy is at least partly lower. In addition, there are difficulties in assessing value creation arising from relationships, mainly because of the complexity of its structure and the different interests of managers (Das and Teng, 2003; Sherer, 2003).

Moreover, opportunistic behavior is a concern of companies that participate in networks, which can generate costs to create a structure of governance and supervision (Gulati *et al.*, 2000). The fear of opportunistic attitudes increases the need for bureaucratic contracts and control by the organization's governance (Williamson, 1985). Another obstacle identified is that managers have encountered difficulties in dealing with the complexity of these environments (Bastl *et al.*, 2010; Subramanian and Ishak, 1998).

As presented, networks can bring advantages and disadvantages to companies. This model of organization generates a space for the social approximation between the managers and enables open discussions among the difficulties and opportunities faced by companies (Perrow, 1992). This view of analyzing interorganizational networks as a social network is gaining ground in scientific research in administration (Machado-da-Silva and Coser, 2006; Marteleto and Silva, 2004; Molina-Morales *et al.*, 2015; Molina-Morales *et al.*, 2013; Sforzi, 2015). Thus, issues such as honesty, commitment, cooperation and trust are fundamental to the sustainability of relationships between companies (Padula and Dagnino, 2007), and the greatest barrier to the formation and growth of networks is the lack of trust between the parties and the fear of opportunistic behavior on the part of the partners (Böhe and Silva, 2004).

## 2.2 Bibliometrics

Bibliometrics is a technique used in studies on the scientific production of a certain area of knowledge. It aims to raise, analyze, monitor, map and evaluate scientific publications, using qualitative and statistical techniques (Negra and Silva, 2013). Among others, it aims to identify trends, technical aspects and methodological procedures used by researchers in a given area (Negra and Silva, 2013). Bibliometrics comes from library science and information science, being characterized as an instrument of evaluation and analysis of scientific production (Glänzel, 2014; Glänzel *et al.*, 2006).

Bibliometrics was originally named as a statistical bibliography (Hulme, 1922), and the expression "bibliometrics" was created by Otlet (1934) (Araújo, 2006; Negra and Silva, 2013). However, the term became popular from Pritchard's article (Pritchard, 1969) entitled "Statistical bibliography or bibliometrics?" (Araújo, 2006; Negra and Silva, 2013). Depending on the area of knowledge, researchers may come across a vast amount of scientific research, which may hinder the process of identifying relevant information, works and researchers (Tejeda-Lorente *et al.*, 2014). This situation may lead researchers, especially the less experienced, to disregard information that could be significant (Pereira *et al.*, 2016).

The relevance of bibliometric research explains the large number of studies of this type in Brazil, distributed by a wide variety of areas of knowledge (Araújo and Alvarenga, 2011). Some studies have analyzed, through bibliometrics, national studies on the subject of interorganizational networks (Alves *et al.*, 2013; Andrighi *et al.*, 2011; Balestrin *et al.*, 2010; Cunha and Carrieri, 2003; Mascena *et al.*, 2013).

Bibliometric studies, in general, are based on three main laws: Lotka's Law (scientific productivity), Bradford's Law (periodic dispersion) and Zipf's Law (word frequency) (Araújo, 2006).

Lotka's Law considers that few researchers, who are considered to be more prestigious in a certain area of knowledge, produce many works and, on the other hand, many researchers,

considered of lesser prestige, produce few works (Guedes and Borschiver, 2005; Voos, 1974). Lotka's Law was developed from the discovery of Voos (1974): most of the scientific literature in a given area of knowledge is produced by a small number of authors (Araújo, 2006).

Bradford's Law states that publications in scientific journals follow a pattern in which the "mechanism of success generates success" (Brookes, 1969). The first articles produced on a particular subject tend to be submitted to a small group of journals and, if accepted and published, these journals attract further studies on the subject. Consequently, other scientific journals are accepting articles on the subject (Guedes and Borschiver, 2005). This law is related to the dispersion of scientific research published in periodicals, which may be divided in descending order of publications and classified into zones. The area made up of journals with more publications on a topic is called the nuclear zone (Brookes, 1969; Novaretti *et al.*, 2015). The Bradford Law is useful, as it allows researchers to estimate the degree of relevance of scientific journals in a given area of knowledge (Guedes and Borschiver, 2005).

Finally, the Zipf's Law is based on the words occurrence frequency of a scientific text and the concentration of terms and keywords for a certain area of knowledge (Pao, 1978). The law states that a small group of words occurs many times throughout the text and many words are rarely used, and it is possible to list them in a ranking system (Guedes and Borschiver, 2005; Novaretti *et al.*, 2015; Pao, 1978). There is a tendency for authors to practice the principle of least effort and to economize on the use of words, thus tending to use the same word several times (Araújo, 2006). Therefore, if the words used in a text are listed in decreasing order, the first ones in the list will be indicative of the subject of the document (Araújo, 2006).

