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Benchmarking scientific journals from the submitting author's viewpoint

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ABSTRACT: Authors of scholarly papers to a large extent base the decision on where to submit their manuscripts on the prestige of journals, taking little account of other possible factors. Information concerning such factors is in fact often not available. This paper argues for the establishment of methods for benchmarking scientific journals, taking into account a wider range of journal performance parameters than is currently available. A model for how prospective authors determine the value of submitting to a particular journal is presented. The model includes eight factors that influence an author's decision and 21 other underlying factors. The model is a qualitative one. The method proposes to benchmark groups of journals by application of the factors. Initial testing of the method has been undertaken in one discipline.

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Introduction

When authors of scientific papers decide where to submit for publication they have to make difficult choices based on incomplete information. This is particularly true for younger researchers who lack experience as authors and reviewers. Often these researchers get guidance from senior colleagues and guidelines from their departments and universities. Journal rankings of different kinds, including the impact factors published by Thomson Scientific, play an important role in this, and there may be internal reward systems that strongly influence the choices. Authors pay less attention to other factors such as journal circulation and expected publication delay. Authors could also better take into account the risk of their papers being rejected and the extra time delays this entails before eventual publication elsewhere.[1] Information concerning these types of performance factors is often not made available by journal publishers and editors.

This article proposes to benchmark groups of journals in the same disciplines by extracting comparable information about as many as possible of the factors. Benchmarking as a method has been widely used in industry, for instance when a particular firm wants to compare its procedures with competitors or perhaps with firms from other branches of industry. The results are usually not given as single numerical values, but rather as graphs were the firm is positioned – often in a two-dimensional figure so that two factors can be compared.

It would be very useful for prospective authors to have as complete information as possible for the journals they are considering. However, this kind of data is not currently readily available and comparable. Where it is available, it must be drawn from a large number of sources. This article starts with a literature review and then goes on to

present a model for how prospective authors could determine the value of submitting to a particular journal. The model includes eight factors that relatively directly influence the author's decision and 21 other underlying factors.

Literature review

Previous research has explored the factors authors take into account when deciding where to publish. Rowlands *et al.* surveyed the opinions of nearly 4,000 senior researchers about what they want from the journals system.[2] According to them, authors want pretty much the same thing out of the journals system as they have wanted for the past four centuries, namely the ability to target a very specific group of key readers, and they want the recognition publishing in peer-reviewed scientific journals offers. Rowlands and Nicholas surveyed more than 5,000 senior journal authors on a number of issues relating to the scholarly communication system.[3]

reaching the right readership is more important than reaching the widest possible readership

Swan and Brown have conducted a number of studies for ALPSP and JISC.[4–7] The first survey studied what motivated and concerned 3,000 authors regarding conventional publishing. The second survey of 1,246 authors focused on the transition from print to electronic publishing. The third survey compared and contrasted the responses of 154 authors who had published on an open access basis with 157 who had not. To the fourth survey there were a total of 1,296 respondents. Both Swan and Brown[6] and Rowlands and Nicholas[3] found that authors are concerned about the effects of the 'publish or perish' culture. Researchers worry about the need to publish more as well as the need to publish in journals with high impact factors as more and more of their funding is based on their publishing activities. While the aims, questions, and populations surveyed differed, they provide a wealth of information about the aspects authors take into consideration when submitting their articles to journals.

