

## **Journal rankings as a means for structuring bibliographic databases: a case study in Economics and Business Studies**

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**Abstract:** We present an approach towards a web based system of journal rankings for collecting, structuring, maintaining, publishing, retrieving and accessing bibliometric information with a focus on journals in Economics and Business Studies. Providing a gateway to several relevant rankings and journals, we added external information to the individual ranking results including subject categories and information from SHERPA/RoMEO list and the German national *Database of Journals (Zeitschriftendatenbank)*. We outline some possible use cases for journal rankings and give hints on further improvements.

**Keywords:** Bibliometrics, Informetrics, Journal rankings, Journal ranking guide

### **1. Introduction**

In the last years, bibliometric approaches and studies have gained increasing interest in both the research and the LIS (library and information science) community. While topics like the measurement of research performance or the observable impact of scientific articles and journals are long since on the agenda (Garfield and Sher 1966), we definitely do observe a compaction of bibliometric activities. Especially in the field of journal rankings in Economics and Business Studies, we do notice a significant increase in the development of journal rankings. One reason for this may be that the overall scientific output has constantly grown during the last decades both in the eastern and in the western world (Larsen and von Ins 2010). To survey or to judge this output even in a sub discipline has become very challenging. More quantitative and ‘efficient’ procedures are needed than single experts’ view. On the other hand, just this

‘experts’ view’ is being requested in the light of several quantitative rankings (Bräuninger and Haucap 2011). A further reason may be that both funding of research and the recruitment of researchers is increasingly dependent on ‘objective’ indicators for research performance. As a reaction to this, organizations and researchers try to gain impact on the assessment of research performance by establishing alternative rankings.

The aim of this paper is to introduce into a web-based management of journal rankings, rather than to establish some kind of meta-ranking or yet another ranking method (which we consider to be part of the disciplinary research). The rest of this paper will first give an overview of the state-of-the-art of journal rankings in Economics. Afterwards, we outline our conception and technical framework for a web-based environment for maintaining and providing data on journals and rankings. In the third section, we describe three use cases for applying the data in different contexts. We conclude by addressing some improvements of the current system.

## **2. Journal rankings in Economics: the story so far**

The most influential although most criticised ranking is the Journal Citation Report (JCR) which is calculated using the impact factor (IF) based on data from the SSCI. The IF is the average number of citations received per paper published in that journal during the two preceding years. This method has been further developed by taking the quality of the citing journal into account (Liebowitz and Palmer 1984) and further extended (Kalaitzidakis, Mamuneas and Stengos 2003), (Kodrzycki and Yu 2006), (Laband and Piette (1994). Another approach is the invariant method (Ritzberger 2008) which also has received some attention. Also should be mentioned Palacio-Huerta, I. and O. Volij (2004) and Combes and Linnemer (2003).

Apart from developing new methods, the databases used to calculate the rankings have changed. Since 2004 Google Scholar and Scopus are competitors to the Social Sciences Citation Index (SSCI). The former is, perhaps due to its vagueness and instability (Harzing and van der Wal 2008), not used by any of the rankings known to us. Despite its large coverage Scopus’ data has failed to make a mark and has only been used to calculate SCImago Journal Rank and the Eigenfactor Article Influence. EconLit is the only subject specific database from which data has been consulted.

The dissatisfaction with the national (for Germany see e.g.: (Bräuninger and Haucap 2011) (for France see: CNRS) and subject coverage (for business studies see: VHB JourQual (Schrader, U. and Hennig-Thurau, T. (2009) and ABS Academic Journal Quality Guide) of all the aforementioned databases have led to an increase in the number of expert surveys particularly in Europe. Next to completely independent surveys nearly all institutional rankings rely on an

element of expert opinion. Since in all these cases only a small set of experts is involved the journal coverage of these surveys is rather small – ranging from 150 journals to 800 journals (VHB JourQual 2010) compared to over 1,000 journals in the JCR. Yet these rankings are geared to the specific needs of the institutions – like, for instance, when it comes to decisions regarding hiring, internal promotion or distribution of funds.

The quality of a ranking can be devised by two factors (Hennig-Thurau and Schrader 2009): The articles introducing new methods of ranking are published in highly ranked national or international journals or the ranking is provided by institutions which have a high reputation. In fact the rankings published by institutions enjoy the largest confidence by third parties.