### 3. Methodological aspects

This paper uses national journals with Concept "A" of the Qualis classification (2016) for journal selection. In its assessment, the Qualis Capes classification considers the indexing parameters of journals and their impact factor (using the JCR of ISI) (Andrighi *et al.*, 2011; Ribeiro and Santos, 2015), which raises the quality of the evaluation (Beuren and de Souza, 2008). The Concept "A" represents the highest quality stage of national scientific production (Nascimento and Beuren, 2011).

In total, 12 "A" concept journals were identified. However, it was decided to analyze ten of them. The two unanalyzed journals – *Cadernos de Saúde Pública* and the *Journal of the Brazilian Chemical Society* – do not follow the scope of the research. In this way, the following journals participated in the research: *Brazilian Administration Review (BAR)*, *Cadernos (EBAPE)*, *Dados, Organizações & Sociedade (O&S)*, *Revista Brasileira de Gestão de Negócios (RBGN)*, *Revista Contabilidade & Finanças (RC&F)*, *Revista de Administração da USP (RAUSP)*, *Revista de Administração Contemporânea (RAC)*, *Revista de Administração de Empresas (RAE)* and *Revista de Administração Pública (RAP)*.

The procedures suggested by Crossan and Apaydin (2010) for conducting bibliometric studies were adopted:

- determination of selection criteria for scientific articles and the use of search terms;
- obtaining and grouping of articles;
- tabulation and classification of findings; and
- presentation and analysis of results.



## INMR

To select the articles, the following criteria were determined:

- search of the works directly on the periodicals website and, when not possible, using the Scielo electronic repository;
- searches occurred in October 2016;
- in the searches, the “all text fields” option was used;
- temporary cut from 2006 to 2016; and
- the following terms were used to search for articles: alliance, cluster, network and partnership. The same terms were used by [Andrighi et al. \(2011\)](#).

A total of 565 articles were identified, all available in a comprehensive manner and free of charge. The articles were downloaded and saved and then transported to a bibliographic management software (Mendeley®), in which the following filters were applied:

- At least one of the search terms should be present in the title, abstract or keywords of the article.
- After the titles and abstracts were read, the papers that were unaligned to the research theme were excluded – it was considered to be misaligned to the research theme a study that, although using the term “alliance”, “cluster”, “network” or “partnership”, did not do so in the sense of arrangements formed voluntarily by several agents, with strategic relevance for those involved, aiming at obtaining or maintaining competitive advantages in the long term with consistency between objectives and business purposes.

After performing these procedures, 77 articles were selected to participate in the study, coming from eight different journals. These articles were read in full and their information was tabulated, according to [Table I](#), with the help of Microsoft Excel 2007® software.

The same criteria were used by [Andrighi et al. \(2011\)](#). These authors justify the choice of these categories: the “main term” category used by the articles is similar to that carried out by [Carter et al. \(2007\)](#) and has the objective similar to the work done by [Gallon et al. \(2007\)](#); the “constructs” analyzed are distinct but related to each other – their analysis can trace a parameter of hegemony of terms used; and the “research approach” and the “type of research” allow to analyze the methodology applied by the studies – the option to study the research methodologies was also carried out by [Gallon and Cunha \(2007\)](#) and [Gallon et al. \(2007\)](#).

In the last part suggested by [Crossan and Apaydin \(2010\)](#), the articles should be analyzed. The R 3.3.2 and R Studio 1.0.136 software were used. The IGRAPH 0.5.5-2 extension (package) was used to analyze graphs and co-authorship networks ([Csárdi and](#)

Article title	Journal	Year of publication	Research Main term	Research approach	Type of research	Constructs	Research strategies
–	–	2006	Alliance	Qualitative–	Descriptive	Competitiveness	Case
		–	Cluster	Quantitative	Explanatory	Cooperation	Documentary
		2016	Network	Qualitative	Exploratory	Knowledge	Essay
			partnership	Quantitative	Theoretical essay	Learning Trust	Survey

**Table I.**  
Criteria used to tabulate the characteristics of articles

**Source:** Elaborated by the authors (2016), from [Andrighi et al. \(2011\)](#), p. 38)

Nepusz, 2006). This extension is able to manipulate networks with millions of vertices and edges and provides a series of functions to analyze the properties of social networks, such as: subnetworks, intermediation, centrality, among other characteristics (Csárdi and Nepusz, 2006).

Correspondence analysis (CA) was also performed. CA is a multivariate exploratory technique that converts a data matrix into a graphical representation, so that rows and columns are represented by points in a graph (Greenacre and Hastie, 1987). Thus, it summarizes and simplifies a set of data and represents them in a two-dimensional graph (Lê *et al.*, 2008). For this, the FactoMineR 1.34 extension was used (Lê *et al.*, 2008). This extension is dedicated to the multivariate analysis of data and allows the manipulation of different types of variables (quantitative or categorical). In the present research, multiple CA (MCA) was applied – indicated when the elements are described as categorical variables (Lê *et al.*, 2008). The characteristics considered for carrying out the MCA were the “main term”, “research approach”, “type of research”, “constructs” and “research strategies” (Table I).

