

Evaluating Research: Diversity and Credibility of Information Sources

Mahmood Ahmad* & Muhammad Ayub Jan**

Abstract

Consistent advancement in Technology has brought an ever easy access to information. However, not all information is created equal. In an academic setting, the critical evaluation of information is crucial to conduct quality research. Every source of information needs to be evaluated in term of its credibility to best support the research. In most cases, some information seems to be more credible than the rest. However, most of the time, the real challenge is how to judge the credibility of information. This situation demands consistent revision of the methods used by the researchers and organization in the production of information related products and services, and to effectively respond to complexity and volume. This study aims to develop an integrated model for evaluating research quality.

Keywords: Research evaluation; Bibilometrics; Information sources; Research quality, Epistemic culture.

Introduction

Consistent advancement in Technology has brought an ever easy access to information. However, this easy and free access to information has complicated the process of selection of information which in turn can cause confusion or misinformation.¹ Hence this situation demands consistent revision of the methods used in the production of information related products and services, and to effectively respond to complexity and volume.² In the succeeding section a brief literature is presented on the evaluation of research quality that provided the base for developing an integrated model for evaluating research quality.

Indicators & Methods for Evaluating Research Quality: A Literature Review

* Mahmood Ahmad, PhD Research Scholar, Department of International Relations, Qurtuba University of Science & IT, Peshawar Campus. Email: zaveyaa@yahoo.com.

** Dr. Muhammad Ayub Jan, Assistant Professor, Department of Political Science, University of Peshawar.

Diversity of information sources as indicator of research quality

In academic discourse, one way to check the quality of research work is to look into the diversity of sources consulted in the research. It is believed that the principal of sources diversity is tied to quality because diverse ideas fuel democracy. Bias can occur when researchers tend to cite particular sources over other source types.³ The diversity of sources is helpful in avoiding the unconscious biases of researchers.⁴ To ensure diversity and credibility, a researcher must use information from diverse set of sources to ensure representativeness.⁵ Moreover, the greater the number of sources used by a researcher in report will more likely present the issue accurately. In addition, it is assumed that the balance of official and unofficial sources represents better representation of reality.⁶ Furthermore, the inclusion of expert sources is also taken as an indicator of credibility.⁷

Credibility of information sources as quality indicator

Credibility is one of the main aspects of the evaluation of quality information⁸ and has been defined using criteria such as believability, reliability, accuracy and truthfulness, among others.⁹

The credibility of scientific and academic research information is an important quality factor¹⁰, and it must be considered in conducting research at any level.¹¹ There has been an increased attention given to credibility of sources from as early as Socratic writings.¹² However, in spite of an extensive literature that is available on the discussion of what constitute information credibility, there is no agreed upon definition. Depending on the specific context, information credibility can be defined on three levels:

- i). The heuristic level, it concerns with the general rules of thumb for value judgment of information in diverse settings;
- ii). The interaction level, it refers to the judgment of credibility based on origin, content, clues and peripheral information; and
- iii). The construct level, which defines credibility, through criteria such as authenticity, believability and reliability.¹³

The Use of Bibliometric Indicators to assess Information

The bibliometric is the statistical analysis of sets of scientific publications that allows the identification of research quality for new knowledge as well as results in production indicators which help in

management and decision-making in research.¹⁴ “The bibliometric indicator is a device based on bibliographic information used to measure and assesses scientific intellectual activity of an individual, country and so on”.¹⁵ Furthermore, bibliometrics is truly interdisciplinary research fields that comprise components from mathematics, engineering, social, natural and even life sciences, hence extend to all scientific fields.¹⁶

The initial stage for bibliographic sources involves identification of adequate publications for the research. In the second stage, analysis and sorting of retrieved publications is done. In both of these stages, the criterion is reliability analysis, which ensures the use of reliable sources during the search and anticipates the retrieval of quality publications. Bibliometrics indicators are one of the criteria used to determine information quality.

