A BIBLIOMETRIC STUDY OF THE SCIENTIFIC LITERATURE ON THE HIERARCHICAL REGRESSION IN ADMINISTRATION.

Beatriz Lucia Salvador Bizotto
Doctorate in Administration at UCS-Universidade de Caxias do Sul
Professor at Centro Universitário UNIFACVEST-Lages /SC
E-mail: *Beatriz.bizotto@uol.com.br*

Dr Maria Emilia Camargo
Professor at UCS- Universidade de Caxias do Sul
E-mail: *mariaemiliappga@gmail.com*

Dr Marta Elisete Ventura da Motta
Professor at UCS- Universidade de Caxias do Sul
E-mail: *Martamotta1234@gmail.com*

Joaquin Rodrigo de Oliveira
Doctorate in Engineering Production and Systems UFSC- Universidade Federal de Santa Catarina
E-mail: *profrodrigo@gmail.com*

Dr Antonio Sergio Coelho
Associate Professor II at UFSC- Universidade Federal de Santa Catarina
E-mail: *a.s.coelho@ufsc.br*

ABSTRACT

In this paper we present results of a study that aimed to analyze the academic scientific production on "Hierarchical regression in Administration" using the bibliometric approach. The analysis study units consisted of articles published in journals and magazines about teaching and research in Brazil. Existing digital libraries in the country took part in this research, as these are important research sources for the mapping of Brazilian science. We analyzed 73 articles, published from 1975 to 2014; this universe was reached after survey at the database of articles in national journals - CAPES-RAC, SAR, PAR AND RAUSP, Scielo and Google Scholar. The bibliometric study to suggest that there is a remarkable growth in the academic scientific literature on Hierarchical regression Administration, observable in Brazilian digital libraries from 2005. The period that had the highest number of publications was 2009, followed by 2012.

Keywords: *Education in Administration. Bibliometrics. Papers. Digital libraries.*

INTRODUCTION

This paper will present the results of a survey that aimed to analyze the results of academic scientific literature on the Hierarchical regression in administration. The study units of analysis consisted of articles in Hierarchical regression. As a research source, the digital libraries of CAPES, Scielo and Google Scholar were selected.

Regarding the choice of the theme, it appears that the scientific literature on the subject does not exist on the same degree of other subjects. Please note that there is a gap on the subject, both in postgraduate studies as well as scientific events. While some themes and periods are shooting and give prestige, hierarchical regression theme in administration does not arouse the same interest.

In the research conducted at CAPES, 136 publications were found between theses, dissertations, articles and textual resources. However, the goal was to use only articles, thus the analysis was made of 73 articles. It can be seen that in the period before 2000 only two articles met the requirements of the search.

From this perspective, it is believed that the study could contribute to the areas of education, as there is a perceived need for studies that can map and get indicators of academic scientific literature on Hierarchical regression in administration.

Fonseca et al (1996) in many cases it is known the number of successes, but it becomes difficult, and sometimes senseless, determine the number of failures or the total number of tests. The author mentions that "it is a technique

to make a statistical inference. That is, from a hypothesis test, carried out with the sample data, it can be inferred on the population "(p, 298 1996).

Multivariate models for research involve the relationship analysis between multiple independent variables, and in some cases, multiple dependent variables. Multiple regression is, according to Tabachinick et al. (1996), a set of statistical techniques.

It is still possible to find other authors that separate analyzes to better understand them. In this sense Abbad explains the following:

According to Abbad et al (2002): "There are three main types of multiple regression analysis: 1 standard multiple regression; 2 hierarchical multiple regression, or sequentially; 3 statistical regression". The hierarchical regression is used in confirmatory studies since this type of analysis seeks explanation of the relationship between vaiáveis described in consistent theoretical models. Here, it is only studied the hierarchical regression.

The origin of the term dates back regression "Fracis Galton (1822- 1911), who employed it for the first time in a study of the relationship between the height of parents and children" Freund (p. 398, 2006).

There are several ways of measuring aimed to evaluate the science and information flows. These include bibliometrics, scientometrics, informetrics and webometrics. The concept, according to Vanti, (2002, p. 153) "All have similar functions, but at the same time, each proposed measure the diffusion of scientific knowledge and the flow of information from various focus." In this study we will only be considered Bibliometry.