By using the FactoMineR 1.34 extension, the hierarchical clustering on principal components (HCPC) function was used (Husson *et al.*, 2007; Lê *et al.*, 2008). This function allows creating clusters from the characteristics of the articles analyzed and highlights the justifications for the groupings created. Thus, searches with more features in common will belong to the same cluster. The function allows forming as many clusters the researcher wishes, being of its attribution to analyze a division that best represents the characteristics of the data (Husson *et al.*, 2010). Husson *et al.* (2010) suggest that an analysis should be performed from the hierarchical tree, thus the number of clusters can be defined considering the overall appearance (or shape) of the tree formed. It should be noted that the greater the number of clusters formed, the greater the heterogeneity of its elements.

At last, a word cloud was created using the Wordcloud 2.5 extension (Fellows, 2013). The noticed advantage of using this extension is that it does not separate the terms that form a keyword when generating the cloud. It has been used for the keywords of the 77 articles analyzed, however, it has been decided to keep those that presented frequency greater than or equal to two. By avoiding occasional terms, a more intelligible cloud was obtained.

#### 4. Data presentation and analysis

From the year 2002, according to Andrichi *et al.* (2011), there has been an expansion of publications on the subject. The authors highlighted the fact that the *RAE* journal published a special call (v. 46, n. 3, 2006) on the subject, as an indication that the subject was on the rise. However, only one article published in this issue focused on the topic of interorganizational networks. Moreover, this trend of growth was not confirmed in subsequent years. The publications on the subject are characterized by stability, not growth. Table II shows the distribution of articles by journals and years.

The work of Andrichi *et al.* (2011) identified articles in seven journals, while the present research detected articles in eight journals. The present study was not able to verify if the journals analyzed by Andrichi *et al.* (2011) have influenced others to publish on the subject, as suggested by the Bradford's Law. The standard “success breeds success”, suggested by the Bradford's Law, was not confirmed. The journals that had published the most on the subject (*RAE* and *RAP*) between 2000 and 2005 (Andrichi *et al.*, 2011) had their annual average of publication reduced. The *RAP* was identified by that study as the main journal – ten publications, which represented 25 per cent of the total articles found. However, half of these ten publications were identified in the year 2000. After that, *RAP* started publishing one or two articles per year. This tendency of few publications remained in the analysis identified by the present research.

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Year	<i>RAE</i>	<i>RAUSP</i>	<i>EBAPE</i>	<i>O&amp;S</i>	<i>BAR</i>	<i>RAP</i>	<i>RBGN</i>	<i>RAC</i>	Total (U)	Total (%)
2006	1		1					1	3	4
2007			2			1		4	7	9
2008			1	3	2	1	1	1	9	12
2009			1			3	2	2	8	10
2010			1	2	2			4	9	12
2011			1			2	1	2	6	8
2012	1	2	1			1	1		6	8
2013	2	2		2	1	1	2	1	11	14
2014		1		1	3	1	2	4	12	16
2015				1	1		1		3	4
2016					1		2		3	4
Total (U)	4	5	8	9	10	10	12	19	77	
Total (%)	5	6	10	12	13	13	16	25		100

**Table II.**  
Distribution of  
articles by journals  
and years

**Source:** Elaborated by the authors (2016)

It should be noted that the journals *BAR* and *RAC* are edited by the National Association of Graduate Studies and Research in Administration (ANPAD). As pointed out by [Balestrin et al. \(2010\)](#), ANPAD promoted two events, one in 2006 and another in 2008, which had in their central axis the theme of interorganizational networks, being: the XXIV Symposium on Management of Technological Innovation (2006), whose theme was “Innovation in networks and networks of innovation”, and the Organizational Studies Meeting (2008), which defined “Intra and interorganizational networks and relationships” as one of its topics of interest. In addition to these events, ANPAD promotes others, such as EnANPAD and 3Es. The present study analyzed whether the articles published in the *BAR* and *RAC* had been first published in the ANPAD events, to identify if there is a tendency for the articles to be published in ANPAD events and later to be published in articles also published by the association. Of the ten articles identified in the *BAR*, three had been published in ANPAD events; and, of the 19 articles published in the *RAC*, five had been published in ANPAD events.

The so-called nuclear zone ([Brookes, 1969](#); [Novaretti et al., 2015](#)) is composed of the journals *BAR*, *RAC*, *RAP* and *RBGN*. The journal *RAC* stands out for having been the one that has increased its annual average of publication in relation to the theme, when compared with the findings of [Andrighi et al. \(2011\)](#). The journals *BAR* and *RBGN* stand out because they are in the nuclear zone, even though they were not considered in the work of [Andrighi et al. \(2011\)](#). *BAR* and *RBGN* are the ones that have published the most studies on the subject in the past four years. It should be noted that the journals *BAR* and *RBGN* did not carry out special editions on the analyzed subject, thus, the publications identified come from the periodical editions.

