# Shaping the Landscape of Research in Information Systems From the Perspective of Editorial Boards: A Scientometric Study of 77 Leading Journals

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**Characteristics of the *Journal of the American Society for Information Science and Technology* and 76 other journals listed in the *Information Systems* category of the *Journal Citation Reports–Science edition 2009* were analyzed. Besides reporting usual bibliographic indicators, we investigated the human cornerstone of any peer-reviewed journal: its editorial board. Demographic data about the 2,846 gatekeepers serving in information systems (IS) editorial boards were collected. We discuss various scientometric indicators supported by descriptive statistics. Our findings reflect the great variety of IS journals in terms of research output, author communities, editorial boards, and gatekeeper demographics (e.g., diversity in gender and location), seniority, authority, and degree of involvement in editorial boards. We believe that these results may help the general public and scholars (e.g., readers, authors, journal gatekeepers, policy makers) to revise and increase their knowledge of scholarly communication in the IS field. The *EB_IS_2009* dataset supporting this scientometric study is released as online supplementary material to this article to foster further research on editorial boards.**

## Introduction

In his first editorial entitled *Changing of the Guard*, the newly appointed editor in chief of the *Journal of the American Society for Information Science and Technology* (*JASIST*) lifted the covers on the internal workings of the journal (Cronin, 2009a). Several follow-up editorials discussed statistics about the *JASIST* peer-review process (Cronin, 2009c, 2011), author demographics (Cronin, 2009b), and geographic diversity of editorial board members (Cronin, 2009d). These scientometric[1] studies complemented other widely available bibliometrics such as the Journal Impact Factor (Garfield, 1955). They offered both readers and authors valuable knowledge about *JASIST*'s characteristics by shedding light on some of the journal internals.

The aim of the present work is to take a broader perspective on this issue. We intend to further investigate the research field in which *JASIST* is much involved: information systems (IS). We thus tackle the following two questions: How do we depict the landscape of research in IS? What are the characteristics underlying leading IS journals? Our purpose is twofold. First, we wish to increase the understanding of scholarly communication in IS. Second, we intend to compare the characteristics of *JASIST* (as a journal contributing to the research in IS) with the characteristics of the leading IS journals. This study ultimately shapes the landscape of IS research, and depicts how *JASIST* is involved.

Past literature from various scientific disciplines has reflected on scholarly communication in those fields. Scientometric studies have attracted considerable interest in disciplines such as accounting (Lowe & Van Fleet, 2009), chemistry (Zsindely, Schubert, & Braun, 1982), economics (Baccini & Barabesi, 2011; Gibbons & Fish, 1991), education and educational psychology (Campanario, González, & Rodríguez, 2006), and nanoscience (Braun, Dióspatonyi, Zádor, & Zsindely, 2007). Complementary studies comparing several scientific disciplines also have been undertaken (e.g., Bedeian, Van Fleet, & Hyman, 2009; Börner, 2010; Braun & Dióspatonyi, 2005a; Braun, Dióspatonyi, Zsindely, & Zádor, 2007; García-Carpintero, Granadino, & Plaza, 2010; Nisonger, 2002). The general purpose of such studies is to assure the research community and general public that

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[1]*Scientometrics* refers to the study of science. The interested reader may refer to Hood and Wilson (2001).

peer-reviewed journals ensure high standards of scholarship (Bedeian, Van Fleet, & Hyman, 2009). These studies also have set out to identify issues (e.g., the empaneling of editorial board members with lack of expertise) and have suggested recommendations to fix them.

Note, however, that only a few scientometric studies have addressed computer science. The work most related to *JASIST*'s topics was recently done by Baccini and Barabesi (2011), who scrutinized 61 journals of information science and library science. They documented the "interlocking editorship" phenomenon, which refers to a gatekeeper[2] sitting on several editorial boards. If each gatekeeper influences the journal's editorial policy, as assumed by the authors, then occupying several seats increases the gatekeeper's power. In a previous study, Cronin (2009d) explored this phenomenon on a sample of 10 journals in information science, 21% gatekeepers of which were sitting on at least two editorial boards.

Interestingly, these studies did not focus on bibliometrics but rather explored a valuable human factor of journals: their editorial boards. These gathered scientists acknowledged in the field (Merton, 1973), and represent a high-quality indicator, as suggested in the literature (e.g., Bedeian, Van Fleet, & Hyman, 2009; Braun, 2005, 2009). We elaborated on this idea to study IS journals from the perspective of their editorial board, thus continuing the works by Cronin (2009d) as well as Baccini and Barabesi (2011) in examining the human cornerstones of scientific journals: editorial boards.

Data about the editorial boards and articles published in 77 leading IS journals were collected. Thorough statistical analysis was applied to quantitative and qualitative data about journals, their editorial boards, and gatekeepers. Our scientometric study highlights the great variability in characteristics for the 77 IS journals. We believe that the findings of this article may contribute to increasing the understanding of scholarly communication in IS and "make a difference to the way we view our world," as encouraged in Cronin (2009a).

The article is organized as follows. First, we introduce the data collected for analyzing the 77 leading IS journals. Next, the methodology used in this study is described, and results are addressed. We then report and discuss findings about IS journals, editorial boards, and gatekeepers, respectively. Past literature is reviewed throughout the article in an attempt to put our results into perspective. Finally, we discuss our findings before concluding by giving some insights into future work.

## Data About Journals, Publications, and Gatekeepers

The purpose of our scientometric study is to enhance the understanding of the IS field of computer science. We rely on leading peer-reviewed journals, which are expected to attract and crystallize high-quality research work in IS. This section introduces the data collected regarding journals and the gatekeepers serving on their editorial boards.

### *Data About 77 Leading IS Journals*

Our study is interested in the *Computer Science, Information Systems* category of the *Journal Citation Reports–Science edition 2009*. This is comprised of 116 journals, one of which is *JASIST*.

The *Journal Citation Reports*[3] (*JCR*) is an annual publication of Thomson-Reuters providing information about academic journals in the sciences and the social sciences. Journals are classified into categories corresponding to domains (e.g., *Computer Science*) and subdomains (e.g., *Information Systems*). They can be compared with several indicators, as reviewed in (Bar-Ilan, 2008). Garfield's (1955) Journal Impact Factor (JIF) is one of the most popular indicators reported for journals (Glänzel & Moed, 2002). For instance, one reads in the *JCR–Science edition 2009* that *JASIST* has a JIF value of 2.300. This means that *JASIST* papers published in 2007 and 2008 received 2.300 citations each, on average.

Reviewing the JIF literature, Campanario (2011a) echoed a criticism related to the citation window of 2 years, which is deemed "too brief to capture all relevant scientific impact." In addition, large variations of the JIF were observed from one year to the other. Most of these were attributed to a large increase in journal self-citation (Campanario, 2011a). In this context, note that the *JCR* also reports 5-year impact factors (5YJIFs). The present study relied on the 5YJIF, considered as a way to smooth the aforementioned short-term variations of the JIF. This requirement implied dropping 24 journals that were too recent to have a 5YJIF in the 2009 edition of the *JCR*. As a result, we focused on the remaining 92 journals with 5YJIFs.

### *Data About Researchers' Publications*

We intended to study the scholarly communication in IS journals. This involves several parties such as authors and gatekeepers. To acquire data about these researchers, both journal articles and conference papers were considered. Indeed, computer science is a field in which publication in conferences is an acknowledged way for disseminating research results (Bar-Ilan, 2010b; Freyne, Coyle, Smyth, & Cunningham, 2010).

Many digital libraries collect computer science publications. We opted for the Data Bibliography & Library Project (DBLP) Computer Science Bibliography (Ley, 2002) for four reasons. First, the DBLP has a large coverage of the computer science literature. It was indexing 1,618,246 publications authored by 932,117 researchers at the time we

[2]Crane (1967) was an early adopter of the term *gatekeeper*. This term has been picked up in scientometrics (e.g., Braun, 2005, 2009; Zsindely Schubert, & Braun, 1982). In the present paper, it refers to any non-technical editorial board member, whatever his or her role (e.g., editor in chief, regional editor, senior editor).

[3]http://www.webofknowledge.com/JCR


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TABLE 1. The 15 journals excluded from our study, with rationale for exclusion.

| Rank | *JCR* abbreviated title | Publisher | 5YJIF[a] | Rationale for exclusion |
|---|---|---|---|---|
| 1 | *Annu Rev Inform Sci* | Information Today | 3.030 | Not in DBLP |
| 2 | *IBM Syst J* | IBM Corporation | 1.975 | Merged to *IBM J Res* in 2009 |
| 3 | *Method Inform Med* | Schattauer | 1.526 | Not in DBLP |
| 4 | *Open Syst Inf Dyn* | Springer | 1.205 | Not in DBLP |
| 5 | *Med Inform Internet* | Taylor & Francis | 1.160 | Discontinued in 2008 |
| 6 | *IET Inform Secur* | IET | 0.892 | Not in DBLP |
| 7 | *Photonic Netw Commun* | Springer | 0.847 | Not in DBLP |
| 8 | *Infor* | University of Toronto Press | 0.843 | Not in DBLP |
| 9 | *Inform Technol Libr* | American Library Association | 0.696 | Not in DBLP |
| 10 | *J VLSI Sig Proc Syst* | Springer | 0.661 | Discontinued in 2008 |
| 11 | *ASLIB Proc* | Emerald | 0.582 | Not in DBLP |
| 12 | *IEICE T Inf Syst* | IEICE | 0.429 | Merged to No. 13 in DBLP |
| 13 | *IEICE T Fund Electr* | IEICE | 0.394 | Merged to No. 12 in DBLP |
| 14 | *Program-Electron Lib* | Emerald | 0.349 | Not in DBLP |
| 15 | *J Commun Netw-S Kor* | KICS | 0.200 | Not in DBLP |

[a]*JCR* = *Journal Citation Reports*; 5YJIF = 5-year journal impact factor.

started our study (April 3, 2011). The DBLP provides records for conference papers and journal articles published by major publishing houses such as the ACM, Elsevier, Springer, and Wiley. Second, DBLP records are created manually, making them more reliable than computer-generated web-based bibliographic data such as CiteSeer (Fiala, 2011). Third, DBLP records are publicly released as the dblp.xml file, which was 834 MB in size on April 3, 2011. Fourth, the DBLP already has been mined for research purposes such as Lotka's Law validation (Elmacioglu & Lee, 2005), expert search (Deng, King, & Lyu, 2008), and assessment of inter-researcher similarity measures (Cabanac, 2011).

From the previously selected 92 journals with 5YJIFs, we had to reject 15 journals (Table 1). There were three exclusion criteria: (a) Publication records for most of them were not found in the DBLP, (b) three journals were discontinued before 2009, and (c) two Institute of Electronics, Information and Communication Engineers (IEICE) journals were merged in the DBLP. Dropping these 15 journals has limited influence on our study. Indeed, journals absent from the DBLP are expected to be poorly related to computer science, which seems to be the case for some listed in Table 1. In addition, all journals except *Annual Review of Information Science and Technology* (*Annu Rev Inform Sci*) have low 5YJIFs, implying that we still managed to capture the top-quality IS journals.

Finally, the 77 IS journals considered in the present study are shown in Table 2, where journal titles (as abbreviated in the *JCR*) and publishers are provided. Journals are ranked by decreasing 5YJIF. The same rank is given to tied journals such as Information Systems (*Inform Syst*) and *Knowledge and Information Systems* (*Knowl Inf Syst*) at Rank 29 with a 2.302 5YJIF. Journal categories were defined to support exploratory studies. The limits of these four categories (labeled *A*, *B*, *C*, and *D*) rely on the quartiles of the 5YJIF distribution. Thus, Category A is concerned with the top 25% journals, Category B with the next 25% journals, and so on.

