Sweet Spots for Manuscripts:
Visualizing the quality of scientific production*

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Introduction

• Information is the key element of research activity…
  … It is the researcher who decides how to obtain the information, what to do with it, how to treat it, and finally, how and to whom it is delivered (Sarabia, 1999).

• Although today the huge volume and the great facility of access to scientific information in digital media generates a promising turn scenario … this presents difficulties for its valuation and synthesis in an efficient manner (Ramírez-Correa and García-Cruz, 2004).

• In particular, the significant rate of growth of new scientific journals (Larsen and von Ins, 2010), imposes a cardinal challenge for the researcher:

  What is the appropriate journal to disseminate research results?

Answering this question is a key milestone in the scientific process (Kelner, 2007; Resta, 2010).
Introduction

• In the last decade, there have been efforts to help evaluate and synthesize various domains of scientific knowledge.

• **Knowledge Domain Visualization** (KDViz) deals with the analysis and modeling of the structure and dynamics of a scientific domain (Chen and Hicks, 2004).

• While in KDViz, various techniques are used, such as exploratory data analysis, information retrieval, and text mining (Chen, 2006) …

  … knowledge domain visualizations traditionally based on citations (Kraker et al., 2015).
Introduction

• The aim of this paper is to present a visual approach for analyzing scientific activity in indexed journals based on bibliometric indicators.

• The result of this analysis can be useful to:
  – support the choice of a scientific journal to send a manuscript with research findings, especially in domains of knowledge where the author is a novice.
  – obtain an overall assessment of the production of researchers, research groups, institutions or countries.
Conceptual basis of the analysis approach

• Until just a couple of decades ago, the review of the scientific literature had a strong qualitative mark.
  
  ... Today, with the huge amount of articles to which researchers have access through the Internet and the many databases available, it is necessary to distinguish relevant articles and sources for the researcher, for which they are increasingly incorporating elements quantitative to this task.

• Different databases have incorporated features that facilitate some of this information within their browsers
  
  ... the analysis approach that supports SSfM goes a step further in this line. Giving answers to researchers when analyzing the literature and designing their own publishing strategies.
The proposed analysis approach is based on indicators associated with the volume and citation of articles in scientific journals.
Conceptual basis of the analysis approach

• **Citations** are *explicit relationships between articles that have common aspects* (Chandy and Williams, 1994). These relationships are essential to build knowledge in a particular discipline, and are one of the foundations on which the scientific method is built (Knight et al., 2000).

• These citations can be seen as social exchanges between authors and readers (Zinkhan et al., 1992), and therefore the citation to a particular article can be considered as an indicator of quality of such work (Knight et al., 2000). The "valuable" articles will be cited and drive both new research and future publishing efforts.

• A journal that is most often cited is more used by the scientific community, and thus will be more attractive to submit new manuscripts.

• If we do not consider other elements in our analysis, more manuscripts increase competition for publication space in that journal, and associated with this, the quality of the journal will increase.

• Then, the number of citations can be considered an **indicator of the quality** of scientific journals.
Conceptual basis of the analysis approach

• In particular, the approach is based on two indicators related to citations, SCImago Journal Rank (SJR) index and h-index, and one associated with the volume, annual number of published articles.

• **SJR index** is an indicator of the prestige of a scientific journal and is calculated through a network of citations to the journal in which the nodes represent the active journal sources, and the directed links between nodes represent citation relationships among those journals (González-Pereira et al., 2010).

• **h-index** was proposed to measure the impact of an author with the total number of publications and citations generated from them, specifically, it is defined as the largest number $h$ such that $h$ publications have received at least $h$ citations each (Hirsch, 2005). The same way as for authors, this index can be calculated for scientific journals.
Operationalization of the Analysis Approach

- SSfM software was built to implement the analysis approach. SSfM operates online and is based on Java, PHP, and PostgreSQL (http://www.sweetspotsw.com).

- The inputs to SSfM are exported files as results of searches in the database Scopus of Elsevier (http://www.scopus.com). Scopus is a bibliographic database covering about 20,000 journals in the scientific, technical, medical, and social sciences.

- In addition, SSfM used for processing the data taken from the site SCImago Journal & Country Rank (http://www.scimagojr.com). SCImago Journal & Country Rank site annually updates bibliometric indicators for journals contained in Scopus.
Operationalization of the Analysis Approach

• Given the differences between disciplines in relation to the volume of publications in each journal and the number of citations to each article in SSfM the indicators used in the analysis must be transformed into percentiles.

• Therefore, each journal is valued at three ranges of percentiles: (1) SJR, (2) H, and (3) annual number of published articles. Based on the input provided by the user and using the indicators in its own database, SSfM generates an integrated graphic as a visualization element.

• Finally, SSfM incorporates filters to the graph associated with the area, category, and the country of the scientific journals.
Implementation of the analysis approach

1. Each circle represents a scientific journal into the data contained in the files that were provided by the user to the application.
2. The size of each circle indicates the number of journal articles into the data files that were provided by the user.
3. The color depends on the percentile of the journal regarding its h-index, the circle is red if less or equal to the percentile 33, it is yellow if it is between the percentile 33 and 66, and it is green if it is higher than 66 percentile.
4. The position on the X axis of the circle is associated with the percentile of the SJR index by the journal. The position on the Y axis of the circle is associated with the percentile of the annual number of articles published in the journal.
Example (not in paper): An issue of research

- Where I can publish a paper on **dynamic capabilities and information technology in education**?