Regarding the period from 2013 onwards, to identify if the editors-in-chief of the *BAR* and *RBGN* have a research profile focused on the theme, their Lattes curricula were analyzed. The *BAR* editors-in-chief of the period (Dr Jorge Manoel Teixeira Carneiro and Dr Salomão Alencar de Farias) do not have the interorganizational networks theme in their areas of interest. In turn, the *RBGN* editor-in-chief of the period (Dr João Mauricio Gama Boaventura) has the interorganizational networks theme in his area of interest. However, it cannot be said that there is a relation between the areas of interest of the editors and the themes published in the journals edited by them. It is difficult to identify which are the variables that most influence a topic to be published in periodical data. For example, when analyzing the information contained in the *BAR*, *EBAPE*, *O&S*, *RAC*, *RAE*, *RAP*, *RAUSP*

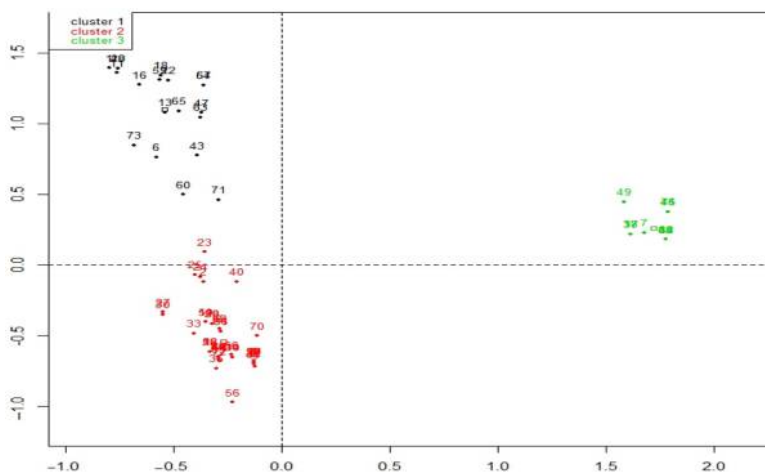
and *RBGN* journals' electronic pages, it is possible to note that they do not use the word "network" to describe the objectives and scope of the journals, and even so, they are among the national journals that published the most on the subject.

It should be noted that all the analyzed journals have in common the fact of addressing the themes of management and administration and, more specifically, making room for the "competitiveness" and "cooperation" constructs. These constructs are related to the theme of networks and were the most recurrent in the articles analyzed. "Cooperation" (29), "competitiveness" (27), "knowledge" (12), "learning" (6) and "trust" (3) were the "constructs" used to compose the 77 articles analyzed. In turn, "network" (49), "alliance" (18) and "cluster" (9) were the "main term" most used in the articles. This implies that the topic of cooperation is more linked to a vision of strategy.

As occurred in the research of [Andrighi et al. \(2011\)](#), the term "network" is the most recurrent; in addition, the growth of space obtained by the term "alliance" stands out. The terms "network" and "alliance" were the most used by the articles, being predominant in 87 per cent of the research. Research studies that address the themes "network" and "alliance" together are recurrent in the literature, as demonstrated by [Lima and Campos Filho \(2009\)](#). In the present research, the predominance of the term "network" may have occurred because its concept is broader and it is used in the literature in different ways, even in contradictory ways ([Andrighi et al., 2011](#); [Schommer, 2001](#)). In turn, the term "alliance" may have been recurrent because it has a wide dispersion of published issues, such as governance structure, cooperation, knowledge transfer and trust ([Lima and Campos Filho, 2009](#)). In addition, the term "alliance" is widely used when studying the strategy theme ([Cunha and Carrieri, 2003](#)).

By using the HCPC function of the FactoMineR extension, the articles were grouped according to their characteristics, and then three clusters were formed. The characteristics considered for the formation of the clusters were the "main term", "research approach", "type of research", "constructs" and "research strategies". [Figure 1](#) demonstrates the clusters.

By analyzing the generated results, it is assumed that the division into three clusters was the one that best represented the data. Cluster 1 is characterized by descriptive, quantitative,



Source: Elaborated by the authors (2016)

Figure 1.  
Hierarchical clusters

half documentary and half survey research studies, being “cluster” the main term. Cluster 2 is characterized by exploratory case studies with qualitative–quantitative analyzes. Cluster 3 is characterized by theoretical tests.

It should be noted that, in the tabulation of data, the theoretical essays have always had the “research approach” and “research strategy” columns classified as “essay (research approach)” and “essay (research strategies)”, for simplification. Thus, there was more cohesion between this type of research (noticeable in the graph analysis). In turn, it is seen that Cluster 1 and Cluster 2 have their elements more spaced apart. It can be stated, for example, that Article 71 (Cluster 1) has more characteristics in common with Article 23 (Cluster 2) than with Article 56 (also of the Cluster 2). [Figure 2](#) represents a graphical demonstration of the correlation between the characteristics of the articles.