The two most important factors are *readership* and the *quality of the journal*. Reaching the right readership is more important than reaching the widest possible readership – although both are important. However, although readership is very important, Swan and Brown found that authors base their estimates of readership more on hearsay that fact.[4] The quality of the journal can be estimated by the impact factor, the reputation of the journal, and the prestige of the editorial board. Although not covered in the other surveys Swan and Brown found that after readership *the closely related factors of career advancement, personal prestige, and funding were very important*.[4] The studies of authors' motivations mentioned above have not focused on the indirect financial rewards from publications. For example Swidler and Goldreyer[8] and Baser and Pema[9] have used different methods to estimate the direct and indirect monetary value journal articles have for their authors. Not surprisingly, the number of publications and in particular the quality of publications have a strong correlation with salaries. The quality of a journal is reflected in its impact factor, which in turn is determined by the number of citations to articles in the journal. One can therefore also calculate the rates of return to citations.[10]

Apart from these above-mentioned factors, which are deemed very important, some other factors, such as inclusion in abstracting and indexing services, speed of refereeing and publication, print and electronic versions, etc., are also deemed important – but to a lesser extent. The least important factors are journal price and permission to post preprints and postprints.

The net value of submission model

Before starting to measure the most important performance characteristics for journals it is important to have some sort of model for how an author values different facets of the services that a particular journal can offer him/her. The premise of this model is that the journal is a service provider to the author.

The term net value of submission is short for the risk- and cost-adjusted average expected value of submitting a paper to a journal. In economics, risk adjustments are often done. For instance, the expected average return on risky investments needs to be higher than for relatively risk-free ones.

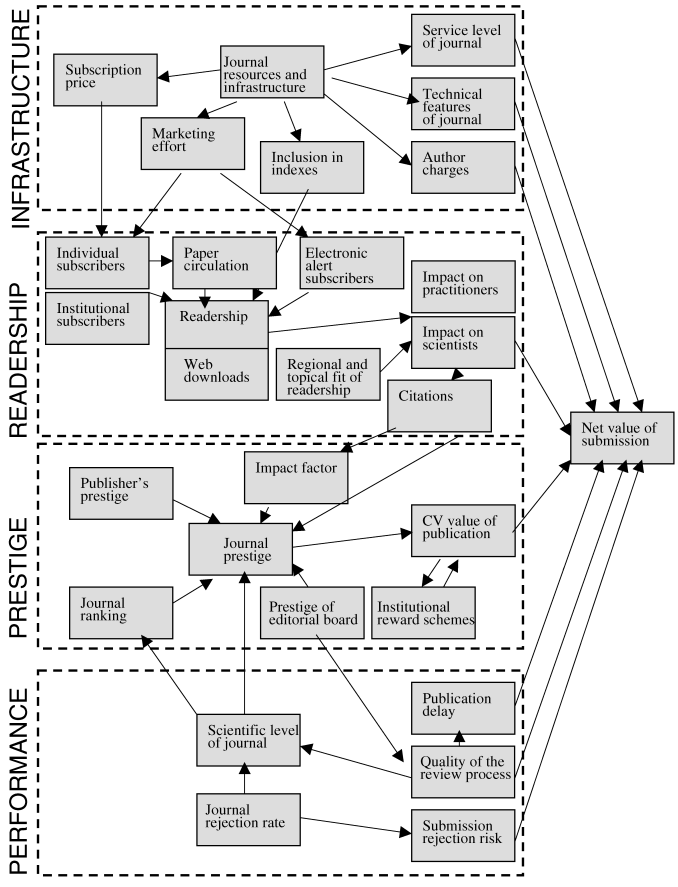

Figure 1 The net value of submission model

Thus in the academic publishing context authors could face a choice of publishing in a highly regarded journal with a 90% rejection rate versus a journal with a 50% rejection rate. Despite the fact that the value of eventually being published in the top journal is much higher, many authors who are risk-averse choose to submit to the journal with the lower rejection rate.

The net value of submission model is presented in Figure 1. The model contains 30 different concepts, which for easier comprehension have been grouped into four different blocks: Infrastructure, Readership, Prestige and Performance.