In addition to the publications of diverse subjects, it was found mainly in the field of psychology, health and motivational factors as well as social capital, but studies on hierarchical regression in administration are few. Perhaps because of the emphasis placed on technological and commercial factors - so much that it does not carry the same emphasis on studies aimed to know or measure the production and the development of a group and their background, where they live.

It is noticed that there are few studies on Hierarchical regression in administration. This corroborates the statement of Nicolini (2003), the small scientific production, which is in the form of books and scientific works in administration is surprising, so as the amount of analytical advice that comes down to a minimum.

However, with the amount of existing titles, it is increasingly difficult for the scientist to decide which journals are the disseminators of information. In addition, there are several factors that can interfere in this decision. To make sure that the data will be disseminated effectively, and the article will be clearly evaluated by peers, the researcher needs a reference, that is, information about the journal you want to use. It is known that the journals are reliable sources of information.

The periodicals or journals are the most important means of dissemination of science. This is a way of conveying the results of research, as demonstrated by the increasing number of titles in recent years.

1. BIBLIOMETRY

To Fonseca (1986, pg. 10), "bibliometrics is the quantitative and statistical technique for measuring production rates and dissemination of scientific knowledge." Bibliometry emerged at the beginning of the century because of the need to study and evaluate the scientific production activities. Thus, Guedes and Borschiver (2005) say that bibliometrics are a set of laws and empirical principles which contributed to establish the theoretical foundations of information science.

The most commonly used concept of bibliometry was defined by Pritchard (1969), it is the set of all studies attempting to qualify the written communication processes, including the Latka (1926) method of measuring productivity of scientists, Bradford (1934) scientific knowledge dispersion law, and the Zipf (1949) distribution model and frequency of words in a text .

Whereas in the application of statistical and mathematical techniques to describe aspects of literature and other media, bibliometrics was originally known as "statistical bibliography" a term coined by (Hulme in 1923), the term "bibliometrics" created by Otlet in 1934 in his "Traité de Documentation". However, the term became popular only in 1969, from a Pritchard's article, which discussed the controversial "Statistical bibliography or bibliometrics" (Guedes, 2005).

Leaving aside the judgments of value, it seems clear the importance of having a

> distribution that informs us about the number of authors, works, countries or magazines that exist in every category of productivity, utility or whatever else we want to know (PRICE, p. 39, 1976).

In Brazil, the bibliometric studies proliferated in the 1970s, mainly to studies in the Brazilian Institute of Bibliography and Documentation - IBBD, today Brazilian Institute for Scientific and Technical Information – IBICT.

In a specific way, the principle of bibliometrics is to analyze the scientific or technical activity by the quantitative study of publications and its main objective is the development of increasingly reliable indicators. Indicators can be defined as the parameters used in the evaluation processes of any activity. They can also indicate and infer that the greater the number of publications made better the journal.

2. THE THREE CLASSICAL LAWS

The Lotka's Law, formulated in 1926, was built from a study on the productivity of scientists from the authors present in Chemical Abstracts, between 1909 and 1916. Lotka found that a large proportion of the scientific literature is produced by a small number of authors, and a large number of small authores equals in production, the small number of large authors. From then formulated the law of inverse frames.

Bufrem and Prates (2005) emphasize that the bibliometric laws most commonly used are those related to scientific productivity (Lotka's Law), the dispersion of scientific production (Bradford's Law) and the occurrence of words in the text (Zipf's law). Their original applications were giving way to changes and mergers, structuring in a theoretical framework that justified the status of science to the body of knowledge that are shaping up around information.

The bibliometrics applied with a high degree of methodological rigor becomes an important tool to analyze the scientific production and qualify the evolution of the knowledge produced by researchers and students.

An important element in the realization of cognitive and social institutionalization of a field is the scientific article. Mueller (2001) comments that both articles, as the journals are important sources of knowledge dissemination.

To study the researchers and their contributions enriches and allows the sharing of information. Thus, to know the main authors and what they are searching, and it is also shared and known authors who are cited throughout the research.

Thus, this article seeks to highlight research in hierarchical regression in administration on Brazil, based on the quotes made in scientific articles, management journals, dissertations, book reviews, books and doctoral dissertations, from 1975 to 2014, in order to identify the scientific characters and their contributions to science.