There are two sets of characteristics that correlate positively. The “main term” and “constructs” used to conduct the researches, as well as the “research strategies”, “type of research” and “research approach”. The way this correlation takes place is clearer in [Figure 3](#). [Figure 3](#) shows a perceptual map resulting from the MCA, based on the characteristics of the articles.

It should be noted that the term “partnership” was used only by one of the 77 articles analyzed. Thus, its representation in [Figure 3](#) should be minimized. The term was added in the figure generation so as to not distort the representation of the other elements.

[Andrighi et al. \(2011\)](#) stated that national surveys predominantly present this profile: a qualitative approach with case studies in small companies. This profile was maintained and the exploratory character is also verified. [Balestrin et al. \(2010\)](#) and [Mascena et al. \(2013\)](#) also wrote that, in the Brazilian context, studies on interorganizational networks are characterized as being, mostly, empirical and qualitative. In many cases, the articles in the area do not go much further into theoretical discussions ([Mascena et al., 2013](#)), sum up to report the experiences in their local context ([Alves et al., 2013](#)), are based on only one case and do not perform longitudinal analyzes ([Cunha and Carrieri, 2003](#)). According to [Balestrin et al. \(2010\)](#), one of the factors that may explain the large number of qualitative and cross-sectional studies in Brazil is given by the fact that research is predominantly exploratory – which indicates that the theme is still developing in the Brazilian scenario. A counterpoint to this justification of [Balestrin et al. \(2010\)](#) may be the fact that many of these papers originate in master’s dissertations, whose term tends to be 24 months, which hinders research with a longitudinal cut and, in general, seem to result in more descriptive work.

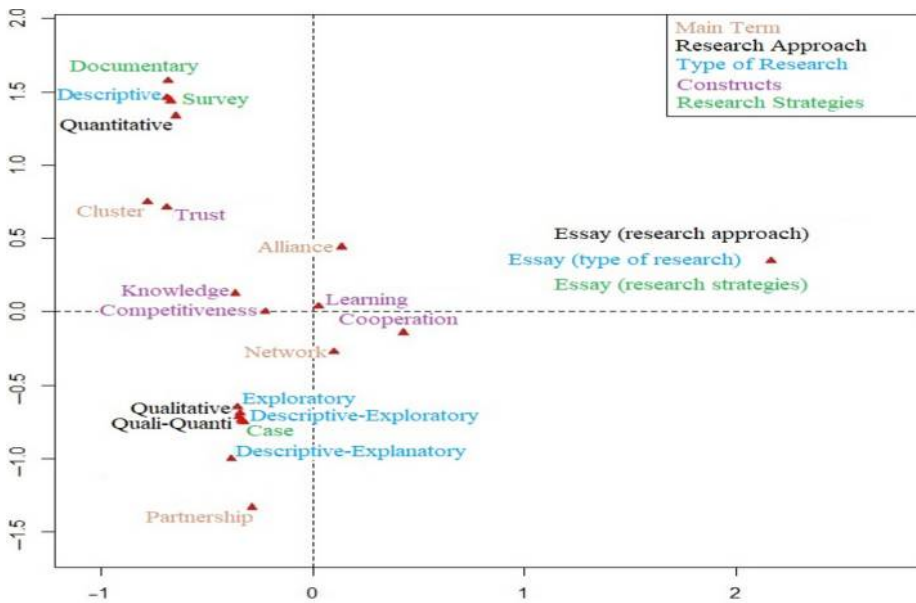
The term “network” was grouped with the “case” research strategy and with the “qualitative” research approach, as occurred in the work of [Andrighi et al. \(2011\)](#). In the same study, the term “cluster” was close to the “cooperation” construct and “quantitative”



**Figure 2.**  
Correlation between  
the characteristics of  
the articles

**Source:** Elaborated by the authors  
(2016)





Analysis of  
scientific  
production

**Figure 3.**  
Perceptual map

**Source:** Elaborated by the authors (2016)

research approach, which is in line with the first works that addressed the topic of networks in Brazil (Amato Neto, 2000; Casarotto and Pires, 1998). In the present research, the term “cluster” maintained the “quantitative” characteristic; however, it showed a smaller approximation to the “cooperation” construct. The closest constructs to the term “cluster” were “trust”, “knowledge” and “competitiveness” – in that order. This situation indicates that more work – when compared to Andrighi *et al.* (2011) – is collectively analyzing “clusters” and “trust”. Mascena *et al.* (2013) also point out that there is a strong relationship between the term “cluster” and the “trust” construct. This relationship is understandable, as one of the main theoretical approaches used to study clusters is precisely the trust existing between the actors of the cluster (Newlands, 2003; Perry, 2005).