*JASIST* appears in bold in Table 2. It is abbreviated *J Am Soc Inf Sci Tec* and lies in Category B since it is ranked 26th according to its 2.480 value of 5YJIF.

### *Data About Editorial Boards and Gatekeepers*

Each journal is run by an editorial board that gathers prominent scientists of the journal's area of research. Leading scientists are invited to join editorial boards as an acknowledgment of their achievements (e.g., Bedeian, Van Fleet, & Hyman, 2009; Faria, 2005; Merton, 1973; Powell, 2010). In most cases, one researcher from the board is appointed as the editor in chief, who is responsible for the quality of papers published in the journal. Other positions may be appointed, such as senior editor, or regional editor (e.g., responsible for submissions coming from the Americas).

Unlike the 5YJIFs and other indicators released in the *JCR*, for instance, we failed to find a unique resource collecting the editorial boards for a given research field. This is especially true for IS. However, the need for such an "up-to-date comprehensive computerized database of science gatekeepers" was notably expressed by Braun (2005).

Since no dataset of IS editorial boards seemed to be publicly available, we managed to collect the editorial boards of the 77 leading IS journals under study. Editorial boards are published in the masthead of journal issues recording a gatekeeper's name, affiliation (i.e., university or company), and role in the board (e.g., editor in chief, senior editor). The data model that we designed and manually populated from January to May of 2011 is shown in Figure 1. We retrieved the title of each journal (as featured in the DBLP and the *JCR*), its publisher, ISBN, and 5YJIF. Names of board members were matched to DBLP records to retrieve all their publication records. Here, we faced two problems. First, some journals do not provide gatekeepers'

TABLE 2. Leading 77 IS journals ranked by decreasing 5-year journal impact factor (5YJIF). Categories A, B, C, and D are delimited by the quartiles of the 5YJIF distribution.

| Rank | *JCR* abbreviated title | Publisher | 5YJIF | Category | Rank | *JCR* abbreviated title | Publisher | 5YJIF | Category |
|---|---|---|---|---|---|---|---|---|---|
| 1 | *Mis Quart* | University of Minnesota | 9.208 | A | 40 | *IEEE Secur Priv* | IEEE | 1.830 | C |
| 2 | *VLDB J* | Springer | 6.987 | A | 41 | *Wirel Netw* | Springer | 1.784 | C |
| 3 | *ACM T Inform Syst* | ACM | 5.774 | A | 42 | *Inform Retrieval* | Springer | 1.752 | C |
| 4 | *J Am Med Inform Assn* | BMJ | 5.199 | A | 43 | *Mobile Netw Appl* | Springer | 1.725 | C |
| 5 | *IEEE T Wirel Commun* | IEEE | 4.534 | A | 44 | *Comput Secur* | Springer | 1.718 | C |
| 6 | *Data Min Knowl Disc* | Springer | 4.432 | A | 45 | *Comput Netw* | Elsevier | 1.610 | C |
| 7 | *IEEE Pervas Comput* | IEEE | 4.395 | A | 46 | *World Wide Web* | Springer | 1.564 | C |
| 8 | *Inform Manage-Amster* | Elsevier | 4.297 | A | 47 | *Distrib Parallel Dat* | Springer | 1.543 | C |
| 9 | *J ACM* | ACM | 4.200 | A | 48 | *Eur J Inform Syst* | Palgrave | 1.534 | C |
| 10 | *IEEE T Mobile Comput* | IEEE | 3.956 | A | 49 | *Int J Coop Inf Syst* | World Scientific | 1.468 | C |
| 11 | *IEEE T Inform Theory* | IEEE | 3.936 | A | 50 | *Inform Syst Manage* | Taylor & Francis | 1.436 | C |
| 12 | *IEEE T Knowl Data En* | IEEE | 3.691 | A | 51 | *Inform Software Tech* | Elsevier | 1.426 | C |
| 13 | *IEEE T Depend Secure* | IEEE | 3.649 | A | 52 | *Geoinformatica* | Springer | 1.396 | C |
| 14 | *J Chem Inf Model* | ACS | 3.631 | A | 53 | *J Vis Commun Image R* | Elsevier | 1.389 | C |
| 15 | *IEEE Network* | IEEE | 3.529 | A | 54 | *Int J Inf Tech Decis* | World Scientific | 1.379 | C |
| 16 | *ACM T Database Syst* | ACM | 3.290 | A | 55 | *Internet Res* | Emerald | 1.346 | C |
| 17 | *J Manage Inform Syst* | M.E. Sharpe | 3.215 | A | 56 | *Inform Syst Front* | Springer | 1.298 | C |
| 18 | *Inform Sciences* | Elsevier | 3.089 | A | 57 | *J Intell Inf Syst* | Springer | 1.207 | C |
| 19 | *Enterp Inform Syst* | Elsevier | 3.085 | A | 58 | *Comput J* | Oxford | 1.194 | C |
| 20 | *Int J Med Inform* | Elsevier | 3.061 | A | 59 | *Online Inform Rev* | Emerald | 1.111 | D |
| 21 | *Decis Support Syst* | Elsevier | 2.842 | B | 60 | *Comput Commun Rev* | ACM | 1.079 | D |
| 22 | *ACM T Web* | ACM | 2.813 | B | 61 | *Acta Inform* | Springer | 1.072 | D |
| 23 | *ACM T Auton Adap Sys* | ACM | 2.707 | B | 62 | *Comput Commun* | Elsevier | 1.012 | D |
| 24 | *J Inf Technol* | Palgrave | 2.664 | B | 63 | *Int J Distrib Sens N* | Taylor & Francis | 0.882 | D |
| 25 | *J Strategic Inf Syst* | Elsevier | 2.531 | B | 64 | *Inform Process Lett* | Elsevier | 0.877 | D |
| 26 | *J Am Soc Inf Sci Tec* | Wiley | 2.480 | B | 65 | *Informatica-Lithuan* | IOS Press | 0.854 | D |
| 27 | *IEEE T Multimedia* | IEEE | 2.372 | B | 66 | *Multimedia Syst* | Springer | 0.852 | D |
| 28 | *Int J Geogr Inf Sci* | Taylor & Francis | 2.303 | B | 67 | *J Org Comp Elect Com* | Taylor & Francis | 0.851 | D |
| 29 | *Inform Syst* | Elsevier | 2.302 | B | 68 | *IEEE Syst J* | IEEE | 0.825 | D |
| 29 | *Knowl Inf Syst* | Springer | 2.302 | B | 69 | *J Res Pract Inf Tech* | ACS | 0.752 | D |
| 31 | *IEEE T Inf Technol B* | IEEE | 2.268 | B | 70 | *Multimedia Tools Appl* | Springer | 0.712 | D |
| 32 | *SIGMOD Rec* | ACM | 2.224 | B | 71 | *J Signal Process Sys* | Springer | 0.578 | D |
| 33 | *Inform Process Manag* | Elsevier | 2.106 | B | 72 | *Sci China Ser F* | Springer | 0.473 | D |
| 34 | *Wirel Commun Mob Com* | Wiley | 2.069 | B | 73 | *Bell Labs Tech J* | Wiley | 0.459 | D |
| 35 | *Data Knowl Eng* | Elsevier | 2.053 | B | 74 | *RAIRO-Theor Inf Appl* | EDP Sciences | 0.451 | D |
| 35 | *J Database Manage* | IGI Global | 2.053 | B | 75 | *J High Speed Netw* | IOS Press | 0.442 | D |
| 37 | *IEEE Multimedia* | IEEE | 2.020 | B | 76 | *J Inf Sci Eng* | Academia Sinica | 0.390 | D |
| 38 | *J Inf Sci* | Sage | 1.996 | B | 77 | *KSII T Internet Inf* | KSII | 0.200 | D |
| 39 | *Requir Eng* | Springer | 1.907 | B | | | | | |

[a]*JCR = Journal Citation Reports.*


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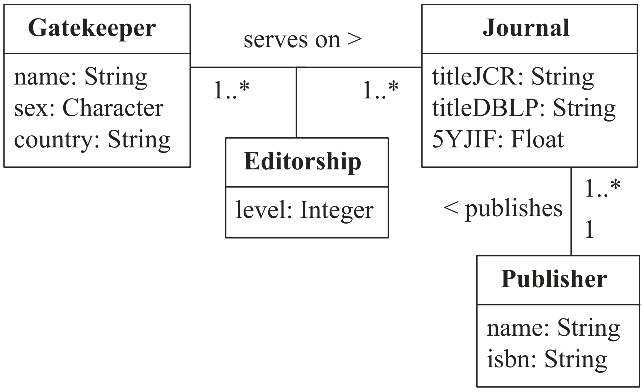


FIG. 1. UML class diagram for the dataset of editorial boards.

TABLE 3. Example of roles as listed in the masthead of the *Journal of the American Society for Information Science and Technology*, with associated level values.

| Level | Role | Count | Gatekeepers |
|---|---|---|---|
| 4 | Editor Emeritus | 1 | D.H. Kraft |
| 3 | Editor in Chief | 1 | B. Cronin |
| 2 | Associate Editors | 3 | J. Furner, D. Shaw, M. Thelwall |
| 1 | Editor | 30 | J. Bar-Ilan, . . . , P. Wouters |

full names but only initials (e.g., “E. Garfield,” who serves on *Scientometrics*). Second, some gatekeepers have namesakes such as “Chen Li,” which is currently attributed to eight different persons (Ley, 2009). As suggested in previous studies (e.g., Bedeian, Van Fleet, & Hyman, 2009), we used names and affiliations in combination to identify the right person in the DBLP.

An original aspect of our study is that we collected gatekeeper demographics (i.e., gender and location). We manually extracted these data from gatekeepers’ web pages or biographies, as published in some journal papers. We failed to find the gender of 24 researchers among the 2,846 gatekeepers (i.e., 0.8%). We believe that this does not question the validity of our study.

Finally, we recorded gatekeepers’ roles in boards with the “level” attribute (see Figure 1). We did not subjectively assign a value to each of the dozen of encountered roles (e.g., editor in chief, senior editor, advisory editor, regional editor) but instead relied on the order in which roles are listed in journal mastheads. The role listed in last position was assigned Level 1, the role listed just above was assigned Level 2, and so on, until the role listed in first position received the highest level. This procedure allowed the objective recording of role importance according to each journal’s policy, which is illustrated in Table 3 for the editorial board of *JASIST*.

Overall, we collected data for the 2,846 researchers serving on editorial boards. We call this dataset *EB_IS_2009* for “editorial boards in IS listed in *JCR* edition 2009.” It is formatted in XML (see Appendix A). In reply to Braun’s (2005) call for a database of science gatekeepers, we release *EB_IS_2009* as an online supplement to this article. This contribution ensures the reproducibility of our findings, which is paramount in research. We also wish to foster further research involving editorial boards.

The *EB_IS_2009* dataset introduced in this section was analyzed in various ways for gaining greater understanding of the IS field. The methodology supporting the conducted analyses is introduced next.

## Method

As suggested for bibliometric analysis (Mallig, 2010; Wolfram, 2006), we relied on a relational database and SQL for computing descriptive statistics about journals, editorial boards, and gatekeepers of the IS field. A two-level analysis was conducted as follows.

