



Contents lists available at ScienceDirect

European Journal of Operational Research

journal homepage: www.elsevier.com/locate/ejor

Innovative Applications of O.R.

The drivers of citations in management science journals

John Mingers*, Fang Xu

Kent Business School, University of Kent, Canterbury CT7 2PE, UK

ARTICLE INFO

Article history:

Received 20 February 2009

Accepted 4 December 2009

Available online 11 December 2009

Keywords:

Citations

Impact factors

Journals

Research quality

ABSTRACT

The number of citations is becoming an increasingly popular index for measuring the impact of a scholar's research or the quality of an academic department. One obvious question is: what are the factors that influence the number of citations that a paper receives? This study investigates the number of citations received by papers published in six well-known management science journals. It considers factors that relate to the author(s), the article itself, and the journal. The results show that the strongest factor is the journal itself; but other factors are also significant including the length of the paper, the number of references, the status of the first author's institution, and the type of paper, especially if it is a review. Overall, this study provides some insights into the determinants of a paper's impact that may be helpful for particular stakeholders to make important decisions.

© 2009 Elsevier B.V. All rights reserved.

1. Introduction

Measuring the scientific impact of researchers' work is a difficult but important issue. Evaluative bibliometric analyses are increasingly being used, often in combination with some form of peer review. Particular attention has been paid to the number of citations that a publication receives. As early as 1927, Gross (1927) suggested citations to evaluate researchers' work, and then this measure was widely used to assess the status of academic departments and the quality of books and scientific journals (Garfield, 1972; Nicolaisen, 2002). As well as this, there is evidence to suggest that citations are correlated with other assessments of scientific influence or impact such as awards, honours (Inhaber and Przednowek, 1976), departmental reputation (Hargens, 2000), and academic rank (Cole and Cole, 1971). The "Leiden methodology" (van Raan, 2003; van Raan et al., 2007), which evaluates research centres in terms of the mean citations per paper normalised against the field average, is being considered for the new research excellence framework (REF) in the UK. Despite the growing importance of this index as a performance measurement, there is still considerable uncertainty as to what drives citation rates for a given paper.

There is a large variance in the number of citations that papers receive; as many as 20% are never cited at all, while highly cited papers receive many hundreds (thousands in the sciences) (Mingers and Burrell, 2006). There is no doubt that the primary driver is the actual content or quality of the paper; those which are particularly innovative, empirically or theoretically, become seminal papers for their area and are constantly referenced. However, it

is also clear that other, more quantifiable factors, such as the type of paper (e.g., a review article), the reputation of the author (Podsakoff et al., 2005) or the standing of the journal may also have significant effects. There has already been some research in this area.

Most researchers aggregate determinants of citations to different categories such as author level (Allison and Long, 1990; Long et al., 1998), institution level (Stahl et al., 1988; Trieschmann et al., 2000) or journal level (Franke et al., 1990; Podsakoff et al., 2005). Generally, these researchers start with a collection of papers selected from particular journals in particular disciplines – law (Ayres and Vars, 1999), marketing (Stremersch et al., 2007), management (Judge et al., 2007b), ecology (Leimu and Koricheva, 2005), and chemical engineering (Peters and van Raan, 1994) – and then analyse the roles of various factors on influencing the number of citations. A few studies focused on particular factors and considered how they affect article citations (Baldi, 1998) or examined the articles themselves to discover which ones are most likely to be cited and in which journals (Hoffman and Holbrook, 1993). Nederhof and van Raan (1987) claimed that the number of citations may be subject to a halo effect or, more generally, to the Matthew effect. This means that a large number of citations lead to a good reputation and this good reputation then attracts even more citations. It seems like "success breeds success."

As reputation is invisible and difficult to measure, other quantitative factors were tested for their influence on the number of citations, such as the number of authors, paper length, and different paper types. Besides these factors, the academic field is one of the major factors that affects the number of citations significantly. For example, a study of the outputs from the 2001 UK Research Assessment Exercise (RAE) found that the mean citations per article for 48,000 bio-medical science papers was 30.1, while for 19,000 social science papers it was 5.4 and for humanities 2.3

* Corresponding author. Tel.: +44 01227 824008.

E-mail address: j.mingers@kent.ac.uk (J. Mingers).

(Mahdi et al., 2008). Also, within a discipline, papers in a relatively narrow field could attract fewer citations than more general ones. For this reason, citation analyses of research groups or departments are always related to the appropriate field averages (van Raan, 2003). In addition, a time-dependent factor also influences the number of citations. In some fields, recent works are cited more frequently than older ones. Moreover, the influence of the physical details of an article such as the language, number of tables or figures, and presentation of the article have also been examined (Stremersch et al., 2007).