As pointed out by Alves *et al.* (2013), the topic of networks has been approached from two perspectives: transaction cost theory (TCT) and resource-based view (RBV). Referring to studies on interorganizational cooperation networks in the Brazilian context, Balestrin *et al.* (2010) also highlight the great presence of TCT and also the resource dependency theory (RDT). The TCT emphasizes that a network will be more efficient through the cooperation of its actors to reduce costs and increase the network’s competitiveness; in turn, RBV and RDT emphasize the role of the network as a source of complementary “learning” and “knowledge” resources (Alves *et al.*, 2013; Pfeffer and Salancik, 1978). In this sense, it can be observed that, in Figure 3, the four constructs that are closest to the term “network” are precisely those that relate to TCT, RBV and RDT: “learning”, “cooperation”, “competitiveness” and “knowledge”.

The existing relationship identified by the present research between the term “alliance” and the “knowledge” and “learning” constructs was also observed by Ferreira *et al.* (2014). As pointed out by Hamel (1991), one of the reasons that lead companies to form alliances is

the search for learning. In addition, one of the main theoretical flows that underpin alliances research refers to the gain of knowledge and learning (Ferreira *et al.*, 2014).

In addition, a word cloud was generated – Figure 4 – from the keywords of the 77 articles with the objective of identifying the most frequent ones.

The word cloud (Figure 4) does not separate the terms that make up a keyword and those that presented frequency greater than or equal to two were maintained. In this way, it can be seen that Zipf's Law was not confirmed. The law points out that a small group of words occurs many times; however, when considering the most recurrent words Networks (9), Strategic Alliances (8), Cooperation (8), Interorganizational Networks (8) and Alliances (6) show that they were present in only about 10 per cent of the works. However, Zipf's Law argues that all the words of all texts, not only the keywords, should be analyzed, as in the present research. Thus, the exclusive analysis of the keywords, although contributing to the understanding of the theme, presents itself as a limitation of the research. It should be noted that in Brazil, in the area of administration, one does not use a standardization of subjects, as it is perceived in other sciences, like in Economics.

A map of the relations between the authors of the articles was made. In all, the 77 papers were produced by 153 different authors. Initially, an image with all authors was generated. However, the chart was unclear and showed irrelevant information. Then, a second image was generated considering only the works in which there was the participation of authors who produced two or more articles. Thus, Figure 5 represents the co-authorship and the relationships of 65 authors.

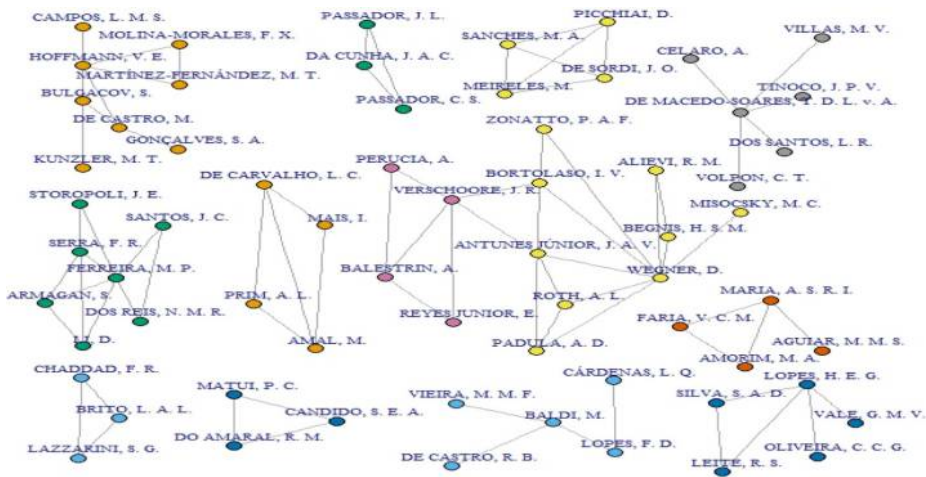
The graph is programmed to show the proximity between the authors, using colors. Authors who have binding (edge) and equal colors are closer than those who have binding but present different colors. The resulting representation of the interactions had its vertices adjusted manually (with the tkplot function), to facilitate the visualization of the map. Figure 5 shows the network of co-authorship relations, and each vertex represents an author.

Lotka's Law, which states that few authors publish much and many authors publish little, was not confirmed. The authors who presented the highest number of publications, T. Diana L. v. A. de Macedo-Soares (6); Jorge Renato Verschoore (6); Alsones Balestrin (5); Douglas Wegner (4); Humberto Elias Garcia Lopes (4), participated in less than 10 per cent of the works. Thus, the authorship was characterized by many researchers publishing few works, what can be an effect of the behavior of these authors, who prefer to publish in network.