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  What journals have published articles on the dynamic capabilities and information technologies in education?

- Scopus search: ALL ( "dynamic capabilities" "information technology" "education") AND PUBYEAR > 2010 AND ( LIMIT-TO ( DOCTYPE , "ar" ) )

- Result: **399 documents**
Dynamic capabilities and information technology in education
Dynamic capabilities and information technology in education
Dynamic capabilities and information technology in education

| Title                                                                 | Year | Volume |
|----------------------------------------------------------------------|------|--------|
| Enterprise architecture, IT effectiveness and the mediating role of IT alignment in US hospitals | 2012 | 22     |
| More than providing 'solutions': Towards an understanding of customer-oriented citizenship | 2015 | 25     |

**Abstract**

Despite the possible benefits of implementing healthcare information technologies, successful implementation of effective healthcare information technology is constrained by cultural and regulatory concerns and technical obstacles encountered when establishing or upgrading an organisation's enterprise infrastructure. In this paper, we advance Ross' four-stage model of enterprise architecture maturity as a valuable IT resource for helping healthcare organisations sustain a competitive advantage. We use partial least squares (PLS) structural equation modelling to analyse survey data from 164 US hospitals at different stages of EA maturity. Our results provide evidence that enterprise architecture maturity directly influences the effectiveness of
Example in paper: The research activity of the institutions belonging to the council of rectors of Chilean universities

- CRUCH is an organization created for the national coordination of academic activity of the 25 Chilean universities that comprise it, ensuring the quality and excellence of them...
  
  ... the institutions belonging to CRUCH directly generate over 87% of the research produced in Chile with international visibility (Ramírez and Alfaro, 2013).

- For purposes of facilitating the comparison of institutions with similar volumes of scientific production, the following procedure was performed.
  
  - Based on information on the production of articles contained in SCImago Institutions Ranking (SIR), a global report that ranks more than 2000 of the best research institutions a hierarchical cluster analysis was performed.
  
  - This analysis identified four groups; the first three groups are composed of universities within the SIR report (which are grouped by volume), and the fourth group consists of those institutions that are not in the report.
About Group 1, we note that there are many prestigious journals where these institutions publish their results, however, it is surprising that given the scientific orientation of the institutions in this group, there are numerous publications in journals of low prestige.
About Group 2, we can say that compared to Group 1, a clear decrease in publications in prestigious journals is seen. Furthermore, there is a greater dispersion of the prestige of the journals where research results are published. This structure may be associated with policies to encourage research that reward volume over quality.
About Group 3, it can be noted that in addition to having fewer publications than Group 2, the prestige of the journals where research results are published decreases, in fact, except for the University of La Serena, the volume is associated with journals with an average or low prestige.
And finally, on Group 4 we can indicate that because of the low volume of publications, there is no clear pattern, and while there are publications in high-impact journals, this fact is an odd element among a few publications in journals of lower prestige.
Last example (not in paper): The research activity of University of the Bío Bío

| Year | Scopus |
|------|--------|
| 2011 | 103    |
| 2012 | 107    |
| 2013 | 127    |
| 2014 | 133    |
| 2015 | 143    |
BB 2013
BB 2014
BB 2015

Percentile of SCImago Journal Rank (SJR)
1. Concentrating on a **single image** the result of the research activity is useful for the assessment and synthesis of efficient form of a domain of knowledge, especially when the image is produced by a computer system as SSfM, as it allows to operate with large volumes of data quickly.

2. It is advisable to have chosen the journal you will send a manuscript to before completing it. Therefore, the use of SSfM be done in the **early stages** of writing the manuscript.

3. The approach can be used for the **rapid and comprehensive evaluation** of the results of research by authors or institutions. This implies that organizations that need to assess their researchers may consider using SSfM as a tool of management control.

4. With this approach it is possible to **observe patterns of behavior** that contrast volume and quality of research results, thereby allowing to establish research strategies at individual, team, and/or institutional levels.
As opportunities for future studies:

1. In relation to the approach, it is possible to incorporate other bibliometric indicators such as citations per document, and the rejection rate of each journal.

2. Related to SSfM, it would be useful to incorporate a new feature that shows how it decomposes and evolves a graph by year, within the time frame of the analysis. You might also consider searching in Scopus within SSfM, and analyze not only journals but sub areas of knowledge.

3. Associated with the CRUCH example, it would be advisable to conduct a study that shows how institutions have progressed over the last three decades, a period where the volume of publications in Chile has tripled.
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Welcome to Sweet Spots for Manuscripts 1.0

Sweet Spots for Manuscripts (SSfM) is a tool to choose which journal or magazine is more suited to publish a particular manuscript.

SSfM is the result of academic work and has the purpose to aid scientists with the search of a journal where to publish their work. SSfM is aimed at both the novel researchers without publishing experience, and senior researchers exploring new disciplinary or multidisciplinary fields.

Documents and Technical Reports

TR01-Research activity of the Council of Rectors of Chilean Universities, year 2014

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