- For the *Overall* level, statistics were computed over the 77 IS journals. Such coarse-grained statistics support the understanding of characteristics related to research in IS as a whole. For example, a coarse-grained statistic may report the 10 most frequent countries found in gatekeeper affiliations.
- For the *Category* level, statistics were computed on one fourth of the 77 IS journals. Categories A, B, C, and D derived from the 5YJIF (as listed in Table 2) were considered in turn for fine-grained analysis. For example, fine-grained statistics are involved when comparing the 10 most frequent countries found in gatekeeper affiliations between the top 25% IS journals (Category A) and the bottom 25% IS journals (Category D).

Other categorical analyses compared populations according to their gender. For example, we computed the ratio of males to females in editorial boards to assess the male–female parity in IS research.

Statistics are reported with supporting charts. Scatter plots show data points in a two-dimensional Cartesian coordinate system. We use bubble plots, which are scatter plots with varying sizes of data points, as a way to represent a third variable. Moreover, we use box plots for reporting statistics about the distribution of data. They show the spread of data, the median value, and outliers (e.g., Williamson, Parker, & Kendrick, 1989). Finally, we report gender-dependent statistics with population pyramids. All charts were generated by either Gnuplot or Graphviz.[4]

## Findings About IS Journals

In this section, we discuss several characteristics of IS journals, such as impact factors, publishing houses, research output, authors, coauthoring behavior, and topics.

### Impact Factors

The box plot in Figure 2 represents the 5YJIF values for the 77 IS journals listed in Table 2. These values lie between

[4]http://gnuplot.sourceforge.net; http://www.graphviz.org


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0.200 (*KSII T Internet Inf*) and 9.208 (*Mis Quart*). The median 5YJIF value is 1.907, as shown by the segment in the box. According to the box, 50% of the journals have a 5YJIF between 1.192 and 3.061. The data are skewed toward low 5YJIF values since the median is closer to the lower bound of the box than to its upper bound. In other words, most of the journals have a 5YJIF lower than those in the middle of the box, which is $1.192+\frac{1}{2}\cdot(3.061-1.192)=2.126$.

There are two outlying IS journals: *Mis Quart*, with a 5YJIF value of 9.208, and *VLDB J*, with a 5YJIF value of 6.987. For the record, the 5YJIF of *JASIST* (2.480) is higher than the median value computed for the 77 IS journals.

### Publishing Houses

The 20 publishing houses issuing the 77 IS journals were listed. The bubble plot in Figure 3 shows the cumulated 5YJIF ($y$ axis) of the 20 publishers sorted by decreasing cumulated 5YJIF ($x$ axis). Bubble size is proportional to the number of journals published by the associated publishing house. For instance, the IEEE publishes 12 of the 77 journals under study, whose cumulated 5YJIF reaches 37.005. This chart suggests that there are four leading publishers in IS regarding the 5YJIF: IEEE, Springer, Elsevier, and the ACM. Although accounting for 4/20 (5%) of the identified publishing houses, they publish $(12+18+14+7)/77=66\%$ of the IS journals under study.

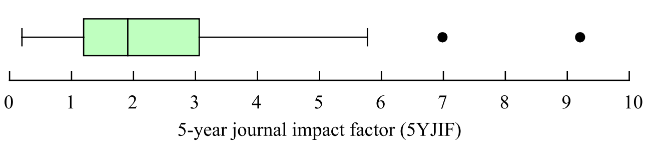


FIG. 2. Box plot of 5-year journal impact factor (5YJIF) values for the 77 leading IS journals.

We have found no study addressing cumulative 5YJIF in this way. However, Braun and Diόspatonyi (2005b) studied 20 "core journals" in 12 scientific domains. Among the 10 top publishing houses selected according to the number of published journals, some also appear in Figure 3: Elsevier (ranked 1st), Wiley (2nd), Springer (5th), and Oxford (10th). The leading publishers in IS do not appear in Braun and Diόspatonyi's (2005b) list, as they only may be concerned with research in computer science. Thus, they may publish a handful of journals in this very field instead of several journals in many fields. This difference seems especially relevant for associations (e.g., the ACM, the ACS).

It is beyond this study to offer an exhaustive account of the literature of scientific publishing. For detailed information about the market of journal publications, the interested reader is referred to, for example, Dewatripont et al. (2006).

### Research Output

The number of articles published by the 77 IS journals was examined. The box plots in Figure 4 show the average number of publications per year. Overall, an IS journal publishes a median of 45 articles per year. There is a great variability in publication rate since 50% of journals publish between 26 and 67 articles per year. *JASIST* published 189 articles per year, on average, which is the outlying value of Category B.

There are five outlying IS journals whose publishing rates vary from 153 to 457 articles per year (i.e., 153 for *Inform Process Lett*, 189 for *J Am Soc Inf Sci Tec*, 226 for *J Chem Inf Model*, 239 for *IEEE T Inform Theory*, and 457 for *IEEE T Wirel Commun*).

A finer grained analysis shows that journals publishing most papers come from Category A, as shown by outliers in

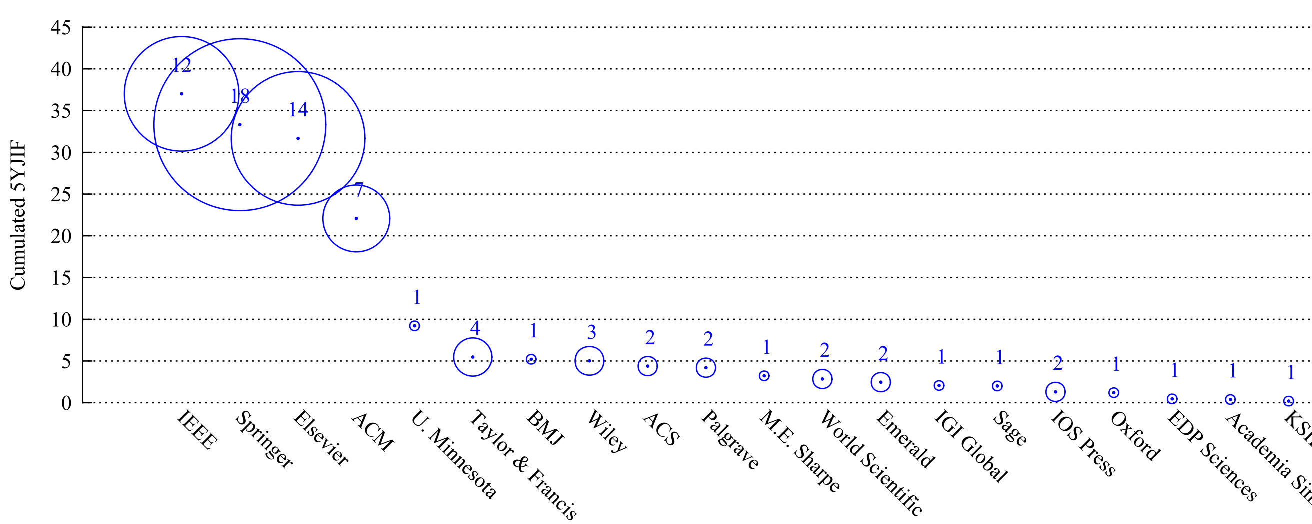


FIG. 3. Bubble plot of cumulated 5-year journal impact factors (5YJIFs) for each publishing house. Bubble size is proportional to the number of journals published by each publishing house (displayed above data points).


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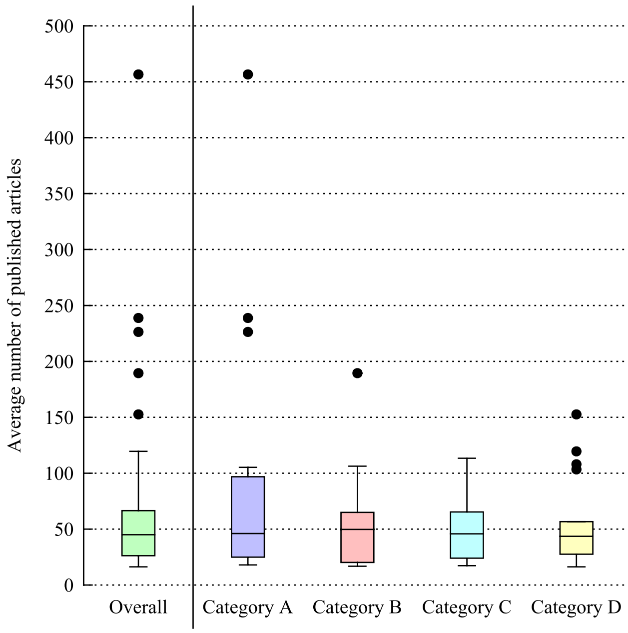


FIG. 4. Box plots of the average number of published articles per year for the 77 leading IS journals.

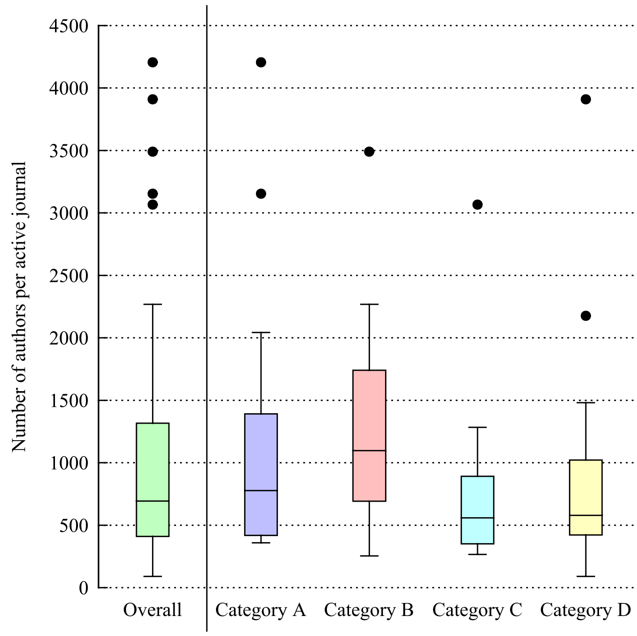


FIG. 5. Box plots of the number of authors for each of 68 IS journals active during the 2005–2010 period.

this category. In addition, the large box with a high upper bound suggests that journals from Category A tend to publish more articles than do the other categories.

*Authorship*

Publication rate has an effect on the potential audience (i.e., readers and authors) of any journal. Let us consider the authors of a journal to be the researchers who had at least one article published in this journal. The box plots in Figure 5 show the number of authors for the IS journals. We considered only the 2005 to 2010 period, and retained those 68 (active) journals having published articles throughout this period.

Overall, an IS journal involves a variable number of authors, as shown by the lengthy whiskers ranging from 90 to 2268 authors. According to the box size of the Overall box plot, half of the journals published between 413 and 1,300 authors from 2005 to 2010 (*Mdn* = 693). For the record, *JASIST* published 1,798 authors during the same period.

Five outlying journals have 3,067 to 4,206 published authors (i.e., 3,067 for *Comput Netw*; 3,154 for *IEEE T Inform Theory*; 3,491 for *J Inf Sci Eng*; 3,910 for *Comput Commun*; and 4,206 for *IEEE T Wirel Commun*).

A finer grained analysis shows that the median number of published authors lies between 559 (Category C) and 1,097 authors (Category B).

For a journal, having a large number of authors can result from publishing many articles, having many coauthors per article, or both. We already investigated the first scenario (publishing many articles) in the previous section. Let us now investigate the second scenario (having many coauthors per article).

*Coauthorship*

The bylines of the articles were analyzed to learn how researchers contribute as coauthors in IS. The box plots in Figure 6 show that 50% of IS journals publish articles authored by 2.3 to 3.0 researchers, on average (*Mdn* = 2.6).