**Figure 4.**  
Cloud made with  
keywords of the  
analyzed articles

**Source:** Elaborated by the authors (2016)



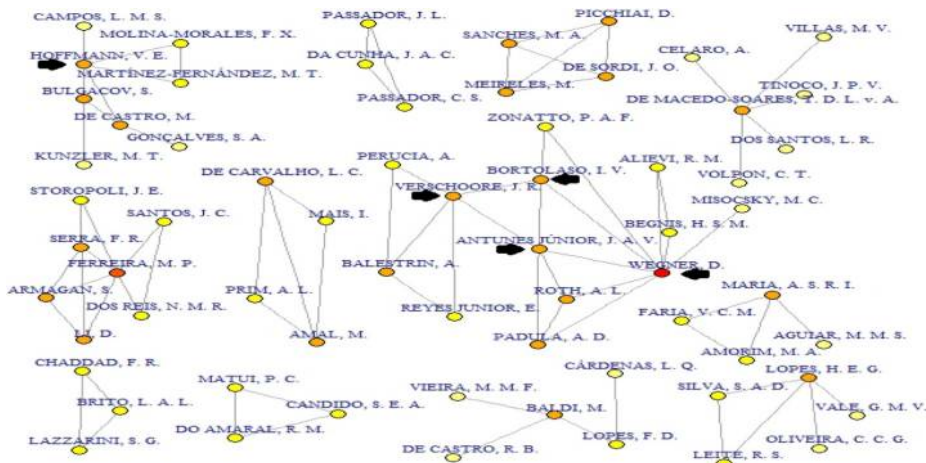
Analysis of  
scientific  
production

**Figure 5.**  
Network of co-  
authoring  
relationships

**Source:** Elaborated by the authors (2016)

The centrality of the relations between the authors was analyzed and, in addition, the intermediation points of the network were identified. This information is represented by Figure 6.

Figure 6 shows the results obtained. The closer to the red color, the greater the author's centrality – considering the number of edges that point to the vertex, and the intermediation points are indicated by the arrows (Aquino, 2014). The concepts of centrality and intermediation should not be confused. It should be noted that the analysis of the intermediation points aims to identify the vertices (authors) that more often represent the shortest path between two other vertices in a network (Aquino, 2014). For example, the



**Figure 6.**  
Centrality of the  
network with  
intermediation points

**Source:** Elaborated by the authors (2016)

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author Manuel Portugal Ferreira is not characterized as a point of intermediation, unlike the author Valmir Emil Hoffmann (Figure 6). This is because Hoffmann, although less central than Ferreira, mediates between more authors and therefore, more often, is the shortest path between two vertices that wish to connect.

In addition to the centrality and intermediation analyzes, alpha centrality and large groups' analyses were performed (Aquino, 2014; Csárdi and Nepusz, 2006). Both the analyses did not produce results. The software was not equipped with enough information to determine the alpha centrality – which considers the importance of exogenous factors in determining centrality (Csárdi and Nepusz, 2006). Already in the case of the analysis of the large groups, it was not possible to be performed because the data did not form a directed network.

The present study also analyzed all the references used by the 77 articles that compose the study, a procedure similar to that performed by Alves *et al.* (2013) and Ferreira *et al.* (2014). The main author of each of the references used was identified. Table III shows the main most recurrent authors.

Among the 30 mentioned authors, Yin and Hair Jr. stand out for books related to fundamentals and research methodologies, that is, they do not research the area of

Authors	Frequency
Powell, Walter W.	28
Porter, Michael Eugene	27
Granovetter, Mark S.	26
Gulati, Ranjay	25
Williamson, Oliver	22
Dyer, Jeffrey	21
Balestrin, Alsones	19
Castells, Manuel	15
Grandori, Anna	15
Ring, Peter Smith	14
Jarillo, José Carlos	13
Nohria, Nitin	13
Yin, Robert K.	13
Provan, Keith	12
Barney, Jay	11
Dimaggio, Paul J.	11
Doz, Yves L.	11
Ebers, Mark	11
Gomes-Casseres, B.	11
Borgatti, Steve P.	10
Burt, Ronald S.	10
Child, John	10
Eisenhardt, Kathleen M.	10
Hair JR., Joseph F.	10
Jones, Candace	10
Kale, Prashant	10
Marshall, Alfred	10
Podolny, Joel M.	10
Prahalad, Coimbatore K.	10
Rowley, Tim	10

**Table III.**  
Most referenced  
authors (as the main  
author of the study)

**Source:** Elaborated by the authors (2016)

interorganizational networks. Borgatti and Eisenhardt developed research on the topic of interorganizational networks and also created works for methodological foundations. Borgatti stands out for the work “UCINET for Windows: software for social network analysis” (Borgatti *et al.*, 2002) and Eisenhardt for the work “Theory building from cases: opportunities and challenges” (Eisenhardt and Graebner, 2007).