> Bibliometrics, as an area of study of Information Science, has an important role in analyzing the scientific production of a country, since its indicators can portray the behavior and development of an area of knowledge. The main motivation for the research presented here is to investigate the bibliometric studies conducted in Brazil, making a cut in the scientific production generated by Brazilian graduate, regardless of subject area (Araújo, p. 52.2007).

In Brazil, however there is a growth in scientific production specifically in hierarchical regression in administration from 2005 and reaching the highest production in 2009, followed by 2012.

Table 1 lists the main laws and bibliometric principles, their study focuses and their main applications in knowledge management information.

Table 1: Major Laws of bibliometrics.

Information Science		
Bibliometrics		
Laws and Principles	**Focus of study**	**Main applications**
Bradford's Law	Journals	Estimate how relevant journals are.
Lotka's Law	Authors	Estimate the degree of relevance of authors.

ISSN: 2047 - 0398
SPECIAL ISSUE – VII|4|N|12| May | 2015

Zipf's Laws	Words	Automatic indexing of scientific and technological articles.
Golffman's Transition point (T)	Words	Automatic indexing of scientific and technological articles.
Invisible colleges	Quotes	Identification of elite researchers.
Factor immediacy or impact	Quotes	Estimate the degree of relevance of scientific journals, in particular area of knowledge.
Bibliographic coupling	Quotes	Estimate the degree of bonding two or more articles.
Co-citations	Quotes	Estimate the degree of bonding two or more articles.
Literature obsolescence	Quotes	Estimate the decline of literature in a particular area of knowledge.
Half-life	Quotes	Estimate the half-life of a unit of literature of a given area of knowledge.
Epidemic theory of Goffman	Quotes	Estimate the growth and decline rate of a particular area of knowledge.
Law of Elitism	Quotes	Estimate the size of the elite population of certain authors.
Front Search	Quotes	Identification of a standard relationship between multiple authors which quote each other.
80/20 Rule	Information demand	Composition, enlargement and reduction of collections.

Source: Prepared by author

3. METHODOLOGICAL METHODS AND PROCEDURES

Contributions are made by the scientific articles, reviews, books, dissertations and theses published in journals dealing on education in administration from 1975 to 2014, available electronically, and references contained in the bibliography of scientific articles.

The methodological procedures used for this study are described below: identifying the number of articles published from 1975 to 2014; it was found 73 articles on the admninistration journals with the phrase "hierarchical regression in administration.". This period was chosen by the availability of electronic information.

The first step in conducting the research was the creation of two bases of interrelated data and citing articles, ie articles published in those vehicles and articles. In the first database, for each of the articles published in the area between 1975 to 2014, the following information was raised: publishing area, text expertise, authors of the article. From this first survey, the second database was created, inter-related to the first, number of authors, journals, year of publication and objectives of each publication.

The second step was the intersection and the consolidation of information as follows: authors count, most influential work and number of publications per year.

The methods used were quantitative, qualitative and inductive. The research is characterized as exploratory and descriptive through bibliometrics. As Silva (2009), the bibliometric research can be defined as the application of mathematics to books, articles and other media. Bibliometry is already considered the measurement of literature, therefore, the quantitative measurement of scientific publications.

The method proposed by empiricists Bacon, Hobbes, Locke and Hume believes that knowledge is fundamental in the experience, not taking into account pre-established principles. In inductive reasoning, generalization is derived

ISSN: 2047 - 0398
SPECIAL ISSUE – VII|4|N|12| May | 2015

from cases of observations of reality. The particular findings lead to the development of generalizations (GIL, 1999; Lakatos, 2001). While scientific research is the investigation process, used for the search for truth and solve problems, (THIOLLENT, 2009).

Exploratory research as to the purposes, according to Vergara (2002), is performed in an area where there is little scientific knowledge accumulated or systematized, because it is a research that seeks to explore concepts and facts of limited bibliography. Moreover, by its nature of research, it does not contain assumptions which may, however, arise during the research (TRIVIÑOS, 1987).

While for Gil (2005), a descriptive and qualitative exploratory research is one that aims to explain and provide greater understanding of a given problem.

It is also noted that the search can be performed by practical or applied reasons. It can be said that they are to achieve something more efficiently (GIL, 2005).