Bylines in *JASIST* credit papers with 2.0 authors, on average, which is the lowest value of Category B. This is in line with figures reported in Cronin (2009b): “The average number of authors per *JASIST* paper increased, though not linearly, from 1.6 in 1980 to 2.4 in 2008.” Our result suggests that *JASIST* authors work alone or in smaller groups than do the authors publishing in Category B.

The two outliers are journals concerned with IS and health issues: *J Am Med Inform Assn* (4.7 coauthors by article, on average) and *IEEE T Inf Technol B* (4.2 coauthors by article, on average). These domains are known to involve substantially more authors in bylines (Cronin, 2001; Rennie, Yank, & Emanuel, 1997; Laine & Mulrow, 2005).

Categorywise boxes suggest that papers in top journals tend to have more coauthors than those in journals with low 5YJIFs. The median number of coauthors is quite stable across categories, varying between 2.5 (Category B) and 2.7 (Category A).


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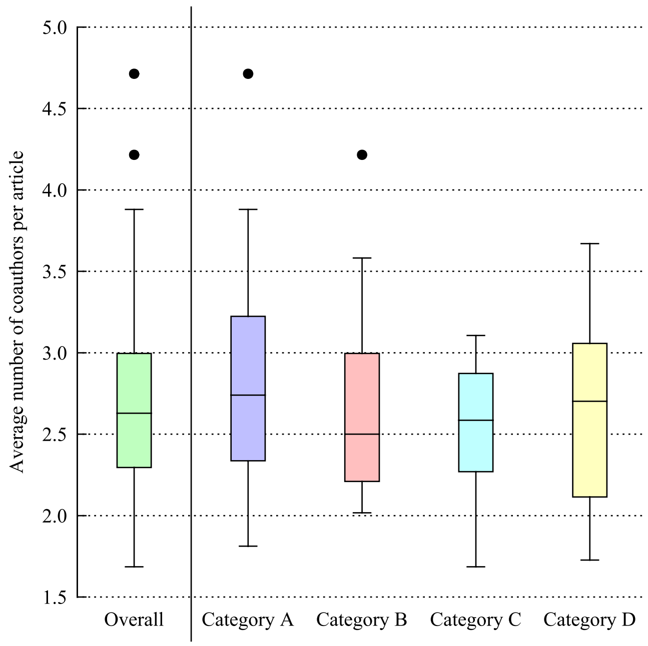


FIG. 6. Box plots of the number of coauthors per article, averaged for each of the 77 IS journals.

*Topics*

Besides analyzing quantitative features of IS journals, we also considered qualitative features extracted from articles. In this section, we address the following question: Which are the most covered topics in IS research?

We hypothesized that the most representative topics in IS would be stated in the titles of articles since these usually convey the main concepts addressed in articles. Another reason for mining titles was that retrieving the full-text version of articles published by all 20 publishers was impossible unless we subscribed to all of them. In contrast, titles are provided in article records on publishers' websites or in the DBLP.

Building on information retrieval techniques, the 100 most representative terms used in the titles of published articles were identified. The word cloud in Figure 7 lays out these top-100 terms with a varying font size according to their importance. Orientation of words (horizontal or vertical) does not convey any meaning since it was chosen only for shrinking the word cloud. Color gradient has no meaning either since color variation is only used to distinguish between words.

Representative terms were retrieved by relying on the indexing process implemented in common search engines (e.g., Manning, Raghavan, & Schütze, 2008, chap. 6). A variation of this process comprising the six following steps was used.

1. Article titles were lowercased to standardize their form. For example, "Advances in the Semantic Web' was changed to "advances in the semantic web."
2. Words were extracted by tokenizing lowercased titles; that is, splitting up title strings on any whitespace (e.g., space, tabulation) or punctuation. For example, "time-constrained scheduling" results in the three words "time," "constrained," and "scheduling."
3. Meaningless words were filtered out. These are known as "stop words" in information retrieval. They usually are articles (e.g., a, the), pronouns (e.g., I, you), and some adverbs (e.g., again, often). Stop word lists are provided with search engines.[5]
4. Remaining words were processed with Harman's (1991) S-stemmer to remove suspected plural forms by trimming the final "s" of words. For example, "models" was changed to "model."
5. The frequency of words [Term Frequency (TF)] was computed, and then combined to the associated Inverse Document Frequency (IDF) computed against the article titles of the 1,090 journals listed in the DBLP. We refer the reader to Manning, Raghavan, & Schütze (2008), for a presentation of the TF·IDF weighting scheme, which is common in information retrieval. This TF·IDF score constitutes a "representativity" score for words, assuming that the more a term is used in IS journals and rare in other journals, the more it is representative of the IS journals.
6. The 100 terms with highest TF·IDF were selected. Note that poorly representative terms were ruled out manually beforehand (e.g., "based" coming from "information-based" or "multi" stemming from "multi-modal"). Moreover, we added a final "s" to words that were stemmed inappropriately (e.g., "wireles" was restored to "wireless").

The top-100 words were laid out using Wordle[6] (Viégas, Wattenberg, & Feinberg, 2009), as illustrated in Figure 7. The five most representative terms of the IS field are *network*, *system*, *information*, *code*, and *data*. When indexing *JASIST* articles only, we found that *information*, *web*, *citation*, *science*, and *journal* are the five most frequent terms in titles (Figure 8).

From a broader perspective, we investigated the relationships among IS journals with respect to the topics they address. Again, we used paper titles to capture journal topics. We used Salton's (1979) Vector Space Model for computing interjournal similarity based on the TF·IDF weighting scheme. Each journal was modeled as a document vector $\vec{d}_i = \left(w_i^1, \ldots, w_i^n\right)$ in the $n$-dimensional vector space of the indexing language (i.e., the terms used in paper titles). A weight $w_i^j \in \mathbb{R}_+$ is calculated for each dimension $j$. Classically, $w_i^j = tf\left(\vec{d}_i, t_j\right) \cdot idf\left(t_j\right)$, where the weight of a term $t_j$ in $\vec{d}_i$ is higher when $t_j$ is frequent in the journal but rare in all other IS journals. The higher the weight $w_i^j$, the more characteristic of document $d_i$ the term $t_j$ is. Finally, the similarity between two journals $j_i$ and $j_j$ is computed by $\cos\left(\vec{d}_i, \vec{d}_j\right) \in [0,1]$.

A map of the 77 leading IS journals organized by topic similarity is showed in Figure 9. Each journal is represented

[5]http://snowball.tartarus.org/algorithms/english/stop.txt
[6]http://www.wordle.net


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FIG. 7. Word cloud of the 100 most representative terms (highest TF·IDF) extracted from titles of articles published in the 77 leading IS journals. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]


FIG. 8. Word cloud of the 100 most representative terms (highest TF·IDF) extracted from titles of articles published in the *Journal of the American Society for Information Science and Technology*. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

as a vertex whose color reflects the category of the journal. We used Kamada and Kawai's (1989) force-directed placement algorithm to lay out the vertices according to constraints set on the edges of the graph. Two vertices are connected by an edge whose length is inversely proportional to the similarity computed between the two associated journals. Hence, two journals sharing common vocabulary and topics are drawn close to each other.

The force-directed placement of journals based on their textual contents revealed a great variety of research topics. These are shown by journal clusters appearing in Figure 9. While dividing this map into several fixed areas would be highly subjective (Where should the lines be drawn?), we may observe that some topics concentrate in some parts of the map. The most prominent topic clusters are those of Database (upper left), Information Theory (upper right), Multimedia and Networking (right), Information Management (bottom), and Information Technology (bottom left). *JASIST* lies in the latter location. Note that most of the Category D journals (in yellow) lie on the right side of the map while there are no journals from Category D in the upper left. This suggests that the distribution of 5YJIFs among clusters (i.e., topics) is not homogeneous, and that a reference classification of journals into topics would be needed to further investigate this point.

In this section, we studied IS journals as black boxes since we reported statistics about their inputs and outputs. Indeed, we considered the number of published papers, the


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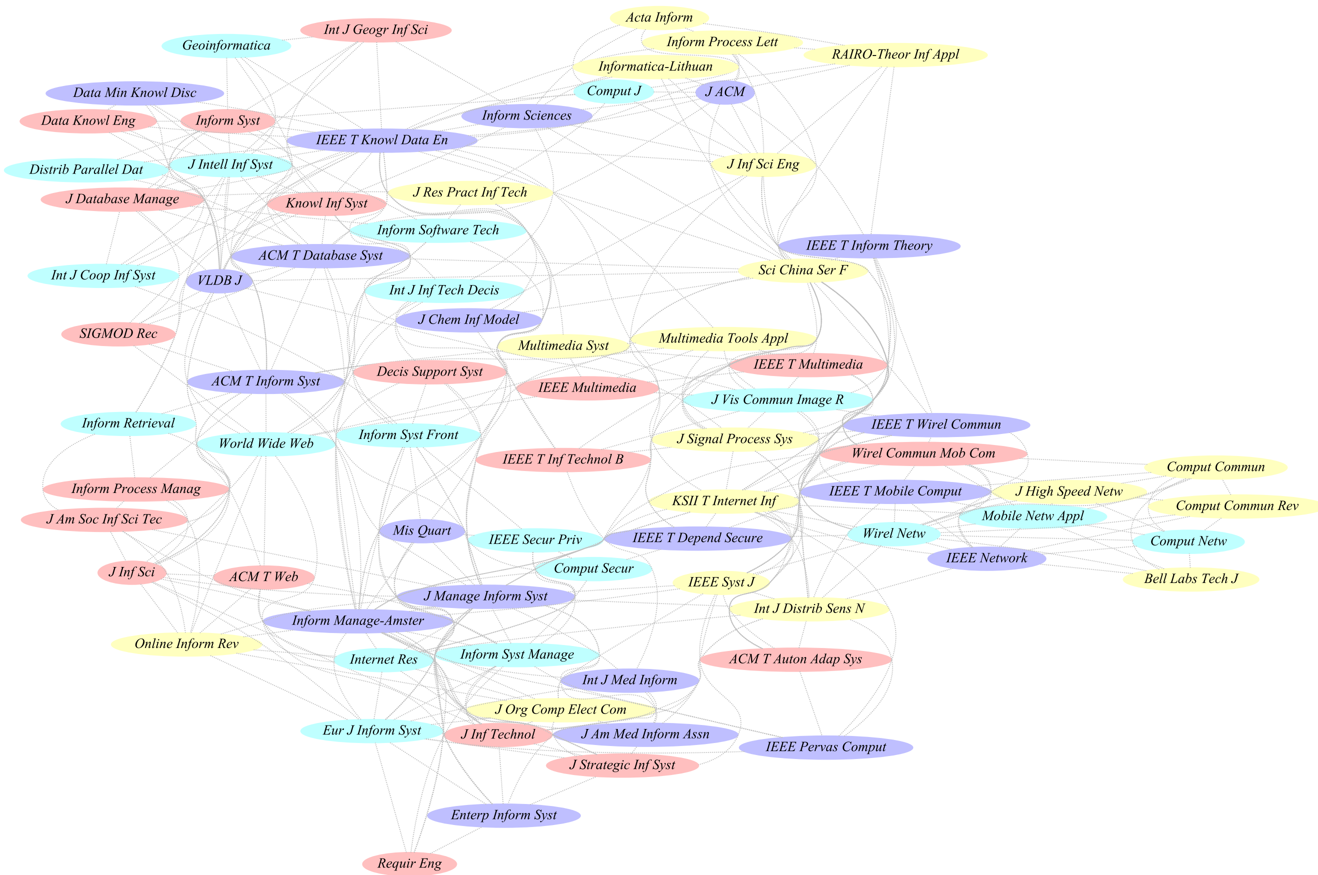


FIG. 9. Map of the 77 leading IS journals laid out according to their topic similarity. Each vertex of the graph represents a journal, whose category is shown by the color of the vertex (A in blue, B in pink, C in green, and D in yellow). An edge connects two vertices; its length is inversely proportional to similarity between the vertices. Vertices were laid out using Kamada and Kawai's (1989) force-directed placement algorithm. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

number of authors involved, their coauthoring habits, and 5YJIF values. In the next section, we intend to open this black box to study the internal machinery of IS journals, which relies on skilled researchers serving on journal editorial boards.