Powell was the most frequently mentioned author (28) and had more different works referenced (9). In addition, the article “Neither market nor hierarchy: network forms of organization” (Powell, 1990) was the most frequently mentioned work (18). Powell stands out for the production of articles published in periodicals, not books. Porter’s situation is the opposite. Most of the quotations made to the author come from his books, especially the work “Competitive strategy” (Porter, 1980).

All authors demonstrated in Table III are foreigners, with the exception of Balestrin. The most referenced works of the author are the article “A dimensão estratégica das redes horizontais de PMES: teorização e evidências” (Balestrin and Vargas, 2004) and the book *Redes de cooperação empresarial: estratégias de gestão na nova economia* (Balestrin and Verschoore, 2000). Marshall, Polanyi, Granovetter and Williamson are authors of works considered seminal, being them, respectively, “Principles of economics” (Marshall, 1890), “Personal knowledge: towards a post critical philosophy” (Polanyi, 1958), “The strength of weak ties” (Granovetter, 1973) and “Markets and hierarchies, analysis and antitrust implications” (Williamson, 1975). Finally, it should be pointed out that of the 100 references most used by the articles, 45 are books, and besides the work of Porter (1980), stands out “the society in network” of Castells (1996).

## 5. Conclusion

The objective of the present work was to characterize the academic production about the subject interorganizational networks available in national journals with Concept “A” (Qualis Capes), in the period between 2006 and 2016. The central themes of this research were interorganizational networks and bibliometrics. It was sought to identify the profile of the national scientific production on the networks subject, through the use of bibliometrics. In all, 77 articles published between the years 2006 and 2016, in eight journals, were analyzed.

The study contributed to updating the research profile, mainly after the triennium 2013-2015 of Qualis Capes’ evaluations. It also added to the mapping of recent Brazilian academic production related to interorganizational networks, completing studies by Alves *et al.* (2013), Andrighi *et al.* (2011), Balestrin *et al.* (2010), Cunha and Carrieri (2003) and Mascena *et al.* (2013). Thus, it is believed that the research reached the proposed objectives, despite its limitations.

This text was started talking about the dispersion of the studies on networks in the country. Previous work has been used, theoretically and empirically demonstrating this fact. Zipf’s Law applied to bibliometrics, as described by Guedes and Borschiver (2005), Novaretti *et al.* (2015) and Pao (1978), was not confirmed in this study, which seems to be an indicative fact that the research on this theme in Brazil presents fragmentation as an intrinsic characteristic. That is, it must remain fragmented, as this would be its own way to evolve. This is evident especially when comparing the study of Andrighi *et al.* (2011) and its results. With several but continuous temporal cut-outs, and the same keywords, the maintenance of this dispersion is evident. This is also a contribution of this study.

Like all research, it has limitations. The first one derives from the selection criteria of the periodicals to be analyzed. The cut referring to the journals of greater impact excludes most of the national articles. These studies may contain important contributions to the knowledge of the national publication profile. In addition, the choice to analyze the journals disregards



other types of work, such as books, scientific events, dissertations and thesis and reports. The choice of articles published in journals is based on the fact that these are a “certified knowledge”, as the studies are peer-reviewed, and in the case of the Qualis “A” stratum, a review of exogenous quality is supposed on this production. Despite its flaws, this system can be considered reliable to evaluate scientific knowledge (Bedeian, 2004; Shugan, 2007).

The analysis of the most recent articles may have been hampered by a temporal issue. In addition, the choice of keywords, a necessary step, leaves out other studies. Another limitation refers to the fact that the articles have been analyzed and classified by the authors, which presupposes the use of their value judgments, at least to some extent.

Other limitations refer to the bibliometric techniques employed. The main authors referenced in the studies were demonstrated, that is, those authors who have been used as a theoretical reference for studies of interorganizational networks. However, the circumstances under which these citations occurred were not analyzed. For example, an author may be quoted to use the contribution of his/her study, to be criticized or just to be another reference in the text. The lack of this analysis can be considered a fragility of the study.

It is perceived that this area of knowledge presents opportunities for future research. Future works can carry out analyzes that compare contents of national and international articles. In these studies, the realization of sociograms would demonstrate the relationship between authors and institutions. Moreover, the comparison between all the academic production on the theme (referring to the periodicals) would make it possible to ascertain which periodicals provide more spaces in their publications for the networks theme. Future research may seek to understand, within the topic of interorganizational networks, which are the hot topics. In addition, a table comparing the number of publications of each author, with the number of times that each author was cited, can contribute to the debate.

It is suggested that research studies analyze which theories were used by the empirical studies. Studies can also perform comparisons between the performance of companies that have chosen to participate in interorganizational networks and companies acting in isolation. Another opportunity is to carry out studies that compare the performance of different interorganizational networks operating in the same segment. For example, the clusters of *Calçados de Franca – SP* and *Calçados de Jau – SP*. As can be seen, there are many research opportunities on the subject, especially in the national scenario, in which research is needed to help understanding the phenomenon of interorganizational networks.

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