As for its qualitative form, he states that it does not use statistical tool in the analysis process of a problem. About this kind of research, Minayo (1993) asserts that it is an appropriate way to get the knowledge of the nature of a social phenomenon, given the fact the researcher collect data actually searched for later review it inductively.

Data collection is how to obtain the data necessary to address the problem (VERGARA, 2000). Thus the means used for research data were digital library research.

The option for the selection of publications bases is characterized as intentional and non-probability motivated by the premise that they regularly publish articles related to the field.

It was used the capture of files in PDF format available on the websites of newspapers, definitions and formatting of the database, as well as the fields and their structures; data tabulation was made in Microsoft Excel.

4. CLASSIFICATION OF RESULTS

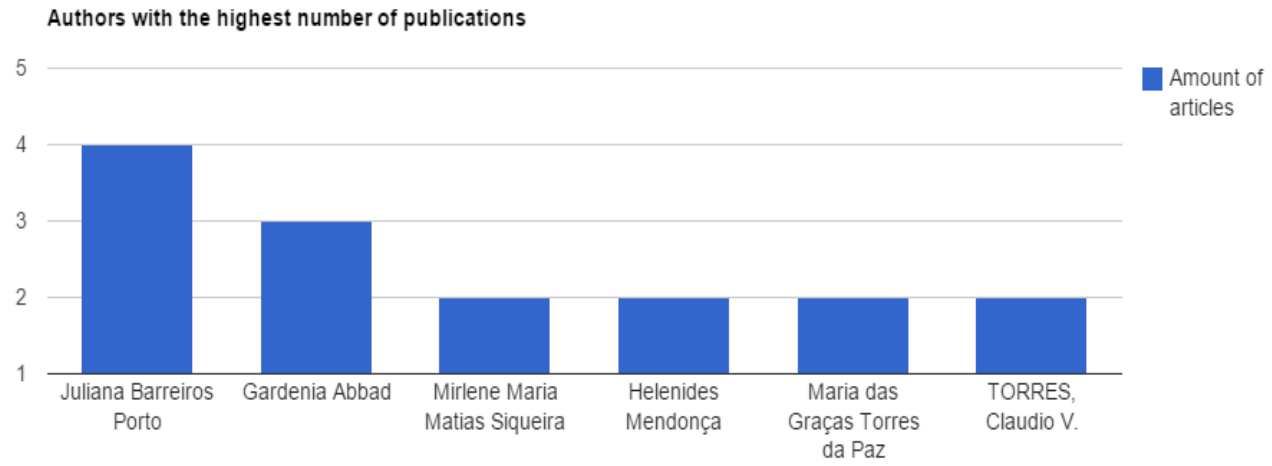
Tables 2 to 4 and Figures 1 to 3 present the results obtained.

Table 2 - Authors with the highest number of publications

Juliana Barreiros Porto	4	26,67
Gardenia Abbad	3	20,00%
Mirlene Maria Matias Siqueira	2	13,33%
Helenides Mendonça	2	13,33 %
Maria das Graças Torres da Paz	2	13,33 %
TORRES, Claudio V.	2	13,33 %

Source: Prepared by author

Figure 1: Graphic representation of academic productions



Source: Prepared by author

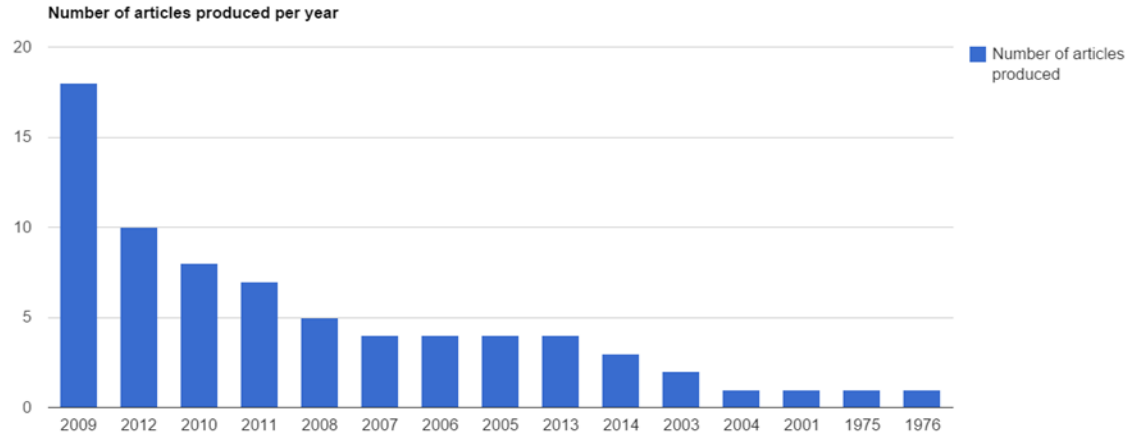
ISSN: 2047 - 0398
SPECIAL ISSUE – VII|4|N|12| May | 2015