Bibliometric studies of scholarly communities use one or more of three theoretical variables that are: producers, artifacts, and concepts. Producers are the originators of information at any level of author's research groups, institutions, fields, or countries, other principles and levels of aggregations, women or men, authors of different ages, and other geographical units. Artifacts are the information products themselves; books, journals articles, encyclopedia articles, conference presentations, and so on, while the third is the Communication concept, which comprises words, themes, citations, or presentation details.¹⁷

The source of bibliometric data is an important consideration for any study that intends to analyze patterns in research reports. Glanzel (2003) suggested some unique features that are basic requirements of a database which would serve as a source of bibliometric data. Gauthier (1998) quoted Polanco (1995) explained that Bibliometrics serve three basic functions, that are, description, evaluation and monitoring. According to Gauthier (1998) bibliometric indicators provide the scientific productivity of a country. He offered two subdivisions of bibliometric indicators: descriptive indicators and relational indicators. The descriptive indicators are used to identify trends in papers, citations and the citations they contain. Whereas, relational indicators are useful in identifying interactions and relationships between researchers, institutions and research fields. In bibliometrics, “the derived measures or metrics are typically counts of the frequencies with which events of specified types are observed to occur, which (once expressed as ratios of the total number of observed events) may be considered as probabilities of occurrence” (Borgman and Furner, 2002, p.4). These resulted probability distributions are called bibliometric distributions, which may form the basis of certain bibliometric laws.¹⁸ However, the validity of

using bibliometric indicators is the awareness of what needs to be measured and for what purpose. Costa et al. (2012) classification of bibliometric indicators includes:

- Thematic association that includes citation and reference analysis.
- Scientific quality, based on peer review that evaluate publications by content;

Thematic association indicators

Thematic association indicators include citation analysis, reference analysis and other bibliometric and scientometric techniques. The classification model¹⁹ of bibliometric indicators is useful in analyzing a set of publications within a specific field. There are other models for classifying bibliometrics indicators,²⁰ which complement the results obtained from and seek to overcome the limitations of bibliometrics such as altimetry that uses other information to measure the impact of scholarly research such as Web citations, link analyses, downloads, view counts, etc. used by social networks.²¹

Citation analysis, involves examining and analyzing the merit of the referring documents, that is used in research for supporting arguments. Citation analysis has been the most frequently used method of bibliometrics is defined as the examination of the frequency, patterns, and graphs of citations in articles and books.²² It is the analysis of the citations or references or both which forms the essential part of the scholarly publication.²³ According to Baughman, it is the systematic enquiry into the structural properties of the literature of the subject.²⁴

Scientific quality indicators

Today, the researchers who want to evaluate the quality of a periodical to be used in their research need to consult the variety of independent scientific publication database evaluation online systems made for this purpose, examples of these systems include Eigenfactor and Google Scholar that provide access to scientific content. These are considered as reliability factors.

After analysis of sources and the selection thereof, the researcher may proceed to the search and discovery of publications in these sources. With a set of publications identified and selected, the third process or stage of research begins. This stage involves the critical analysis of the publication's contents before including it as a citation and reference source.

To evaluate publication attributes, the researcher may use several criteria that include, publishing, use of norms and standard instruments, analysis of the citations and reference use by the authors.

Publishing

Well known and prestigious institutes or publishers that are involved in organizing and publishing academic works are considered as a positive reliability factor. These institution or publishers apply strict criteria for publications to adhere to in order to get published. Therefore, such publications are considered more reliable.

Use of citations and references

Depending upon the subject, researchers often base their work on previous literature to either refute or confirm their own hypothesis, thus generate a scientific dialogue for future publications. Moreover, this also demonstrates that the researchers have studied the previous literature on the particular theme and would thus avoid repeating the already completed research in their publication. Therefore, the citation analysis, i.e. how many and which particular citations are used in a publication may give a good idea regarding the reliability of the research.