## Findings About IS Editorial Boards

Much research has been devoted to the study of journals according to published papers, authors, and outgoing and incoming citations (e.g., Bar-Ilan, 2010a; Sin, 2011); however, little research has considered the cornerstone of any journal: its editorial board. Intending to raise the understanding of scholarly publishing in IS, we present in this section findings about the editorial boards of the 77 IS journals under study.

### *Board Size*

From the dataset we collected (see Appendix A), we counted the number of gatekeepers serving on editorial boards. According to the Overall box plot in Figure 10, there are between 28 and 56 gatekeepers in 50% of IS journals.

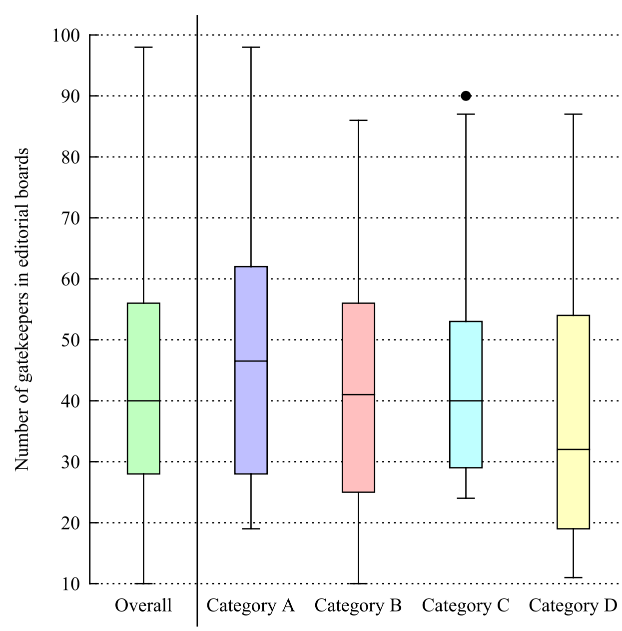


FIG. 10. Box plots of the number of gatekeepers serving on the editorial boards of the 77 leading IS journals.


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Moreover, the editorial board size varies from 10 to 98 gatekeepers ($M = 43.6$, $Mdn = 40$). This result is higher than the 32.8 average board size for the journals in the *Information Science & Library Science* category of the *JCR–Social Science edition 2008* analyzed by Baccini and Barabesi (2011). Another study reported an average of 35.8 gatekeepers per journal for the top-20 journals of 15 scientific disciplines extracted from the *JCR–Science edition 2009* (García-Carpintero, Granadino, & Plaza, 2010).

At the time the *EB_IS_2009* dataset was collected, there were 32 gatekeepers in *JASIST*.

A categorywise analysis suggests that journals with higher 5YJIFs have larger editorial boards according to the median: 46 gatekeepers for Category A, 41 gatekeepers for Category B, 40 gatekeepers for Category C, and 32 gatekeepers for Category D.

### Estimate of Gatekeeper Workload

Accurate determination of gatekeeper workload requires information not readily available for all journals, such as number of reviewers per submission, total number of submissions, and proportion of papers rejected without review. However, we do have this information for *JASIST*. It is known that *JASIST* receives about 600 submissions a year, that 30% of submissions are rejected with no review by the editor in chief, and that other submissions are usually assigned to two or three editors who serve as reviewers (Cronin, 2011).

We started by measuring the ratio of published articles per year to the number of gatekeepers serving a given journal. The Overall box plot in Figure 11 shows a great variability since this ratio ranges from 0.3 to 11.9 papers a year, with several outliers. For the 50% of the journals represented in the box, this ratio ranges from 0.6 to 1.8 articles per gatekeeper per year.

The ratio for *JASIST* is 5.9 published articles per gatekeeper per year. This is the highest value for Category B journals, suggesting that *JASIST* gatekeepers are much called upon compared to those serving on other journals.

In an attempt to estimate gatekeeper workload, let us consider a journal with an acceptance rate of 30% and the median ratio of 1.1 (the Overall box plot in Figure 11). With a three-referee approach, each gatekeeper of this hypothetical journal would be assigned $3 \times 1.1 \times (100/30) = 11$ papers a year. Note that, as does *JASIST* (Cronin, 2009a, 2011), most journals also rely on additional reviewers, whom we cannot take into account here since they are not part of the editorial board.

In this section, we reported findings about editorial boards as a whole. To further this scientometric study, we consider gatekeepers and their characteristics next.

## Findings About Gatekeepers of IS Journals

As we failed to find any study of gatekeeper characteristics in IS, we investigate the following in this section: involvement in editorial boards, demographics, seniority, authority, geographic diversity, and gender distribution.

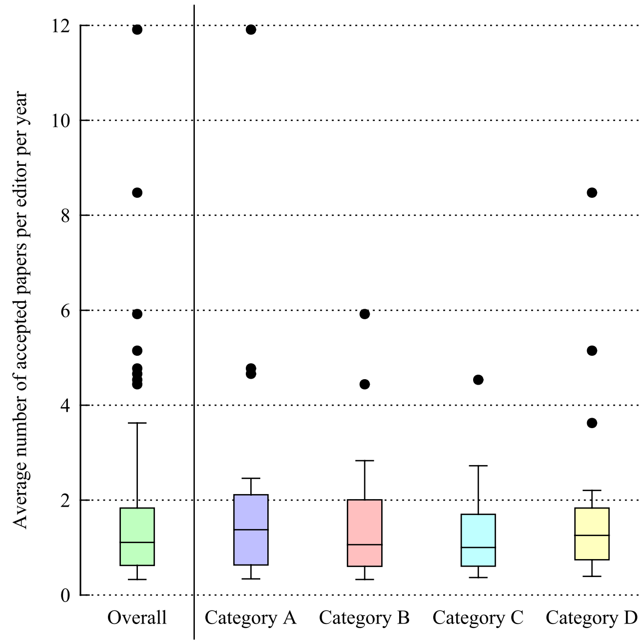


FIG. 11. Box plots of the average number of accepted papers per gatekeeper per year in the 77 leading IS journals.

### Involvement in Editorial Boards

Gatekeepers' degree of involvement in the 77 IS journals was studied by counting their participation in editorial boards. Then, two ranking policies were used for ordering them in Table 4, where the name, country,[7] and gender of each gatekeeper are given, along with a numerical value used to sort table rows. This value is computed as follows:

- In the left column labeled *Gatekeepers' involvement*, we report the number of journals in which researchers serve as gatekeeper. This does not account, however, for the gatekeepers' roles in boards. In other words, an editor in chief position contributes to number of journals as 1, as do other positions (e.g., advisory board member).
- In the right column labeled *Gatekeepers' weighted involvement*, we report a score depending on the roles that they hold in editorial boards. Recall that "roles" were introduced and illustrated for *JASIST* in Table 3. Roles were mapped to levels encoded in a numerical value in $\mathbb{N}_{+}$. To handle various journals with different number of levels (e.g., *J Am Soc Inf Sci Tec* has four levels wheras *ACM T Inform Syst* has two levels only), we normalized the level values of any journal into the range ]0,1]. Regarding the example in Table 3, the normalized level is computed by dividing the level value by 4 since it is the greatest level value of *JASIST*.

[7]In the remainder of this article, a two-letter country code is used for referring to countries. These are known as ISO 3166-1-alpha-2; see http://www.iso.org/iso/list-en1-semic-3.txt


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TABLE 4. Top-50 gatekeepers serving on the 77 leading IS journals in Year 2011.

| Rank | Gatekeepers' involvement | | | | Gatekeepers' weighted involvement | | | |
|---|---|---|---|---|---|---|---|---|
| | Gatekeeper | Country | Sex | No. of journals | Gatekeeper | Country | Sex | Score |
| 1 | Elisa Bertino | USA | F | 8 | Elisa Bertino | USA | F | 3.50 |
| 2 | Andrew B. Whinston | USA | M | 5 | Andrew B. Whinston | USA | M | 3.17 |
| 3 | Athanasios V. Vasilakos | Greece | M | 5 | Hsiao-Hwa Chen | Taiwan | M | 2.58 |
| 4 | Benjamin W. Wah | USA | M | 5 | Benjamin W. Wah | USA | M | 2.25 |
| 5 | Qian Zhang | Hong Kong | F | 5 | Anthony S. Acampora | USA | M | 2.17 |
| 6 | Anthony S. Acampora | USA | M | 4 | Pericles Loucopoulos | United Kingdom | M | 2.17 |
| 7 | Edward A. Fox | USA | M | 4 | Justin Zobel | Australia | M | 2.08 |
| 8 | Fabio Crestani | Switzerland | M | 4 | Imrich Chlamtac | Italy | M | 2.00 |
| 9 | Hsiao-Hwa Chen | Taiwan | M | 4 | Qian Zhang | Hong Kong | F | 2.00 |
| 10 | Johannes Gehrke | USA | M | 4 | Fabio Crestani | Switzerland | M | 1.92 |
| 11 | Justin Zobel | Australia | M | 4 | James R. Marsden | USA | M | 1.92 |
| 12 | Kalle Lyytinen | USA | M | 4 | Lotfi A. Zadeh | USA | M | 1.92 |
| 13 | Lotfi A. Zadeh | USA | M | 4 | Ricardo A. Baeza-Yates | Chile | M | 1.92 |
| 14 | Matthias Jarke | Germany | M | 4 | Amit P. Sheth | USA | M | 1.83 |
| 15 | Robert J. Kauffman | USA | M | 4 | Beng Chin Ooi | Singapore | M | 1.83 |
| 16 | Sid L. Huff | New Zealand | M | 4 | Mike P. Papazoglou | the Netherlands | M | 1.83 |
| 17 | Sudha Ram | USA | F | 4 | Sudha Ram | USA | F | 1.83 |
| 18 | Aidong Zhang | USA | F | 3 | Leonid Libkin | United Kingdom | M | 1.75 |
| 19 | Amit P. Sheth | USA | M | 3 | Marianne Winslett | USA | F | 1.75 |
| 20 | Andrzej Skowron | Poland | M | 3 | Robert J. Kauffman | USA | M | 1.75 |
| 21 | Antonio Capone | Italy | M | 3 | Ugur Çetintemel | USA | M | 1.75 |
| 22 | Athman Bouguettaya | Australia | M | 3 | Athanasios V. Vasilakos | Greece | M | 1.67 |
| 23 | Beng Chin Ooi | Singapore | M | 3 | Clyde W. Holsapple | USA | M | 1.67 |
| 24 | Bernard C. Y. Tan | Singapore | M | 3 | Gary J. Koehler | USA | M | 1.67 |
| 25 | Blaize Horner Reich | Canada | F | 3 | Kian-Lee Tan | Singapore | M | 1.67 |
| 26 | Bruce W. Weber | United Kingdom | M | 3 | Leonard Kleinrock | USA | M | 1.67 |
| 27 | ChengXiang Zhai | USA | M | 3 | Mischa Schwartz | USA | M | 1.67 |
| 28 | Chris Jermaine | USA | M | 3 | Mohsen Guizani | Kuwait | M | 1.67 |
| 29 | Christina Fragouli | Switzerland | F | 3 | Philip A. Bernstein | USA | M | 1.67 |
| 30 | Colette Rolland | France | F | 3 | Sid L. Huff | New Zealand | M | 1.67 |
| 31 | Daniel Dajun Zeng | USA | M | 3 | Wen-Lian Hsu | Taiwan | M | 1.67 |
| 32 | David L. Olson | USA | M | 3 | Witold Pedrycz | Canada | M | 1.67 |
| 33 | Dominik Slezak | Switzerland | M | 3 | Keng Siau | USA | M | 1.60 |
| 34 | Douglas W. Oard | USA | M | 3 | Edward A. Fox | USA | M | 1.58 |
| 35 | Edie M. Rasmussen | USA | F | 3 | Johannes Gehrke | USA | M | 1.58 |
| 36 | Fabrizio Sebastiani | Italy | M | 3 | Minho Jo | Republic of Korea | M | 1.58 |
| 37 | Gary J. Koehler | USA | M | 3 | Bernard C. Y. Tan | Singapore | M | 1.50 |
| 38 | Hasan Pirkul | USA | M | 3 | ChengXiang Zhai | USA | M | 1.50 |
| 39 | Ian Ruthven | United Kingdom | M | 3 | Erol Gelenbe | United Kingdom | M | 1.50 |
| 40 | Iris Vessey | USA | F | 3 | Ling Liu | USA | F | 1.50 |
| 41 | James R. Marsden | USA | M | 3 | Marek Rusinkiewicz | USA | M | 1.50 |
| 42 | Javier Lopez | Spain | M | 3 | Nigel Davies | United Kingdom | M | 1.50 |
| 43 | Jayant R. Haritsa | India | M | 3 | Prabuddha De | USA | M | 1.50 |
| 44 | Jiangchuan Liu | Canada | M | 3 | Richard Baskerville | USA | M | 1.50 |
| 45 | John C. Henderson | USA | M | 3 | Srinivasan Keshav | Canada | M | 1.50 |
| 46 | John Leslie King | USA | M | 3 | Vijay K. Vaishnavi | USA | M | 1.50 |
| 47 | Jon Crowcroft | United Kingdom | M | 3 | Matthias Jarke | Germany | M | 1.48 |
| 48 | Kar Yan Tam | Hong Kong | M | 3 | Sihem Amer-Yahia | USA | F | 1.42 |
| 49 | Kian-Lee Tan | Singapore | M | 3 | Kalle Lyytinen | USA | M | 1.40 |
| 50 | Leonard Kleinrock | USA | M | 3 | Colette Rolland | France | F | 1.35 |