A recent development which should be observed closely is the provision of bibliometric data by RePEc (Research Papers in Economics). The currency of the data is its main advantage and drawback at the same time (Seiler and Wohlrabe 2012). It provides 6 journal rankings based on: simple impact factor, recursive impact factor, discounted impact factors, h-index (Hirsch 2005) and abstracts views. It remains to be seen if it will be accepted as a journal ranking source.

### **3. The ‘Journal Ranking Guide’ (JRG) as a web framework for information on journals and rankings**

#### **General outline and design principles**

By developing a web page for browsing, searching and viewing bibliometric data on journals and rankings, we wanted to meet the needs of different target groups:

- Librarians who are interested in rankings for maintaining their library’s holdings by acquiring and subscribing journals,
- information scientists who want to perform bibliometric studies, e.g. to compare different rankings with the impact factor,
- researchers both as producers and consumers of bibliometric data, the latter with respect to their publishing work,
- software developers whose applications must access the journal and ranking information in an efficient and transparent way.

A further assumption was that we just wanted to expose existing rankings without generating a meta-ranking, introducing a new ranking, or preferring one of the existing rankings. Rather, we aimed at structuring both journals and rankings by clustering them into different categories: the former by categorizing them into subjects according to the Dewey Decimal Classification, the latter according to subjects and types of rating.

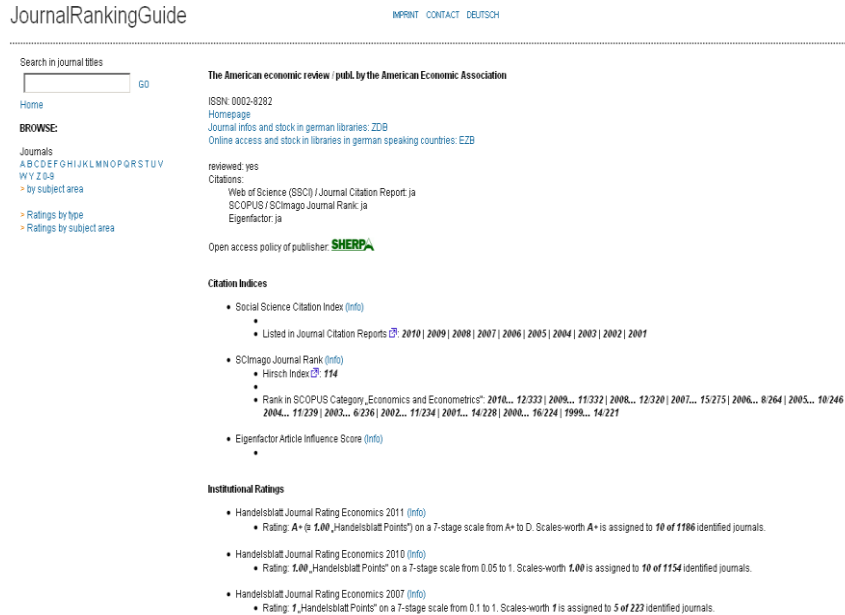


Image 1: Screenshot of a journal record in JRG

### Facts and figures

Overall, the JRG (<http://zbw.eu/zis>) provides ranking information from nearly 6.000 scientific journals within the Social Sciences and Economics. 70% of these journals are reviewed, thus formally quality assured. 50% of them are listed in SSCI, or in other words: nearly all of 2.500 SSCI listed journals are ranked according to at least one of the rankings. There are 31 rankings in total, which we subdivided into four classes:

- Citation indices (3)
- Institutional ratings from research institutes, departments of Economics and societies (15)
- Expert surveys (5)
- Bibliometric studies from researchers (8)

Despite their origin and methodology the rankings are heterogeneous with respect to the amount of included journals, the database used (Web of Science, Scopus, Google Scholar, EconLit, JCR), their metrics, refresh rates and coverage. For this reason, we disclaimed from calculating or establishing a meta-ranking.