However, there is no clear criteria about the number of citations that a paper must contain, as the number may vary across the areas and fields of knowledge for variety of factors neither there is an absolute set of criteria that assure the quality of the work being cited.²⁵ Further, differences exist in the types of works cited by different academic groups.²⁶ The researchers have complex motives for citing sources that add to the complication of analysis related to the quantitative and qualitative citations that they include to defend their arguments and interests, convincing the reader and to obtain a prominent position in the scientific community.²⁷

In spite of such complexities, there are good reasons to use citations and references as criteria in a publication that includes acknowledging the previous literature on the subject; giving credit to the predecessors; supporting the arguments made by the researchers, grounding on established concepts and theories; validating research methods, techniques and tools; sharing findings with peers; authenticating data and facts; exploring, analyzing or evaluating and attesting or refuting previous works; and validating results and conclusions.²⁸ When references or citations are used to these ends the publication are generally accepted as reliable. Further, studies that offer stronger evidence tend to be more effective than observational studies.²⁹

In spite of the fact that the reliability of information varies, so as its suitability for any given research project, however, there is no denial that the evaluation of information sources is a critical part of a research process. Moreover, printed sources and the sources available on internet also vary to great extent in terms of its authority, accuracy, objectivity, currency, and coverage. The quality of printed materials is managed and controlled through various standards using a system based on, peer review, editorial boards and publishing agencies. These and other checks and balances assures that the printed materials have gone through critical review and evaluation and less qualitative or poorly drafted materials are prevented from getting published. This system ensures that the information is presented in logical manner and best suited to the topic covered.

Methods for evaluating information sources

As stated earlier that due to the ever easy access to large amounts of documents, evaluation of information sources has gain a greater importance where the focus of evaluation in this context is check whether a given source is being reliable to be used to support a scholarly argument. Hjørland presented and discussed 12 different approaches to the evaluation of information sources: (1) the checklist approach; (2) classical peer review; (3) modified peer review; (4) evaluation based on examining the coverage of controversial views; (5) evidence-based evaluation; (6) comparative studies; (7) author credentials; (8) publisher reputation; (9) journal impact factor; (10) sponsoring; tracing the influence of economic, political, and ideological interests; (11) book reviews and book reviewing; and (12) broader criteria.³⁰

However, there are only three approaches that are considered to be the gold standards in research assessment that are: (1) Peer review (2) author credentials and (3) publisher reputation.³¹ In the following, these three approaches are briefly discussed along-with criticism of each approach.

Peer Review

Amongst all the peer review is the most commonly used scientific quality indicators, which is based on the assumption that the academic worth of a publication should be analyzed objectively by members from the same community and, ideally, in an anonymous way. In a peer review process, the member does not work on the review for any financial benefit, rather they consider it as their allegiance to the scientific community and their recognition as authority on the subject.³²

The peer review is used in several contexts, that include but not limited to, the evaluation of a dissertation by the research examining board, the evaluation of papers submitted to scholarly journals as well as the evaluation and approval of research projects by donors agencies among other contexts. The peer review process is the most important indicator of publications' reliability because it is evaluated by the filed specialists. In peer review approach two to three experts from the same field evaluate the information source. The review is either blind or double blind. A formal evaluation form may or may not be used but in either case the evaluations are not made public rather it is shared with authors only. Peer review approach is regarded as one of the 'gold standard' in academia.

Author credentials

The study of author credentials considered the second gold standards in research assessment. It does not require the author to have a high academic degree or association with any academic institution; rather it take into take in to consideration the author's expertise in the given field of the document that is to be evaluated. Author's credentials can be examined by, looking up to his/her resume; biographies; and bibliometric data that include both publications and citations. In principle this criteria is more or less the same as the criteria used in reviewers' selection for peer review. However, critics believe that this is an indirect evaluation. They contend that contents of the documents are more important than the credentials of its authors. Reputed authors at times write poor papers, whereas less known authors sometimes write brilliant papers. Moreover, critics also contend that scientific breakthroughs are most often made by 'outsiders'.³³

Publisher reputation

Publisher reputation is third gold standards in research evaluation. The assessment of monographs and grey literature may be done by examining the reputation of its publishers – prestigious publishers, i.e. University presses, are considered as an indicator of good quality because most of them apply a peer review process – whereas research journals are evaluated mainly by its impact factors.