Walkthrough of the model

The model has been constructed in the following way. There are a number of factors, which are assumed to influence relatively directly the author's decision. These are:

- CV value of publication;
- impact on scientists and practitioners;
- quality of the review process;
- publication delay;
- submission rejection risk;
- service level of journal;
- technical features of the journal;
- author charges.

authors who are risk-averse choose to submit to the journal with the lower rejection rate

The weighting of these eight factors to give the overall net value is highly dependent on individual preferences due to career stage, and personality, etc., and no attempt will be made to construct a single numerical net value for a journal. Rather the objective of the model is to highlight which factors are involved and to try to measure the different

underlying factors in order to provide authors with as good a decision-making basis as possible.

Behind these eight factors there is a bigger set of other interrelated factors, which are shown in the model. The relationships would be very difficult to measure numerically using statistical analysis. The direction of the causality is, however, in most cases relatively clear. The following walkthrough of the model follows the block structure of the overall model.

The central factor in the Infrastructure block is the amount of resources available for the journal, in terms of editorial staff, IT infrastructure, marketing resources, etc.

The resources of the journal influence many other factors. A relatively new parameter to be considered is the direct cost for submitting in the form of author charges that some open access journals use to fund their activities (i.e. BioMedCentral or Public Library of Science journals). Page charges for extra pages, colour reproduction, etc., have been used for decades by some journals but this type of comprehensive author charge is new as a concept. If the prestige level of publishing in the open access journal is equal to a subscription alternative, then the author has to balance the payment of an author charge in the range of US$1,000–1,500 versus the potential for a wider readership that the open access journal might offer. In this way author payments and subscriptions differ in a significant way. Author payments very directly influence the decision of an author to submit or not, whereas the number of subscriptions is relatively far removed in the causal chain.

often it is better to submit to a smaller, highly specialised journal than a bigger broader one

Authors may also appreciate the service level of a journal in, for instance, electronic review process tracking, timeliness of review, prompt replies to queries, handling of proofs, receiving of off prints, etc. Technical features can include colour for figures and hypermedia features for electronic journals.

The Readership block deals with the readership of the average article published by the journal. For traditional journals the readership is largely determined by the subscription price and the journal prestige. This is done via individual and, in particular, institutional subscriptions, which together in the print world determined the circulation of the journal. Nowadays the relationship between subscriptions and readership is more complex, due to the increasing use of electronic licenses and so-called big deals including large bundles of journals. For open access journals subscriptions no longer have any meaning, since by definition anybody with an Internet connection can read the articles. For them the most interesting statistics are Web downloads of full papers, and the number of individuals who have signed up for table of contents alerts.

In addition to the total average amount of readers per paper in the journal the regional distribution of readers and their interest area (topical fit) is important for the actual impact of the reading. Often it is better to submit to a smaller, highly specialised journal than a bigger broader one, because one gets the experts in the relevant research community to read the article. (Originally scholarly journals developed as parts of scientific societies, with all members receiving copies.) An author based in Scandinavia would be much more likely to submit to a Scandinavian journal than an Australian, and vice versa.

Impact on scientists and practitioners denotes the effects that the average article in the considered journal can be expected to have on others in influencing their thinking. Behind this expected impact is the total amount of readership of a journal and the relevance of the readership (specialists in the same field, colleagues in the researchers network, industry experts in his/her own country, etc.).

The Prestige block informs us about factors that contribute to the value that the academic receives from adding a paper published in the journal to his/her CV. The central concept is the somewhat fuzzy one of the prestige of a journal. The prestige is influenced by many factors. The prestige of the publisher influences the valuation. The major commercial and academic publishers and bigger scientific societies have become almost brand names in their own right, despite the fact that the quality of their journals varies enormously. Another prestige factor is the editorial board membership. This is especially important when new

journals are started in order to attract submissions. Thomson Scientific publishes the impact factors most often used, but it should however be noted that the concept of citations in the model is more comprehensive and that there is work underway to develop measures of citations in the bulk of material on the Web. Based on a number of factors and often polls with scientists, many disciplines have produced rankings of journals in their area.