Several gatekeepers occupy more than one seat on IS editorial boards. This was documented as "interlocking editorship" by Baccini and Barabesi (2010). Elisa Bertino serves on eight IS editorial boards, for instance. On average, a gatekeeper occupies 1.18 seats on IS editorial boards. This is slightly higher than the 1.14 reported for the 61 journals of "Information Science & Library Science" by Baccini and Barabesi (2011).

The large body of gatekeepers with the strongest involvement listed in Table 4 are affiliated to the USA (46% in the left column, 57% in the right column). Interestingly, this figure concerning all IS is consistent with the 47% reported for 10 Information Science journals in Cronin (2009d). This suggests that these journals represent an accurate sample of all IS journals, at least regarding the location of gatekeepers.


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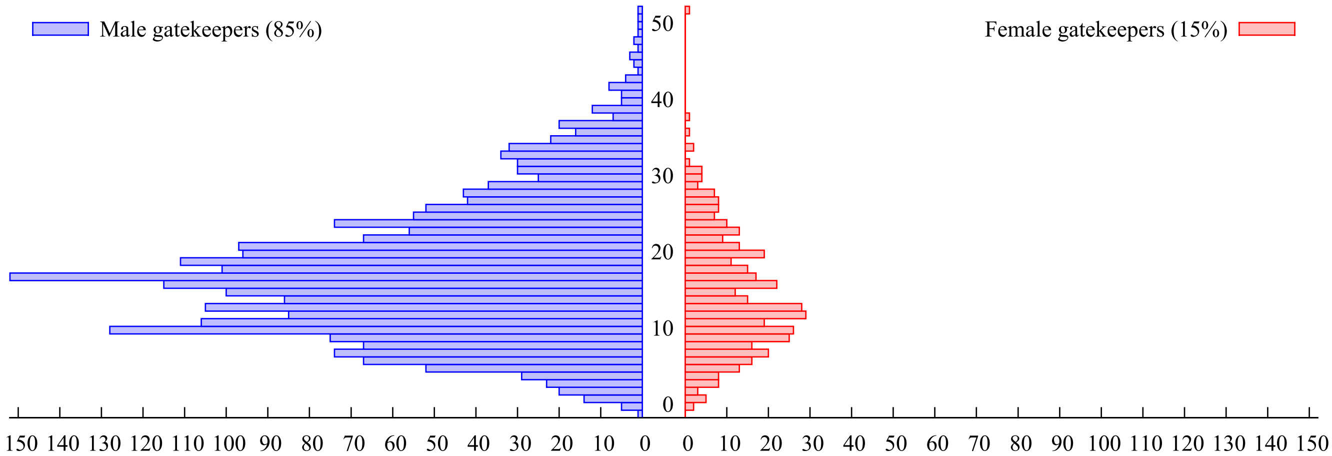


FIG. 12. Population pyramid of gatekeepers serving on the 77 leading IS journals, showing the distribution of seniority (i.e., number of years since first published scholarly article) with respect to gender. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

There are 7/50 (14%) female gatekeepers in the top-50 with weighted involvement. Next, we investigate whether this statistic is accurate for the remaining gatekeepers.

### *Demographics*

Gatekeeper demographics were analyzed by examining their gender and age. While gender was collected (see Appendix A), there is no way to know the age of the 2,846 gatekeepers. Nevertheless, we estimated a gatekeeper's seniority by mining the DBLP records. Let us define the seniority of a gatekeeper as the number of years since his or her first scholarly article was published. The population pyramid in Figure 12 shows the distribution of gatekeeper seniority (in years) according to gender.

Overall, male gatekeepers (85%) clearly outnumber female gatekeepers (15%). One explanation for this large female/male imbalance may involve the falling proportion of computer science degrees going to women. According to De Palma (2001), this tendency has been increasing from the mid-1980s (when women received 35% of computer science degrees) to nowadays. Stross (2008) reported that women account for less than 10% of the newest undergraduates in many computer science departments. This shortage of female graduates surely has an influence on the number of women entering academia, and later on the number of female gatekeepers. According to the figures reported by Stross, we may expect the ratio of female to male gatekeepers to substantially decrease in the near future if no affirmative action is taken.

Regarding seniority, the distribution for male gatekeepers peaks at 18 years of seniority whereas the peak value is 13 years for female gatekeepers. Incidentally, the doyens of gatekeepers are Dana S. Scott and Friedrich L. Bauer, as their oldest articles present in the DBLP date from 1958.

Regardless of their gender, there are a few gatekeepers with a low number of years since their first article was published (see the bottom of the pyramid in Figure 12). These may be junior researchers or researchers publishing in domains not covered by the DBLP (e.g., physics). As a result, we cannot conclude that gatekeepers with low seniority have limited research experience.

### *Seniority*

We refined this demographic analysis by studying seniority according to journal categories. The median seniority was computed for each journal. We opted for the median instead of the average because the former is robust to outliers while the latter is not. The Overall box plot in Figure 13 shows that 50% of the IS journals involve gatekeepers whose median seniority lies between 15 and 21 years ($Mdn = 18$, as shown by the segment in the box). Median seniority for categories are similar (Category A: 18 years, Category B: 19 years, Category C: 20 years, Category D: 18 years).

The two outliers are *Acta Inform* from Category D, with 38 years of median seniority, and *Data Knowl Eng* from Category B, with 32 years of median seniority. Gatekeepers of *JASIST* have a median seniority of 19 years, which corresponds to the median value in Category B.

### *Authority*

Seniority may be one factor of gatekeeper expertise. A more accurate evidence of scientific achievement may be conveyed by a large number of published journal articles. We call this indicator *authority*. In the literature, gatekeeper authority was studied for selected journals in various domains such as management, economics, psychology, and sociology (Bedeian, Van Fleet, & Hyman, 2009; Lowe & Van Fleet, 2009); however, we failed to find any study on the IS field.


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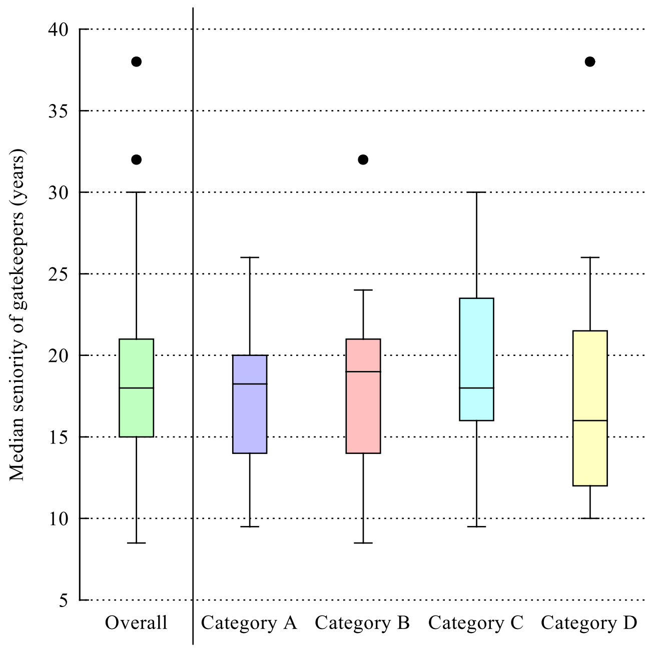


FIG. 13. Box plots showing the median seniority of gatekeepers serving on the 77 leading IS journals.

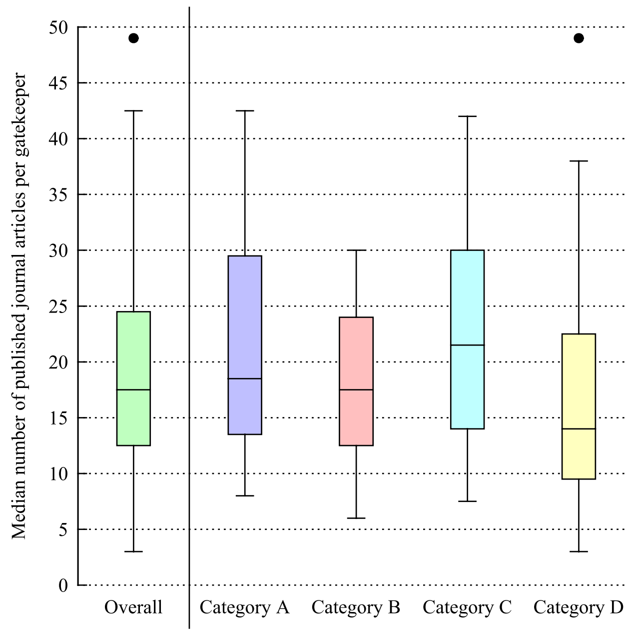


FIG. 14. Box plots showing the median number of journal papers published by gatekeepers, for each of the 77 leading IS journal.