Theoretical Framework

Considering the large amount of literature available and discussed briefly in the previous section on the indicators and methods for evaluation of information quality, the following theoretical framework could be very

useful to towards developing an integrated model for evaluating research quality.

Epistemic culture and knowledge

Since the beginning of the 21st century, it is has been argued by many that the era of modernity and industrial economy along with nation state societies; has gone through transformations and the new system has been emerged based on post-industrial society, post-modernity, information society, globalisation and knowledge society.³⁴ Whereas, almost all agree that knowledge and information are crucial to this transformation.

The concepts of epistemic culture and knowledge culture belong to this transformation. Knowledge is increasingly acknowledged as the major source of the today's economy. The significance of knowledge is evident from that fact it has become the major source of productivity in the current wave of the economic revolution, surpassing the traditional factors of labour and capital.³⁵

In this new wave of development, "epistemic culture" may possibly be one of the most useful theoretical frameworks to a have deep insights on the production of knowledge in the social sciences specifically. The concept of "epistemic culture" introduced by Cetina³⁶ are the cultures of knowledge settings, that are changing and expanding rapidly since more and more expert knowledge is produced outside of university settings.³⁷ The concept promotes comparative research having multi-levels, whereas emphasizing diversity within and across different institutional settings.³⁸

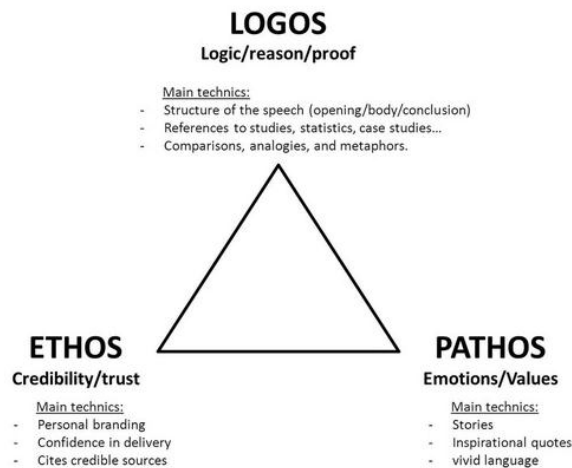
"The concept of epistemic culture is meant to cover internal processes of knowledge creation, referring to "those sets of practices, arrangements and mechanisms bound together by necessity, affinity and historical coincidence which, in a given area of professional expertise, make up how we know what we know".³⁹

In other words, epistemic cultures are the cultures of producing and affirming knowledge. Hence, the concept of epistemic knowledge is very helpful to get the insights of trends and practices of citations types and patterns in the research production of an organization. As discussed earlier, the use of diverse sources of information could be considered as an indicator of research quality. This could be further, strengthened by looking into the credibility of each information sources – as another indicator research quality.

Aristotle's Ethos (Credibility of sources)

It is to be underscored that the concept of credibility has its roots in ancient times. Greek philosopher, Aristotle advanced the term ethos⁴⁰, a Greek expression for source credibility.⁴¹ Ethos is more concerned about the appearance of the character rather than its “real” characteristics. Describing the concept of Ethos, Aristotle contends that logos mainly deal with statistical properties of the documents, i.e. references comparison, analogies and the use of metaphors to authenticate the argument of the speaker. The real question to ask when dealing with ethos “is the source credible” or stricter understanding of ethos would be to ask question “does the source appears to be credible?”