Moving more specifically to the field of management, Judge et al. (2007b) looked at a sample of 600 papers published in top management journals between 1990 and 1994, counting the citations until 2006. They were interested in determining the relative contribution of the content of the article itself, characteristics of the author(s), and the perceived quality of the journal using structural equation models. Their main conclusions were: (i) the best predictors of citations were characteristics of the journal: the citation rate and perceived quality; (ii) the next most significant effect was the number of references and then other article attributes such as year published (negative); (iii) in terms of authors, the prestige of the authors' institution and the number of other top-tier publications were both significant; and (iv) in terms of content, the only significant attributes were if the paper was a meta-analysis, or if it was revolutionary in a Kuhnian sense, i.e., breaking new ground rather than being incremental. Effects that might have been expected but were not found were whether or not the paper was a review, and a dependence on the application area.

Stremersch et al. (2007) conducted a similar study using regression on five top marketing journals, looking at 1800 papers published from 1990 to 2002. They were interested in universal factors (broadly, the content), social constructivist factors (broadly the authors) and presentational factors (how and where the paper appeared). The main results are: (i) for universal factors, the number of awards (a surrogate for quality) and article length both positively affected citations, as did some of the subject areas, e.g., relationship, services, and e-commerce positively and advertising and sales negatively; (ii) with social factors, editorial board membership, institutional ranking, and self-citation intensity (self-promotion) were the main effects; (iii) presentationally, the only significant factors were the number of appendices and reading clarity (negatively correlated, interestingly). The number of references was not included as a variable. Finally, there was not a large journal effect, which seems to be unusual. This may be explained by the fact that all the journals were top-class and four out of the five were US, so they were in principal very similar. The only non-US journal, the *International Journal of Research in Marketing*, did have a significant negative effect.

In this paper, we will report the results of an investigation into various factors that cause papers in management science journals to be cited. We applied a negative binomial model (Mingers and Burrell, 2006) to build the relationship between citations and other factors we discovered. The current paper is organized as follows: the next section is mainly about methodology, including sample selection, data collection, and data cleaning, followed with the results we obtained from our experiments. A conclusion is given at the end.

2. Methodology

2.1. Sample of papers

In order to study the factors affecting the number of citations, we need to examine a representative set of papers. In this study, we selected all papers published in six management science jour-

nals in 1990 – *Management Science* (ManSci), *Journal of the Operational Research Society* (JORS), *European Journal of Operational Research* (EJOR), *Operations Research* (OpsRes), *Decision Science* (DecSci) and *Omega* (Omega). These six management science journals were selected to give a range in terms of breadth/narrowness of coverage, status and quality, and region of origin. The six journals include several types of papers: regular papers, technical notes, replies, letters, and book reviews. These were all included apart from book reviews, which were considered to have significantly different citation profiles. The final sample of papers includes all regular papers, technical notes, replies, and letters in every issue of each journal. In total, we have selected 696 papers as the collection of papers in this study. All papers are coded from 1 to 696. More details about ensuring the validity of the dataset are contained in (Mingers and Burrell, 2006). Unlike the two studies in the management area discussed above, our data do not include any time dependence as all papers are from the same year – 1990.

2.2. Dependent variable

Article impact is measured through the number of citations a paper received until July, 2008. It is coded as *Citations* in the data set. The information is provided by the Social Science Citation Index accessed from the Web of Science (WoS). The number of citations per paper varies widely both across journals and within journals. All journals have a significant proportion of papers that are never cited. Mingers and Burrell (2006) showed both theoretically and empirically that the number of citations is distributed according to the negative binomial distribution. This is accounted for in the regression model.

2.3. Independent variables

In reviewing the literature, we found many potential independent variables, as well as ways of measuring them. We also considered the extent to which they have been found to be significant in previous studies. These results are summarised in Table 1.

Among these factors, several are hard to measure such as the author's reputation, the accessibility (Scoper, 1976) and visibility (Silverman, 1985) of the journal, and, above all, the paper's intrinsic quality. We might hope that it is the quality of the paper that determines how often it is cited, but how can one measure quality except through circular factors such as the journal it is published in or the number of citations? It is interesting that in the UK's recent RAE over 12,000 separate publications in business and management were rated from 0* (little research quality) – 4* (world-leading research quality) by a peer review panel (Otley, 2009) in order to evaluate the quality of different business schools. Although the overall results are public, the actual grades given to individual papers are not. Had it been otherwise, this would have been a tremendous data source. A recent paper by Mingers et al. has attempted to reconstruct the Panel's judgements at the journal level using linear programming (Mingers et al., 2009).

In this study, we decided to focus on quantitative factors that could be reliably measured, and we explored how these factors affect the number of citations in the six journals. All factors involved are grouped into three levels: journal level, author level, and article level. Each level contains several dimensions.

2.3.1. Author level

Four dimensions related to authors' characteristics are tested in this study. Previous research revealed that more authors could increase the chance of a paper being cited (Beaver, 2003; Lawani, 1986). The first variable is called *Authors*, which is the number of authors of each paper. The second variable is called *Publications*, which records the number of publications of the sole author or

Download English Version:

<https://daneshyari.com/en/article/480489>

Download Persian Version:

<https://daneshyari.com/article/480489>

[Daneshyari.com](https://daneshyari.com)