Table 3 - Scientific Productions from 1975 to 2014

Magazines with coverage on "hierarchical regression in administration."	Year
RAC	2008, 2009, 2010,2011, 2013
RAM-Revista de Administração Mackenzie	2010, 2009, 2012, 2008
Revista de Administração Contemporânea	2005, 2006,2003.
Psicologia: Teoria e Pesquisa	2010, 2011,2004, 2005, 2009, 2013,2014.
Revista de Cont. Fin.USP	2007,2009
RAE(Revista eletrônica)	2012,2005
Psicologia: Reflexão & Critica	2001, 2011, 2009
Revista de gestão da USP	2012, 2008,2009

Source: Prepared by author

Figure 2: Number of articles produced per year.



Source: Prepared by author

Table 3 - Periodic and magazines that participated in the study (the 8 better ranked)

Magazine with coverage on "hierarchical regression in administration."	Year
RAC	2008, 2009, 2010,2011, 2013
RAM-Revista de Administração Mackenzie	2010, 2009, 2012, 2008
Revista de Administração Contemporânea	2005, 2006,2003.
Psicologia: Teoria e Pesquisa	2010, 2011,2004, 2005, 2009, 2013,2014.
Revista de Cont. Fin.USP	2007,2009
RAE(Revista eletrônica)	2012,2005
Psicologia: Reflexão & Critica	2001, 2011, 2009
Revista de gestão da USP	2012, 2008,2009

Source: Prepared by author

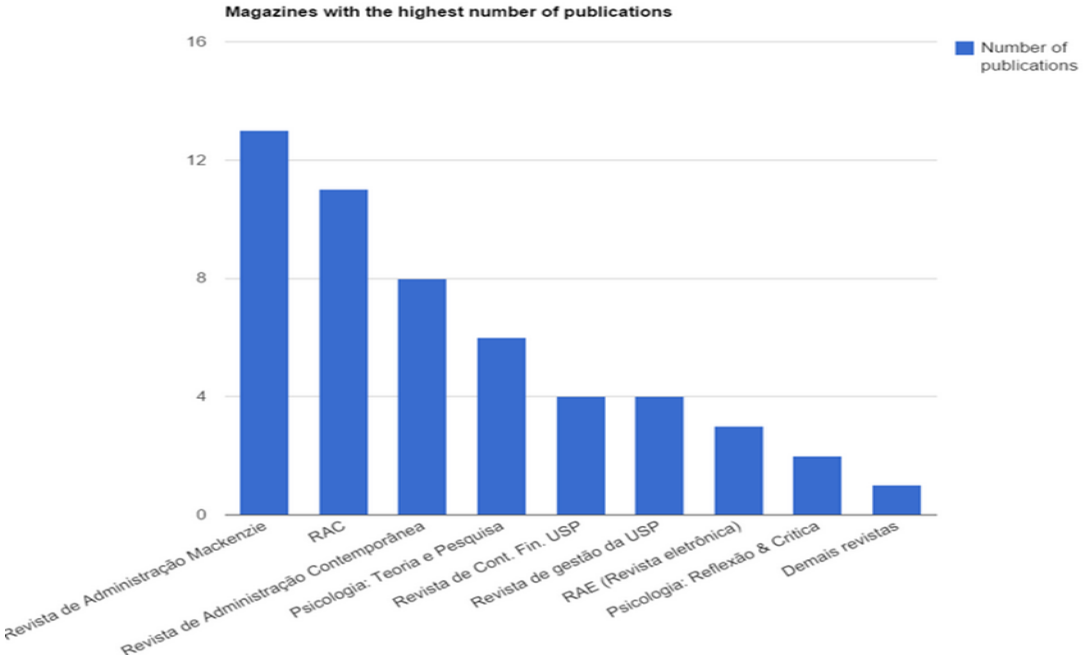
Table 4 - Magazines who obtained the highest number of publications in the period 1975-2014.