Figure 1: Aristotle Rhetorical Model



Source: <https://unionacademy.instructure.com/courses/1386/pages/rhetoric-ethos-pathos-and-logos>

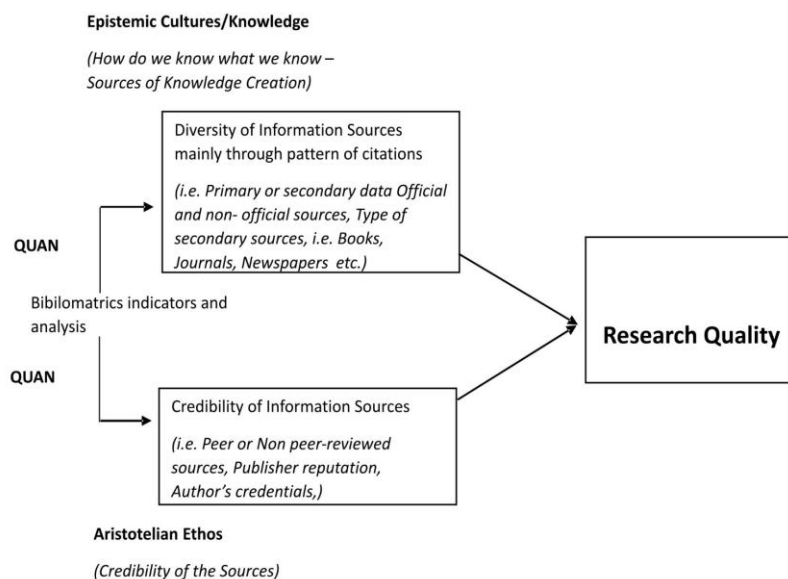
Aristotle's Rhetorical Model is equally relevant today as it provide the theoretical framework to evaluate the information sources in terms of its credibility. It should be underlined that not all information is created equal. In an academic setting, the critical evaluation of information is crucial to conduct quality research. Every source of information needs to be evaluated in term of its credibility to best support the research. In most cases, some information seems to be more credible than the rest. However, most of the time, the real challenge is how to judge the credibility of information.⁴² Where credibility is the judgments made by a researcher concerning the credibility of the authority of sources⁴³ as well as the reputation of institutions that produced it.⁴⁴

An Integrated Approach for Evaluating Research Quality

The quest for facts and its impartial reporting are very crucial in conducting scientific research. As stated earlier, the validity and quality of research output greatly depends on the diversity and credibility of the information sources consulted in reporting the data as an evidence to back up their findings and is not only a matter of individual integrity, but also very vital for safeguarding the academic credibility that builds up the trust of public in the research venture.

As evident from the above literature, citation data could serve as an objective and quantitative indicator for evaluating research performance.⁴⁵ For this purpose, a Two-Pronged multimethod bibliometrics approach that is, diversity of information source type and credible information sources is adopted to better inform evaluation. Bibliometric analysis offers "top-down" review in gathering the objective information such as, type of sources that considered an indicator of research quality. Moreover, diversity of sources as a quality indicator could be further strengthened by using criteria such as credibility of information sources. The procedure involves the quantification of the type of sources and number of credible sources.

Figure 2: Conceptual Framework



Methods and Analysis

A simultaneous multimethod design type using two quantitative methods with equal emphasis, $QUAN+QUAN^{46}$ is adopted which seeks to elaborate on or expand the findings of one method with another method. Collection of data using this model is obtained from referenced research reports. The features of acquired bibliometric data are:

- i). Full coverage: all and only Referenced reports are recorded;
- ii). Type of references: all type of publications cited in reports are indicated;
- iii). Credibility of sources: In term of peer-reviewed, publisher reputation and author's credentials are quantified that allow analyses of diversity and credibility of each information sources consulted as source of bibliographical references.

In the first method, the level of diversity is measured by quantity the number of type of sources whereas, using the second method, number of credible sources based on the criteria defined in the above model were identified and quantified to further elaborate and strengthened the findings of the first method.

Together with each document their references are processed. Redefining references as sources make it possible to analyze citation patterns and the construct the citation credibility indicators.

The information are compiled, recorded, tabulated and analyzed in order to reach a bibliometric conclusion through observations and measurement. Software such as, Microsoft Excel could be used to manage the data. During cited sources collection process, duplicate data are frequently encountered and needs to be diligently sorted to make sure what is intended to be counted.