Table 1 shows the deviance from those journals that are numerically ranked in interval scale, with an almost three-quarter within a deviance less than or equal to 1.0. On the other hand, the majority of journals is listed in only 5 rankings or less (Table 2), hence a reliable meta-ranking would only comprise a minority of 16% of all journals.

std.dev.	nr.	% of 3283 (cumulative)
==0	1048	32%
<=0.5	1238	38%
<=1.0	2372	72%
<=2.0	3195	97%
>2.0	88	3%
sum	3283	100%
undef	2599	

Table 1: Deviances in rankings

nr. rankings	nr. journals	% of 5882
==0	0	0%
<=2	870	15%
<=5	2385	41%
<=10	1609	27%
<=40	933	16%
sum	5882	100%

Table 2: Distribution in rankings

### Technical framework

The programming of JRG is based on MySQL and CakePHP, hence following the Model-View-Controller paradigm. The external Microsoft® Access data source is maintained by our project partner, the Institute for Employment Research (IAB) in Nuremberg. The JRG's database is regularly updated. It is planned to setup a web-based content management system for maintaining the data by means of the application. Links and requests to external information on journals (SHERPA/RoMEO list and availability checks from the German Journals Database *Zeitschriftendatenbank*) are automatically created by appending the ISSN number. JRG does only provide a simple search for journal titles, but with auto suggesting these titles on keying.

### 4. Use cases for applying JRG's data

In the following, we describe three potential use cases for library purposes:

#### Use case 'retrieval application'

Library applications for retrieving and accessing scientific information still do not support well enough user specific needs and profiles, esp. for science and research. While faceted browsing and searching in different metadata categories like 'institutions' or 'document type' has become a standard for filtering search results, it is still unclear which relevance criteria are being applied for sorting. Hence, an obvious option would be to integrate the ranking information for journals resp. articles in order to resort a result list. This could be achieved by

applying either a default ranking with good coverage (e.g., SSCI index), or a specific ranking, e.g. the 'Tinbergen Institute Journal Ranking'. Apart from the question which ranking to be preferred, the integration of ranking information requires a framework for metadata handling which is capable of identifying all articles which belong to a certain journal.

#### **Use case 'paper submission'**

Nowadays, many libraries are hosting repository systems for submitting, managing and archiving scientific papers. Especially in Economics, there is a significant output of working papers and preprints for quick dissemination of and access to research results (Borst and Weiland 2009). While these repository systems are supposed to support Open Access policies, from the researcher's point of view they are not equivalent to publication agents like publishers. Rather, they are conceived as a platform for ongoing research work, which is capable to manage different versions of a paper. To put it simply, a repository is for submitting and managing preprints which are supposed to be published afterwards in a journal. Hence, it would be an option to support the researcher by suggesting potential journals and publishers as a reward for submitting her or his work. Such a 'potential journal' could be identified by its topics in combination with its ranking according to JRG's data and its Open Access policy according to SHERPA/RoMEO list.

#### **Use case 'evaluation and managing of a library's holdings'**

Facing a general growth of publications while at the same time experiencing severe budget cuts, libraries must increasingly focus on most relevant and wanted journals. From the point of view of an information provider, crucial questions will be: Do my holdings reflect the rankings? Is there a significant correspondence between most wanted and top ranked journals? Is there a usage pattern according to a certain ranking, or do usage patterns simply follow the rule 'most cited = best ranked = most wanted'? In this situation, JRG's data could help to identify top ranked journals or to analyze and optimize current holdings by checking the report of subscribed journals. So far, the systematic evaluation, controlling and planning of a library's holdings and subscriptions by means of journal rankings is at its very beginning.

## **5. Conclusion**

In Economics, bibliometrics in terms of journal rankings is popular, but heterogeneous and scattered. With the JRG, we aggregate, structure and augment these rankings with additional information, serving as a potential hub for bibliometric data to other information providers. The latter may find more use cases for applying the data. Improvements of the current database mostly aim at identifying journals which appeared under different names, thus handling duplicates. Further developments of the JRG focus on

- providing automatic access to machine readable data. While the web page of JRG is crucial for exposing and viewing the data, it is not suitable for consuming it by other applications. Yet not implemented, we therefore want to establish REST based web services (Richardson and Ruby 2007) to query and access the data in an efficient way. A useful web service for instance would be the request for ranking information on a certain journal by using its ISSN.
- generating more descriptive information on a journal via (automatic) keyword extraction from included articles,
- visualization of text based statistics.

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