Magazine	Amount of articles published
RAM-Revista de Administração Mackenzie	13
RAC	11
Revista de Administração Contemporânea	8
Psicologia: Teoria e Pesquisa	6
Revista de Cont. Fin. USP	4
Revista de gestão da USP	4
RAE (Revista eletrônica)	3
Psicologia: Reflexão & Critica	2
Demais revistas: somente uma publicação de cada.	

Source: Prepared by author

ISSN: 2047 - 0398
SPECIAL ISSUE – VII|4|N|12| May | 2015

Figure 3 - Journals with the highest number of publications



Source: Prepared by author

CLOSING REMARKS

This research has selected articles which included the word "Hierarchical regression in administration" in their abstracts, digital journals, in order to analyze what has been published about the proposed subject.

The assessment of the data provides a set of journals in the scientific production in bibliometrics, published in national journals published from 1975 to 2014.

So 73 articles met the prerequisites, with greater coverage in psychology studies and social capital (186 authors). Most of the articles had its scope in the areas of psychology, occupational health, human development and social capital. In its contents included the phrase "hierarchical regression in administration," but in isolation, which did not meet the study objective. Therefore, it was necessary to sort the items contained in the summary expression "hierarchical regression in administration" and that its development obtain scientific contribution to the study. Of this total, 49.32% of these articles with coverage on "hierarchical regression in administration" and of all the authors who participated in the survey only 1 (2.15%) author published four articles, one published 3 (1.61%) articles, four authors published 2 (1.08) articles each and the remaining published only an article in the entire study period. The magazine that had the highest number of publications in the period was RAM- Mackenzie Administration Magazine with 13 contributions. The RAC journal contributes with 11 publications, followed by the Journal of Contemporary Management 8, Accounting and Finance Magazine USP 4, Magazine Management USP 4, RAE. 3, journal Psychology: Theory Research 6, journal Psychology & Critical Reflection 2; other magazines published only one article each.

When comparing production during the study period 1975-2014, it is observed that in 1975 and 1976 only one article was published, and the next publication occurred only in 2001 with one article, in 2003 with 3 articles, in 2004 only one article. From this date there was no gap, stressing that the apex of publications occurred in 2009 with 18 publications, followed by 2012 with 10 publications. The publications have become frequent in other periods. It was found the first publication with the word "hierarchical regression administration" in 1975. It is noted a gradual increase in publications on "hierarchical regression in administration." Since peak occurred in 2009 with 18 publications.

It is noteworthy that for the study of "hierarchical regression in administration" be made, it is necessary to introduce in the post-graduate courses themes linked to hierarchical regression in administration. One option would be to introduce them in the disciplines focused on statistics and mathematics.

The indicators presented in this study had a picture of scientific development. The year 2014 has an output of 3 articles, and in 2015 it has not yet been found any article, so the possibility of the next studies this number to surpass previous years can not be refuted, since they are still being submitted articles for publication.

Therefore it is possible that there may be a new panorama, especially with the development of other research. However, does not end the possibility of including other sources of research, including only with Master and Doctoral Theses.

With the end result of bibliometric analysis, it appears that one author (2.15% of authors) who produced the articles surveyed are related to the proposed subject, which shows there is a gap in academic production, perhaps due to the very authors only meet the requirements of Postgraduate programs and when they end, do not produce more research. And through this there is the possibility to invest in scientific literature on Hierarchical regression Administration in order to find what is the hypothesis of the authors cease to produce. Yet they suggest future research in scientometrics, informetrics and webometrics.

REFERENCES

ARAÚJO, Carlos Alberto. **Bibliometria: evolução história e questões atuais**. Em Questão, Porto Alegre, v. 12, n. 1, pg. 11-32, jan./jun. 2006.

ARAÚJO, R. Ferreira. **A Bibliometria na pesquisa cientifica da pós-graduação brasileira de 1987 a 2007.** Enc. Bibli: R. Eletr. Bibliotecon. Ci. Inf., ISSN 1518-2924, Florianópolis, v. 16, n. 31, pg.51-70, 2011.