Analysis of data is carried out through descriptive methods using a bibliometric approach. The collected data is exported to Microsoft Excel or SPSS and arranged according to various fields to allow for proper sorting. A proper arrangement and organization of data in various fields in the spreadsheet facilitate the appropriate utilization of statistical functions such as Percentages and Means. Analysis is drawn to assess the sources identity, their diversity patterns and credibility of each source cited in the reports. The analysis of each variable returned values and results that are presented in form of tables and depicted in charts and graphs.

For results pertaining to the diversity in cited references, the references are divided into predefined type of information sources. That may include but not limited to the most common type such as: i). Journals ii). Books & Monographs iii). Conference papers iv). Newspapers & Magazines, v). Websites vi). Official sources vii). Primary sources and viii). Reports & Thesis.

Descriptive tables and figures are used to indicate types of referenced sources and number of citations referenced. The results are illustrated descriptively in tables and graph.

Using the following model, the indicators are extracted and recorded against the predefined fields. A Bibliometrics methods and analysis is used to know the diversity level of a single publication or total output of research production using the using the following equation:

$$\text{Diversity}_1 = \text{Number of type of cited work} / \text{Total number of source type defined}$$

Whereas, the mean diversity level in case of multiple documents is calculated using the following equation:

$$\text{Diversity}_m = \text{Diversity}_1 + \text{Diversity}_2 \dots \text{Diversity}_n / \text{Total number of research documents}$$

Further, to evaluate the credibility of each referenced source the parameters such as, of peer or non-peer reviewed, publisher reputation and author credentials of sources of information is applied to quantify the number of credible sources.

To find out the credibility level of a research document the following equation is used:

$$\text{Credibility}_1 = \text{Number of credible sources} / \text{Total number of citations} * 100$$

Further, the mean credibility level in case of multiple documents is determined by the following equation:

$$\text{Credibility}_m = \text{Credibility}_1 + \text{Credibility}_2 \dots \text{Credibility}_n / \text{Total number of documents}$$

Conclusion

This study offered an integrated approach by introducing indicators that is, diversity and credibility, towards evaluation of research quality that could serve to evaluate a research quality and total output of research production of an organization involved in research. Further, the model presented in this study is equally applicable to evaluate research quality in cases where no citation index or database is readily available for measuring their impact. The model could be very useful in providing some useful insights for academic as well as policy formulation and recommendation bodies in comprehending the effect of epistemic cultures that include their organizational structures, operational practices, ideological orientation and political affiliation on research quality by identifying the citation pattern and research strength of policy research organization and thus enabling policy maker to make informed and better judgments.