The median number of journal articles published per gatekeeper was computed for each journal. The Overall box plot in Figure 14 shows that this value lies between 12.5 and 24.5 for 50% of the journals (*Mdn* =17.5 articles). The outlying journal is *Acta Inform*, with a median of 49.0 published journal articles per gatekeeper.

Categorywise medians show some variability that does not seem to depend on journal quality (Category A: 18.5 articles, Category B: 17.5 articles, Category C: 21.5 articles, Category D: 14.0 articles).

*JASIST* gatekeepers published a median of 14.0 journal articles, which is lower than the median number of 17.5 articles published per gatekeepers for all journals studied. This difference may be due to the tendency of *JASIST* authors to write papers with fewer coauthors than in other journals (see Figure 6). Assuming that *JASIST* authors and gatekeepers may share this trait, then it is more difficult for them to have as many papers as do researchers collaborating with many coauthors. This remark echoes Põder's (2010) Letter to the Editor.

### *Geographic Diversity*

Having considered gatekeepers' gender, seniority, and authority, we now investigate their geographic diversity with varying level of granularity.

*Geographic diversity at the level of IS research.* Gatekeeper countries were deduced from their affiliations. The bar chart in Figure 15 shows the country distribution of the 2,846 gatekeepers. The *x* axis lists countries sorted by decreasing number of gatekeepers. A base-2 logarithmic scale was used for the *y* axis since there are large variations across countries. The number of gatekeepers for each country is displayed above the associated bar for ease of reading. Due to space limitations, countries hosting less than 12 gatekeepers are not displayed. Interestingly, countries from the five inhabited continents appear in the figure: Africa with South Africa (za), America with the USA (us), Asia with China (cn), Australia (au), and Europe with the UK (uk).

For the 2,846 gatekeepers under study, we found 54 countries of affiliation. A large body of these gatekeepers are affiliated with the United States (44%). Despite contributing seven times less gatekeepers, the United Kingdom has the second most gatekeepers (6%). Note that these two countries altogether host half of all gatekeepers in the world. The predominance of the United States and the United Kingdom has been previously reported for the core 20 journals of 12 science fields (Braun & Dióspatonyi, 2005a, 2005b; Braun, Dióspatonyi, Zádor, & Zsindely, 2007). Braun (2005) found that 75% of the seats on these editorial boards were held by 10 countries. Similar figures were reported in the previously mentioned study by García-Carpintero, Granadino, & Plaza, (2010). Focusing on 10 information science journals, Cronin (2009d) found that gatekeepers from the United States occupy 47% of the seats. Regarding *JASIST*, Cronin (2009a) welcomed newly appointed gatekeepers and noted that they come from various countries. The geographic diversity of gatekeepers is deemed to be a desirable property for international journals (García-Carpintero, Granadino, & Plaza, 2010).

Comparing countries according to their number of gatekeepers as presented in Figure 15 does not account for each country's population; however, this factor has a tremendous


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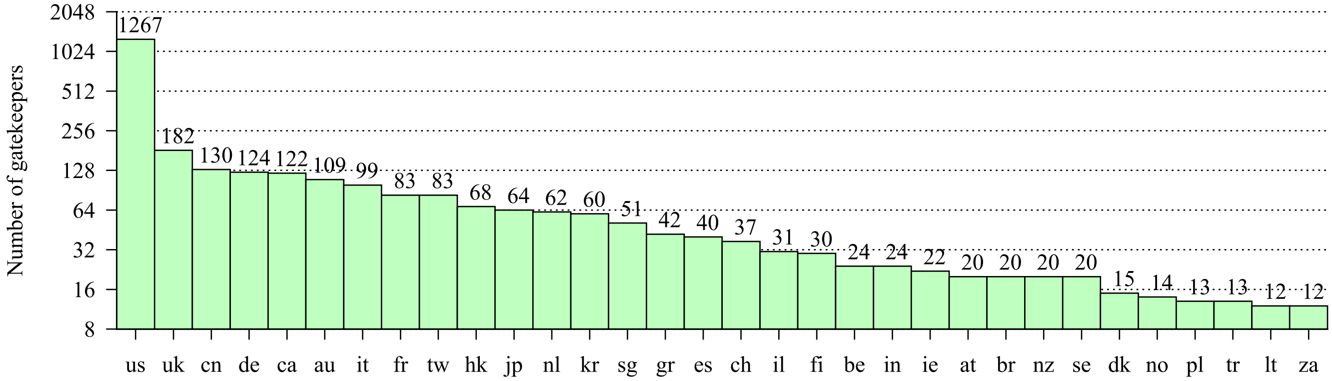


FIG. 15. Number of gatekeepers serving on the 77 leading IS journals for each country, as declared in their affiliation. Countries with less than 12 gatekeepers are not shown due to space limitations.

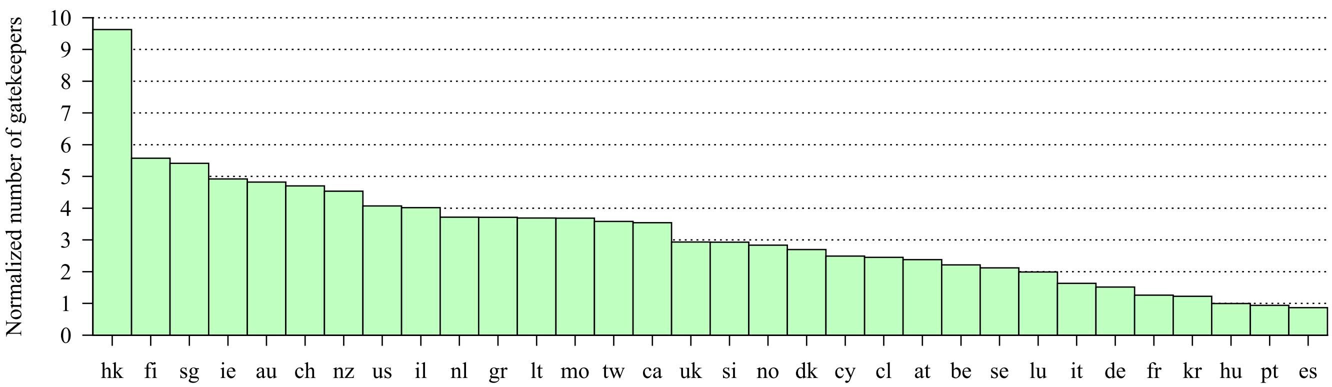


FIG. 16. Number of gatekeepers serving on the 77 leading IS journals for each country, normalized by the country's population. Due to space limitations, only the top-32 countries are displayed (same number of countries as in Figure 13).

effect on the number of potential researchers in computer science. We thus normalized each country's number of gatekeepers by its population.[8] This ratio is shown in Figure 16, where the top-five countries are now Hong Kong (hk), Finland (fi), Singapore (sg), Ireland (ie), and Australia (au). This result suggests that compared to other countries, a larger body of these five countries' populations serve as gatekeepers in IS journals.

*Geographic diversity at the journal category level.* Does journal category have an effect on the location of gatekeepers? We studied gatekeeper affiliations in light of journal categories to answer this question.

The bar charts in Figure 17 show the percentage of gatekeepers affiliated to countries listed on the $x$ axis. The prominent role of the United States is established for the four categories, as gatekeepers from this country account for 52.4 to 36.4% of all gatekeepers. Journals with low 5YJIFs seem to involve less gatekeepers from the United States in favor of researchers from other countries. Interestingly, scientists from Asia (especially from China, Taiwan, and South Korea) represent 18% of all gatekeepers in Category D (Figure 17).

*Geographic diversity at the journal level.* Geographic diversity was studied at the global level of IS research (Figure 15), then according to journal category (Figure 17). In this section, we explore whether this diversity is equally distributed in journals. In other words, do all journals equally foster geographic diversity?

The ratio of the number of distinct gatekeeper countries to the total number of gatekeepers on the board of the journal was computed. For example, *Mis Quart* (5YJIF = 9.208) has 56 gatekeepers from 13 distinct countries, leading to a geographic diversity of 13/56 = 0.23. This ratio is higher when journals involve gatekeepers from various distinct countries.

The box plot in Figure 18 shows the values of geographic diversity, which range from 0.07 (*J High Speed Netw* with a 5YJIF = 0.442) to 0.61 (*Inform Process Lett* with a 5YJIF = 0.877), with a median ratio of 0.32 (*IEEE MultiMedia* with a 5YJIF = 2.020).

For the record, *JASIST* has a 0.28 geographic diversity, and it seems that relying on gatekeepers from several loca-

[8]http://en.wikipedia.org/wiki/List_of_countries_by_population


DOI: 10.1002/asi

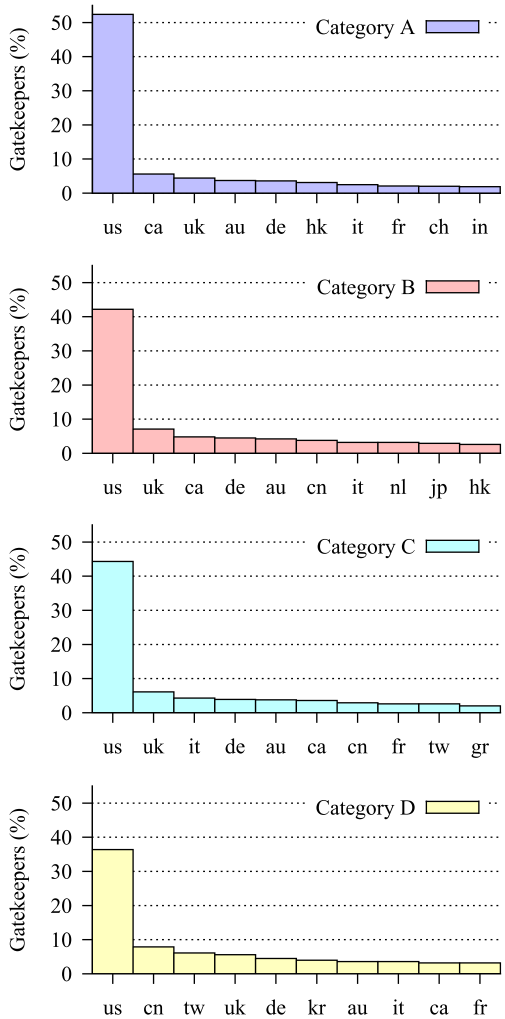


FIG. 17. Bar charts showing the proportion of most representative countries (as extracted from editors' affiliations) for the four journal categories shown in Table 2.

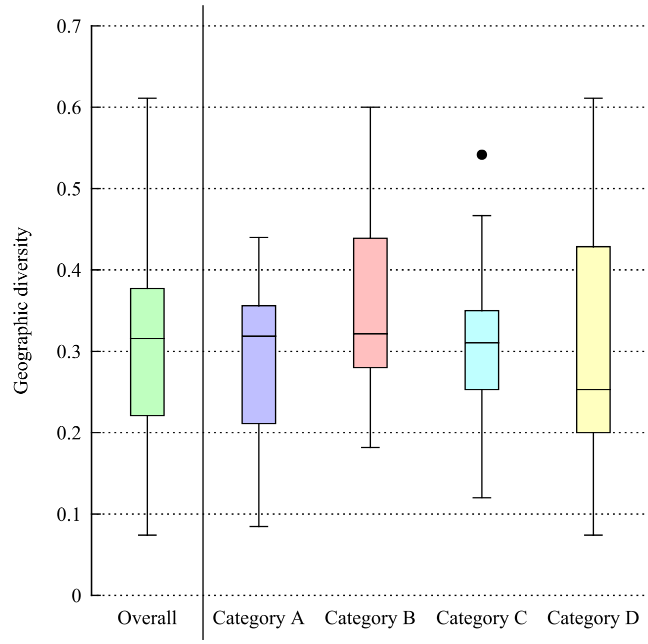


FIG. 18. Box plot showing the geographic diversity of gatekeepers in the 77 leading IS journals.

tions is important for this journal, as advertised in the *Changing of the Guard* editorial by Cronin (2009a).