The CV value of publication means the incremental value that the scientist, in his/her particular institutional, national, and research community setting, gets from adding an article in the journal in question to his/her publication list. The value materializes in helping the scientist obtain positions, tenure, research grants, etc. The well-known slogan 'publish or perish' aptly describes this. The above factors are rather global in their reach. The author's CV value, in this context, may also be strongly influenced by the particular rewarding schemes of his/her university, research funding agencies, national governments, etc.

The last block in the model deals with Performance. Here important factors include the quality of the review process, the rejection rate, and the publication delay. The quality of the review process differs enormously between journals, from relatively quick reviews done in a few hours to interaction processes lasting months between reviewers and authors, which more resemble supervision of a Ph.D. thesis. A good review process offers the author the chance of considerable improvement of his/her manuscript. On the other hand this also increases the publication delay, which also depends on other factors. The publication delay, in particular to those parts where it has nothing to do with improving the paper, is a negative factor.

The overall rejection rate of a journal is also an important factor for an author contemplating submitting to the journal. In his/her judgement of the journal the scientist also needs to take into account how well his/her article fits into the journal's focus. The better the fit the lower the expected rejection rate for this particular paper is likely to be (also the chances of getting competent reviewers increases). This is also one of the reasons for the popularity of special issues.

Average publication delay and submission rejection risk together with author charges are the major negative factors in the overall decision tree. In an earlier version the publication delay was modelled only as a background factor decreasing the impact of the research, but it was decided to bring it upfront since it is one of most overlooked factors. The delay is typically the sum of a number of different factors, the most important ones being the quality of the review process (journals with multiple rounds of reviews have longer delays but also better quality) and the waiting time in the publishing queue. Average delays vary between disciplines. The negative effects of a long delay on the impact of the article also vary a lot with discipline. A long delay is a particularly negative factor for papers in research areas where the technology changes quickly (i.e. Internet research).

the quality of the review process differs enormously between journals

Measuring the different parameters in the model

Looking at the different parameters in the model there are some which are easily available as such, and some for which raw data are available but need to be collected and analysed. Some of the measurable factors are, however, often not publicly available to prospective authors since many journals treat such figures as trade secrets, in particular if they could be considered bad publicity.

Examples of measurable and easily available factors include: subscription price, author charges, impact factor, inclusion in indexes, journal ranking. Examples of measurable factors, which often are not available, include: number of subscribers, paper circulation, downloads, publication delay, journal rejection rate.

For some of these latter factors there could be roundabout ways to obtain the information. One could, for instance, make surveys with authors in a research field and ask them about their readership, paper rejections, etc., and get crude estimates for some factors. This would also help in measuring

Table 1

Factor	Scale	Data Source
Infrastructure		
Subscription price (Marketing effort) (Journal resources and infra)	Price/article	DA, CBC
Inclusion in indexes	Likert scale	DA, AS
Service level of journal	Likert scale	AS
Technical features of journal	Likert scale	DA
Readership		
Individual subscribers	Number	FP, AS
Institutional subscribers	Number	FP, AS
Paper circulation	Number	FP
Web downloads	Number/article	FP
Readership	% of scientists	AS
Electronic alert subscribers	Number	FP
Regional and topical fit of read (Impact on practitioners) (Impact on scientists)	Distribution	CBC, FP
Citations	Number/article	CBC
Prestige		
Publisher's prestige	Likert scale	DA
Impact factor	Number/article	DA
Journal ranking (Journal prestige)	Ordinal /likert	DA
Prestige of the editorial board (Institutional reward schemes) (CV value of publication)	Likert scale	CBC
Performance (scientific level of journal)		
Journal rejection rate	%	FP
Quality of the review process	Likert scale	AS
Publication delay (Submission rejection risk)	Months	CBC, FP

DA, directly available; CBC, can be calculated; FP, from publishers; AS, author survey.

some of the more qualitative factors such as the service level of journal. However, this is quite tedious and resource demanding. Lastly, citation analysis could be used, also going further than the core journals that Thomson Scientific tracks.