Notes & References

- ¹ Arazy, Ofer, Oded Nov, Raymond Patterson, and Lisa Yeo. "Information quality in Wikipedia: The effects of group composition and task conflict." *Journal of Management Information Systems* 27, no. 4 (2011): 71-98.
- ² Colepicolo, Eliane. "Information reliability for academic research: review and recommendations." *New Library World* 116, no. 11/12 (2015): 646-660.
- ³ Graber Doris A. *Mass Media & American Politics*, 7th ed. (Washington, DC: CQ Press, 2006).
- ⁴ Gans, Herbert J. "Multiperspectival News," in *Philosophical Issues in Journalism*, ed. Elliot D. Cohen. (New York: Oxford University Press, Inc. 1992)
- ⁵ Rosenstiel, Tom, Carl Gottlieb, and Lee Ann Brady. "Local TV News Project 1998. What Works, What Flops, and Why. What is a 'Good' Newscast?." *Project for Excellence in Journalism* 1 (1999). See also: Rosenstiel, Tom, Carl Gottlieb, and Lee Ann Brady. "Quality brings higher ratings, but enterprise is disappearing." *Columbia Journalism Review* 38, no. 4 (1999): 80; Rosenstiel, Tom, Carl Gottlieb, Lee Ann Brady, and Dan Rosenheim. "Time of peril for TV news." *Columbia Journalism Review* 39, no. 4 (2000): 84.
- ⁶ Lemert, James B. *Criticizing the media: Empirical approaches*. (Newbury Park, CA: Sage Publication, 1989).
- ⁷ Rosenstiel, Tom, Carl Gottlieb, and Lee Ann Brady. "Local TV News Project 1998...", loc.cit.
- ⁸ Hilligoss, Brian, and Soo Young Rieh. "Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context." *Information Processing & Management* 44, no. 4 (2008): 1467-1484. See also: Mai, Jens- Erik. "The quality and qualities of information." *Journal of the American society for information science and technology* 64, no. 4 (2013): 675-688; Wathen, C. Nadine, and Jacquelyn Burkell. "Believe it or not: Factors influencing credibility on the Web." *Journal of the American society for information science and technology* 53, no. 2 (2002): 134-144.
- ⁹ Kim (2010) quoted in Colepicolo, Eliane. "Information reliability for academic research: review and recommendations." op.cit.
- ¹⁰ Mai, Jens- Erik. "The quality and qualities of information." *Journal of the American society for information science and technology* 64, no. 4 (2013): 675-688.
- ¹¹ Gonzalez, Cristina. "Undergraduate research, graduate mentoring, and the university's mission." *Science* 293, no. 5535 (2001): 1624-1626. See also: Smith, Eleanor M. "Developing an information skills curriculum for the sciences." *Issues in Science and Technology Librarianship* 37, no. 1 (2003).
- ¹² Wathen, C. Nadine, and Jacquelyn Burkell. "Believe it or not: Factors influencing credibility on the Web." op.cit.
- ¹³ Hilligoss, Brian, and Soo Young Rieh. "Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context." *Information Processing & Management* 44, no. 4 (2008): 1467-1484.

¹⁴ Colepicolo, Eliane. "Information reliability for academic research: review and recommendations." op.cit.

¹⁵ El-Maamiry, Ali Amour, and Mohammad Abid Ghauri. "Measuring information quality: Concerns on the use of Bibliometric studies." *International Journal of Information Dissemination & Technology* 3, no. 4 (2013), p. 275

¹⁶ Glanzel, Wolfgang. *Bibliometrics as a research field a course on theory and application of bibliometric indicators*. 2003. Available at: http://www.cin.ufpe.br/~ajhol/futuro/references/01%23_Bibliometrics_Module_KUL_BIBLIOMETRICS%20AS%20A%20RESEARCH%20FIELD.pdf

¹⁷ Borgman, Christine L. *Scholarly communication and bibliometrics*. (n.p: Sage Publications, 1990). See also: Paisley, William. "The future of bibliometrics." *Scholarly communication and bibliometrics*. (n.p: Sage, 1990): 281-299.

¹⁸ laws such as the Bradford's laws for journal distribution of productivity in a discipline and Lotka's law for the distribution of author's productivity (Borgman and Furner, 2002).

¹⁹ Costa et al. (2012) quoted in Colepicolo, Eliane. "Information reliability for academic research: review and recommendations." op.cit.

²⁰ El-Maamiry, Ali Amour, and Mohammad Abid Ghauri. "Measuring information quality: Concerns on the use of Bibliometric studies.", op.cit. See also Okubo, Yoshiko. "Bibliometric indicators and analysis of research systems." OECD Science, Technology and Industry Working Papers (1997).

²¹ Zahedi, Zohreh, Rodrigo Costas, and Paul Wouters. "How well developed are altmetrics? A cross-disciplinary analysis of the presence of 'alternative metrics' in scientific publications." *Scientometrics* 101, no. 2 (2014): 1491-1513.

²² Garfield, Eugene. "Citation indexes for science. A new dimension in documentation through association of ideas." *International journal of epidemiology* 35, no. 5 (2006): 1123-1127.

²³ Martin, Lowell A. "User studies and library planning." *Library Trends* 24(30).

²⁴ Baughman, James C. "A structural analysis of the literature of sociology." *The Library Quarterly* 44, no. 4 (1974): 293-308.