BRADFORD, S. C. **Sources of information on specific subjects.** Egineering, [s.l.], v.137, pg. 85-86, 1934.

BUFREM. L.; PRATES, Y. **O saber científico registrado e as práticas de mensuração da informação**. Ciência da Informação, Brasília, v. 34, n. 2, pg. 9-25, maio/agosto. 2005.

FONSECA, E. N. **Bibliografia estatística e bibliometria: uma reivindicação de prioridades.** Ciência da Informação, Brasília, v. 2, n.1, pg. 5-7, 1973.

FONSECA, Edson Nery da. **Bibliometria: teoria e prática**. São Paulo: Pensamento - Cultrix, 1986.

FONSECA, E. N. (Org.). **Bibliometria: teoria e prática.** São Paulo: EDUSP, pg. 141, 1986.

FREUND, John E. **Estatística Aplicada: economia, administração e contabilidades**. 11. Ed., Porto Alegre: Bookman, 2006.

FONSECA, Jairo Simon da, Martins, Gilberto de Andrade**.** Pg 66,1996 (editora Atlas, 6ª Edição**) Curso de estatística.**

GIL, A.C. **Métodos e técnicas de pesquisa social**. São Paulo: Atlas, 2005.

GIL, A.C. **Métodos e técnicas de pesquisa Social.** 5ª ed. São Paulo: Atlas, 1999.

GUEDES, Vânia; BORSCHIVER, Suzana. **Bibliometria: uma ferramenta estatística para a gestão da informação e do conhecimento, em sistemas de informação, de comunicação e de avaliação científica e tecnológica**. In: CINFORM – ENCONTRO NACIONAL DE CIÊNCIA DA INFORMAÇÃO, 6, Salvador: ICI/UFBA, 2005.

LAKATOS, E.M.; MARCONI, M. de A. **Fundamentos de metodologia cientifica.** 4ª ed, São Paulo, Atlas, 2000.

MINAYO, M.C. de S. **O desafio do conhecimento**. São Paulo: Hucitec, 1993.

MUELLER, S. P. M.;PECEGUEIRO, C. M. P. de A. **O periódico Ciência da Informação na década de 90: um retrato de área refletido em seus artigos.** Ciência da Informação, Brasília, v. 30, n. 2.47-63, maio/agosto de 2001.

PINHEIRO, Lena Vânia Ribeiro. **Lei de Bradford: uma reformulação conceitual**. Ciência da Informação, Brasília, v. 12, n. 2, p. 59-80, jul./dez 1983.

PRICE, Derek J. De Solla. **Networks of scientific papers.** Science, [s.l.], v. 149, n.3683, pg. 56-64, July 1965.

PRITCHARD, A. **Statistical bibliography or bibliometrics?** Journal of Documentation, [s. l.], v. 25, n.4, pg. 348-349, Dec. 1969.

SILVA, Adriano J.; da, et al – Jorge Ribeiro de Toledo Filho, Juliana Pinto. **Análise Bibliométrica dos Artigos sobre Controladoria publicados em periódicos dos programas de Pós - Graduação em Ciências Contábeis**. Recomendados pela CAPES- ABCustos Associação Brasileira de Custos –Vol. IV nº 1 – jan/abr 2009.

TABACHNICK,B.; & FIDELL, L.S (1996). **Using multivariante statistics.** (3ªed.) New York: Harper Collins.

THIOLLENT, Michel. Pesquisa-ação nas organizações. 2ª ed. São Paulo: Atlas, 2009.

TRIVIÑOS, A.N.S. **Introdução à pesquisa e Ciências Sociais: a pesquisa qualitativa em educação**. São Paulo, Atlas, 1987.

UNG-DE PRÉVAUX, Aude. **Jacques e Lotka:** uma história da resistência. Rio de Janeiro: Record, 2002. 252 p. ISBN 8501058823.

VANTI, N. A. P. **Da bibliometria à webometria: uma exploração conceitual dos mecanismos utilizados para medir o registro da informação e a difusão do conhecimento.** Ciência da Informação, Brasília, v. 31, n. 2, p. 152-162, maio/ago. 2002.

VERGARA, S.C. **Projeto e relatórios de pesquisa em administração**. São Paulo.