Table 1 lists all the parameters in the model and suggests the possibilities for obtaining data about them. All the parameters are shown in the list, but note that some of them are intermediary in the model but are not really measured. In some cases because it makes better sense to measure the factors that they influence (marketing effort) or from which they are derived (journal prestige). In other cases because they really do not exist globally for the journal but are factors in the authors immediate vicinity, which influence his decision (institutional reward schemes).

Testing the method on a group of journals

The model was tested on a group of journals in the field of construction information technology.[11] This is a scientific subdiscipline numbering a few hundred academics worldwide, mostly active in the architectural and civil engineering departments of universities as well as in a few government research institutes. It is a relatively young field where speed of publication is an important factor, due to the fast developments in the technology studied. Despite the fact that the field is relatively small there are half-a-dozen peer-reviewed journals specializing in the topic, most with circulations in the hundreds rather than exceeding 1,000 copies. In 2004 these journals published 235 peer-reviewed articles. There are also a couple of open access journals. Because of this situation the competition for good submissions is at times quite tough.

The benchmarking was at this stage concentrated on such factors as were readily available or could be calculated from journal issues. For some of the factors, nearby journals in the related field of construction management, which often publish papers on construction IT, were also studied to get a wider perspective. Web surveys with authors in the field were not used but could be an option in the future. Such studies have previously been conducted for these journals,[12] but so far only to determine the overall prestige or ranking. The following factors were estimated.

1. Journal subscription price

The subscription prices are easily available from the journal websites. The institutional subscriptions to electronic versions are by far the most important and were used. In order to make the results comparable, the yearly subscription rates were divided by the number of scientific articles. The price per article ranged from 7.1 to 33.3 euro. Two of the journals compared were open access journals. They have neither subscription prices nor author charges.

2. Downloads

This figure, the average number of downloads per paper, is only given for one of the journals. It would be a very useful yardstick to compare journals. For one of the open access journals in the sample the Web download figures from the past three years were used. In order to make the data useable downloads by Web search engines and other non-human users were as far as possible excluded (which resulted in a reduction of the figures by 74%). The downloads of the full-text PDFs were counted, since this would come closest to actual readings. Over the three-year period each of the 120 published papers was on the average downloaded 21.2 times per month (with a spread of 4.7–47.3).

3. Impact factors

Three of the journals are indexed in the Science Citation Index but with rather low impact factors (0.219–0.678) and none of the journals is clearly superior to the other in prestige or scientific quality.

4. Regional spread of authorship

Although this factor is not explicitly included in the model, one could assume that there would be a strong correlation between authorship and readership. Thus the spread gives a good indication of how relevant the readership would be. The spread was calculated for the journals from articles published in 2001–2005.

It is relatively straightforward to calculate the geographic spread of journal authors since the affiliations of the authors are published with the articles. The actual analysis was done on a country-by-country basis but in the following figures the results are reported for a number of regions. The percentages and numbers are presented in Table 2.

The results proved to be very interesting. Only one of the journals, *JCCE*, published by the American Society for Civil Engineers was not *a priori* a global journal. The Elsevier journal *AIC* had a very high East Asian authorship and *CI* (published by a smaller publisher) a very strong British Commonwealth following. The open access *ITcon* had a major share of Central and Northern European authors.

Table 2 Geographic spread of authors (%) and total number of authors and articles per journal

	ITcon	*CI*	*JCCE*	*AIC*	*CACIE*	Percentage of authorships
North America	20.2	13.7	66.7	21.4	45.8	37.5
South America	0	0	0.2	0	0	0.1
Africa	1	0	0.7	0	0	0.3
Great Britain	25.3	24	4.5	14.7	3	12.1
Central Europe	15.8	5.1	4	7.5	8.7	8.1
Northern Europe	21.5	1.1	0	0.3	1.5	4.2
South & East Europe	6.4	1.7	1.4	2	7.2	3.8
Asia	8.4	33.2	20.9	48.9	32.1	29.5
Australia & Oceania	1.4	21.2	1.6	5.2	1.7	4.5
Total number of authorships	287	175	425	410	402	100.0
Total number of articles (n = 768)	107	69	167	274	169	

The full journal names are in Björk *et al.*, note 11.