²⁵ Krell, Frank-Thorsten. "Why impact factors don't work for taxonomy." *Nature* 415, no. 6875 (2002): 957. See also: Cameron, Brian D. "Trends in the usage of ISI bibliometric data: Uses, abuses, and implications." *portal: Libraries and the Academy* 5, no. 1 (2005):105-125.

²⁶ Bollen, Johan, Marko A. Rodriguez, and Herbert Van de Sompel. "Journal status." *Scientometrics* 69, no. 3 (2006): 669-687.

²⁷ Bornmann, Lutz, and Hans-Dieter Daniel. "What do citation counts measure? A review of studies on citing behavior." *Journal of documentation* 64, no. 1 (2008): 45-80.

²⁸ Weinstock, Melvin. *Citation Index*. Encyclopedia of Library and Information Sciences. (New York, NY: M.Dekker, 1971).

²⁹ Nordenstrom, J. (2008), quoted in Colepicolo, Eliane. "Information reliability for academic research: review and recommendations." op.cit.

- ³⁰ Hjørland, Birger. "Methods for evaluating information sources: An annotated catalogue." *Journal of Information Science* 38, no. 3 (2012): 258-268.
- ³¹ Bailin, Alan, and Ann Grafstein. *The critical assessment of research: Traditional and new methods of evaluation*. Elsevier, 2010.
- ³² Deslandes and Silva (2013) quoted in in Colepiccolo, Eliane. "Information reliability for academic research: review and recommendations." op.cit.
- ³³ Fleck, Ludwik. *Genesis and development of a scientific fact*. (University of Chicago Press, 2012); Hjørland, Birger, and Jeppe Nicolaisen. "The social psychology of information use: seeking 'friends', avoiding 'enemies'." *Information Research* 15, no. 3 (2010): 15-3.
- ³⁴ Giddens, Anthony. "The consequences of modernity." (Stanford, CA, Stanford University Press, 1990).
- ³⁵ Drucker, Peter. "F.(1993), Post-capitalist Society." *HarperBusiness, New York* (1993). See also: Bell, D. "1973 The coming of post-industrial society: A venture in social forecasting. (New York: Basic Books, 1973).
- ³⁶ Cetina, Karin Knorr. *Epistemic cultures: How the sciences make knowledge*. (n.p: Harvard University Press, 2009).
- ³⁷ Gibbons, Michael, ed. *The new production of knowledge: The dynamics of science and research in contemporary societies*. (n.p: Sage, 1994).
- ³⁸ Cetina, Karin Knorr. *Epistemic cultures: How the sciences make knowledge*, loc.cit.
- ³⁹ Cetina, Karin Knorr. "Culture in global knowledge societies: Knowledge cultures and epistemic cultures." *Interdisciplinary science reviews* 32, no. 4 (2007): 363
- ⁴⁰ The three major ways by which presenters persuade audience – ethos, pathos and logos.
- ⁴¹ Griffin, E. M. *A first look at communication theory*. McGraw-Hill, 2006. See also: Infante, Dominic A., Andrew S. Rancer, and Deanna F. Womack. "Building communication theory." (3rd ed.). (Prospect Heights, IL: Waveland Press, 1997).
- ⁴² Hilligoss, Brian, and Soo Young Rieh. "Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context." *Information Processing & Management* 44, no. 4 (2008): 1467-1484.
- ⁴³ O'keefe, Daniel J. *Persuasion: Theory and research*. Vol. 2. (n.p: Sage, 2002).
- ⁴⁴ Gass, Robert H., and John S. Seiter. *Persuasion: Social influence and compliance gaining*. (n.p: Routledge, 2015).
- ⁴⁵ "Whitepaper Using Bibliometrics: A guide to evaluating research performance with citation data", Reuters. Available at: http://ip-science.thomsonreuters.com/m/pdfs/325133_thomson.pdf
- ⁴⁶ Morse, Janice M. "Principles of mixed methods and multimethod research design." *Handbook of mixed methods in social and behavioral research* 1 (2003): 189-208.