Refining this analysis, the scatter plot in Figure 19 shows the 77 IS journals as data points whose coordinates depend on the 5YJIF ($x$ axis) and geographic diversity ($y$ axis). *JASIST* is pinpointed. The linear regression trend line also is graphed. It suggests that journals with higher 5YJIFs have slightly less geographic diversity than do others. Nevertheless, the weak coefficient of determination ($R^2 = 0.0039$) suggests that the trend line is not a good approximation of all the data points. This confirms the perception of great variability across journals regarding geographic diversity.

Overall, some journals are run by boards representing very few countries. For instance, 12 IS journals have less than a 20% geographic diversity. This kind of hegemony or nationalism may be an issue since these editorial boards may not encompass the variety of viewpoints that one would expect from an international journal. In addition, they may not attract as many papers from worldwide researchers as would journals with higher geographic diversity (Braun, 2005; García-Carpintero, Granadino, & Plaza, 2010).

### Gender Distribution

Examining the profile of *JASIST* authors, Cronin (2009b) reported that females account for 33% of all authors in 2008. Regarding editorial board members, however, we failed to find studies on gatekeeper gender distribution (either in IS or other disciplines). This question seems worth studying to get a clearer understanding of gatekeeper demographics. Just as Cronin (2009b) encouraged female authors, journals also may involve and encourage more females to serve on their boards.

The ratio of female to male gatekeepers was computed. The box plot in Figure 20 shows that 50% of IS journals involve between 9% and 22% of female gatekeepers ($Mdn = 14\%$). The two outliers are *Internet Res* involving 45% and *Inform Syst Manage* involving 42% of female gatekeepers. For the record, the editorial board of *JASIST* is comprised of 37% of female gatekeepers, which is the highest value among Category B journals.

We refined this analysis by studying the proportion of female gatekeepers at the journal level. The scatter plot in Figure 21 shows the 77 IS journals as data points whose coordinates depend of the 5YJIF ($x$ axis) and female proportion ($y$ axis). *JASIST* is pinpointed. The linear regression trend line also is graphed. It suggests that journals with higher 5YJIF involve more female gatekeepers than do others. Nevertheless, the weak coefficient of determination


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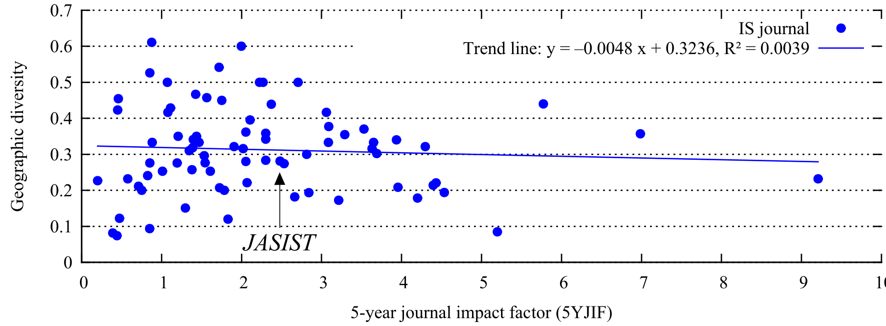


FIG. 19. Scatter plot showing the geographic diversity of gatekeepers in the 77 leading IS journals. Each data point represents a journal according to its 5-year journal impact factor (5YJIF) (*x* axis) and its geographic diversity: the ratio of distinct countries from editors' affiliations over the number of editors serving on its editorial board (*y* axis). [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

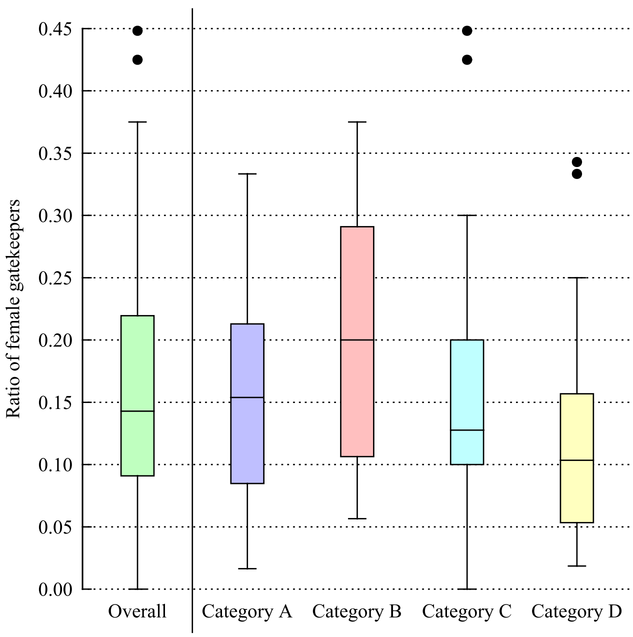


FIG. 20. Box plot showing the proportion of female gatekeepers on the boards of the 77 leading IS journals.

($R^2 = 0.0331$) suggests that the trend line is not a good approximation of all the data points. This confirms the perception of great variability across journals regarding female participation as gatekeepers.

In this section, we shaped the landscape of research in IS by considering the human cornerstone of every science journal: its editorial board. We studied the demographics of gatekeepers according to gender, seniority, authority, and the countries to which they are affiliated.

Throughout this article, extensive data analysis allowed the setting of a scene depicting IS research as of 2011. Several of our findings help to draw the profile of the typical IS journal having the following characteristics:

- The typical IS journal publishes 45 articles a year.
- The typical IS journal has a 1.907 5YJIF.
- The typical IS journal is run by 40 gatekeepers, of whom 18 are affiliated in the United States, and 6 are female scientists. Gatekeepers typically published their first article 18 years ago, and they typically have published a total of 17.5 journal articles.
- Editorial boards of journals with high 5YJIF tend to have lower geographic diversity than other journals.
- Editorial boards of journals with high 5YJIF tend to involve more female gatekeepers than other journals.

## Discussion

The scientometric study reported in this article is intended to shape the landscape of IS research. We relied on the *JCR–Science edition 2009* as an acknowledged list of peer-reviewed journals. We selected the *Information Systems* category, which also includes *JASIST*, among the following available categories for computer science.

- *Artificial Intelligence*
- *Cybernetics*
- *Hardware & Architecture*
- *Information Systems*
- *Interdisciplinary Application*
- *Software Engineering*
- *Theory & Methods*

Various investigations led us to believe that the IS category is not exclusively dedicated to IS journals, strictly speaking. Several journals related to networking appear in Table 2, such as *IEEE T Wirel Commun* and *IEEE T Mobile Comput*. In our view, there are at least 11 of the 77 journals that could join a hypothetical *Networking* category in the *JCR*. These are located in the right side of the map of IS journals clustered by topics (Figure 9). Networking journals may have characteristics different from "pure" IS journals. For instance, we found that *IEEE T Wirel Commun* is an outlying journal when it comes to research output (Figure 4) and authorship (Figure 5). In addition, the word cloud for IS research (Figure 7) contains many networking terms (e.g., network, wireless, routing) compared to *JASIST*'s word cloud (Figure 8). This observation has a practical implica-


DOI: 10.1002/asi

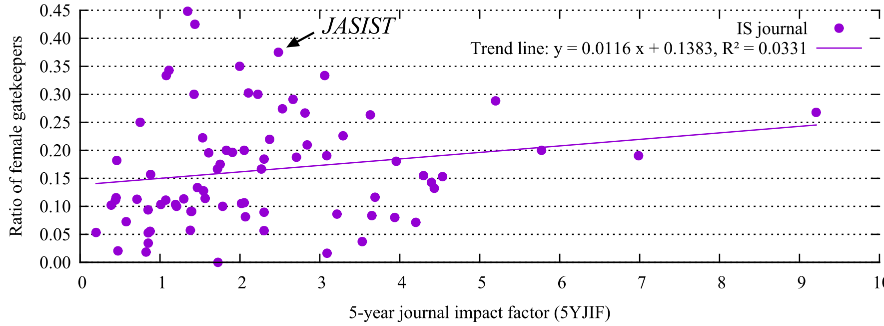


FIG. 21. Scatter plot showing the proportion of female gatekeepers on the boards of the 77 leading IS journals. Each data point represents a journal according to its 5-year journal impact factor (5YJIF) (*x* axis) and the ratio of female over male gatekeepers serving on its board (*y* axis). [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

tion. Studies of IS journals based on the *Information Systems* category of the *JCR* (including ours) may be influenced by networking journals.

## Conclusion

The landscape of research in IS has been investigated in this article. We tackled the research question "What are the characteristics of journals in IS?"

From the *Computer Science, Information Systems* category of the *JCR–Science edition 2009*, we studied 77 leading IS journals. Extensive statistical analysis was applied to quantitative and qualitative data about journals, editorial boards, and gatekeepers. Scientometric indicators were reported at two levels of granularity with supporting charts, such as box plots. On one hand, *overall* statistics concerned all 77 journals, which offered a global insight into journal characteristics. On the other hand, *categorywise* statistics were reported for journals grouped into four categories according to decreasing 5YJIFs. These refined overall statistics by assessing the variation of the observed statistic according to journal quality, as estimated by the 5YJIF. The place of *JASIST* in the landscape of IS journals was discussed regarding the various indicators and existing scientometric studies about this journal (Cronin, 2009b,c,d, 2011).

The *EB_IS_2009* dataset collected for our scientometric study covers the 77 IS journals and their editorial boards and associated 2,846 gatekeepers (with name, gender, and country). Our dataset is released as an online supplement to this article to enable researchers to reproduce our results and further our study. Despite Braun's (2005) call for building a database of science journal gatekeepers, we found no such material in the literature. As a result, to the best of our knowledge, *EB_IS_2009* is the first publicly available dataset of gatekeepers in IS. We hope that this dataset will serve as a base for future studies on editorial boards.

Improving our understanding of scholarly communication in other fields of computer science (e.g., artificial intelligence) as well as other scientific domains is a goal that we believe to be worth pursuing. Recent and ongoing controversies (see the "Research Evaluation" section in Bar-Ilan, 2008) suggest that the evaluation of research cannot rely on only bibliometric indicators. We hope that the present scientometric study has gone some way toward enhancing our understanding of the scholarly communication in IS journals.

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I thank Paul Ferré, my undergraduate assistant at the University of Toulouse, and my daughter Lise for helping to collect data for the *EB_IS_2009* dataset. Thanks to Dr. David Hawking, Australian National University and Funnelback, as well as Sarah Chrisment-Patterson, Air France, for improving the linguistic content of the article. I am also grateful to the anonymous referees for their insightful remarks.

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## Appendix A

The *EB_IS_2009* dataset is supplied as an XML file and released as an online supplement to this article. An excerpt of the dataset is shown below, where the document type definition (DTD) precedes the records of the 77 leading IS journals.


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 EB_IS_2009: Editorial boards of Information System journals (JCR 2009 edition)
 @version 31-MAY-2011
 @author Guillaume Cabanac (guillaume.cabanac@univ-tlse3.fr)
-->
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 <!ELEMENT journal    (titleISI,titleDBLP,isbn,publisher,if5years,researcher+)>
 <!ELEMENT titleISI   (#PCDATA)>
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