5. Prestige of editorial board

While editorial boards were not directly compared, the overlaps in editorial boards were studied, revealing quite interesting information about the journals. Three of the journals form a very tight cluster.

6. Publication delay

Some editors are willing to share data, others are not

The speed of publication (from submission to final publication of accepted papers) is an important factor for submitting authors. For one journal the full publication delays where calculated from available databases. For two journals complete or incomplete information could be gathered from the submission and acceptance dates posted with the articles. The publication delays ranged from 7.6 to 21.8 months, with the open access journal publishing on average one year faster than the two conventional ones.

7. Acceptance rate

Acceptance rates (rather than the rejection rates in the model) where available for three journals, and where 47% (*JCCE*[13]), 51% (*CME*), and 55% (*ITcon*). These figures are very much in line with a a recent study on open access publishing performed by the Kaufman-Wills Group,[14] which provides statistics on acceptance rates for around 500 journals from different types of publishers, covering both subscription-based and open access journals. Thus the average acceptance rate for the subscription-based journals published by the Association of Learned and Professional Society Publishers was 42%. The average for open access journals indexed by the Directory of Open Access Journals (DOAJ) was 64%, but if one excludes two large biomedical open access publishers (ISP and BioMed Central) the average was 55%.

8. Survey with authors

This was not done at this stage. An earlier study of how researchers in this domain retrieve information via the Internet had contained some questions related to journal quality.[12]

Conclusions

The proposed method is still at the prototype stage. One of the lessons learned from the test case was that it is difficult to obtain values for all parameters for all journals. Some journals post submission and acceptance dates for papers, whereas others do not. Some editors are willing to share data, others are not. The best way to tackle this is to also include data from journals in related fields which are likely to be familiar to the readers and also to include more general average values if such are available (journal prices, publication delay, rejection rates).

In further testing the model the two next

steps could be to try to solicit statistics from journal publishers and to do Web surveys with the research community at hand. The first method is easy to use but the expectations for responses are low, especially if journals feel they will be singled out and that competitors could use the information. It would be particularly interesting if the query comes from an editorial board member of the journal. Should editorial board members have access to information about the amount of readership, publication delay and rejection rates, and if yes, should the information be classified?

Looking outside the construction IT community at all scientific disciplines it should in principle be possible to obtain data directly from at least the major open access publishers. Also one could *a priori* expect a positive attitude for sharing data from some of the bigger society publishers.

In the long run a survey with all authors in a field would be an interesting method, because it could capture more subjective factors as well (i.e. service level of a journal). This method has been used for journal prestige rankings in many scientific disciplines, but rarely for capturing other journal characteristics.

The method should also be used for other scientific disciplines than the constrution IT field used in the pilot testing. In addition to providing useful information for the scholars in the disciplines at hand this would add very useful data for cross-discipline comparisons.

One way to develop the method could be to make a Web tool, which would be available for journal self-benchmarking. The idea would be that a journal editor would submit the data for his/her own journal, and could then compare his/her own journal to others. In return he/she would have to agree to make the data available for general comparisons and statistics, but perhaps so that the journals identity could be hidden (it might otherwise be difficult to get the data).

Why was this manuscript submitted to *Learned Publishing*?

This paper was submitted to *Learned Publishing*, because of its highly relevant readership, reasonable expected publication delay and acceptance rate, author-friendly copyright policy and good service level based on earlier experience. The journal also has a reasonable impact factor, which is helpful to the authors in the internal reward scheme of their university.

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