Evaluating Journal Quality and the Association for Information Systems (AIS) Senior Scholars' Journal Basket via Bibliometric Measures: Do Expert Journal Assessments Add Value?

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BIOGRAPHIES

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Evaluating Journal Quality and the Association for Information Systems (AIS) Senior Scholars' Journal Basket via Bibliometric Measures: Do Expert Journal Assessments Add Value?

ABSTRACT

Information systems (IS) journal rankings and ratings help scholars focus their publishing efforts and are widely used surrogates for judging the quality of research. Over the years, numerous approaches have been used to rank IS journals, approaches such as citation metrics, school lists, acceptance rates, and expert assessments. However, the results of these approaches often conflict due to a host of validity concerns. In the current scientometric study, we make significant strides toward correcting for these limitations in the ranking of mainstream IS journals. We compare expert rankings to bibliometric measures such as the ISI Impact Factor™, the h-index, and social network analysis metrics. Among other findings, we conclude that bibliometric measures provide very similar results to expert-based methods in determining a tiered structure of IS journals, thereby suggesting that bibliometrics can be a complete, a less expensive, and a more efficient substitute for expert assessment. We also find strong support for seven of the eight journals in the Association for Information Systems (AIS) Senior Scholars' "basket" of journals. A cluster analysis of our results indicates a two-tiered separation in the quality of the highest quality IS journals—with *MISQ*, *ISR*, and *JMIS* belonging, in that order, to the highest A+ tier. Journal quality metrics fit nicely into the sociology of science literature and can be useful in models that attempt to explain how knowledge disseminates through scientific communities.

KEYWORDS

Information systems journal rankings, scientometrics, bibliometrics, journal quality, SenS-6, SenS-8, self-citation, Impact Factor, h-index, social network analysis, expert opinion, composite ranking or rating, AIS Senior Scholars basket of journals, nomologies for dissemination of scientific knowledge

INTRODUCTION

As a scientific discipline, Information Systems (IS) defines itself in large part by the academic journals it produces. This is so because peer-reviewed journals serve as the primary outlet for research findings and academic discussion. Rainer and Miller (2005) assert that a journal's importance to a discipline "naturally leads to the question of relative academic quality [of its journals]" (p. 92). Lewis et al. (2007) argue the importance of rigorous research regarding journal quality and rankings: "Scientometric studies form a vital line of inquiry to facilitate the ongoing evaluation and improvement of an academic discipline. In particular, Straub (2006) notes that scientometric research is concerned with "the legitimacy in a field and how it is established" (p. 242) and lauded the inherent value of these self-studies to the development and progress of the IS field.

Discussion of relative journal quality in a discipline must be continual, relevant, and rigorous in order to inform and convince internal and external stakeholders (Straub 2006). Timely discussion regarding the rigor and scope of a field's top journals also helps to educate stakeholders outside the discipline (e.g., college deans, P&T Committees, external reviewers, etc.). This issue is particularly relevant in IS because of some misconceptions regarding the quality of IS journals. For example, in December 2011, the *Financial Times* expanded their list of top business journals, which increased the number of top journals for virtually every business discipline except IS. Valacich et al. (2006) and Kozar et al. (2006) earlier confirmed this disparity among business disciplines regarding elite publishing opportunities—concluding that most other business areas have significantly more elite publishing opportunities than IS researchers.

Dennis et al. (2006) identified a serious problem with what business schools might consider to be top IS journals. They discovered that few tenured IS researchers publish in "elite" journals as defined by one of the commonly accepted business-school journal lists promoted in Trieschmann et al. (2000), which includes only *MISQ*[1] and *ISR* from the IS discipline (this is also true of other top business journal lists from *Financial Times*, *Business Week*, and UT-Dallas). Among *tenured* IS faculty, only 0.8 percent in the US and 0.7 percent worldwide published in *MISQ* and *ISR*. However, Dennis et al. (2006) state that 86 percent of the 49 institutions they studied expected three or more elite publications for tenure. In a separate survey of 375 IS faculty, 55 percent of the respondents reported that to qualify for tenure, researchers had to publish in top-tier journals (Galletta 2010). As a result of these pressures and disparities, IS faculty face more difficulty in meeting tenure requirements than those in other business disciplines, which then further affects the IS field (Dean et al. 2011; Dennis et al. 2006; Valacich et al. 2006).

Key problems with well-publicized lists that drive research behavior and reward in business schools are their creation by an external organization serving a non-academic agenda. The process to create the lists is not scientific, i.e., lack of an open, peer-reviewed, intellectual process that uses empirical evidence to determine what constitutes a top journal. Based on such lists, the longstanding tradition in some North American business schools is that only *MISQ* and *ISR* are considered top-tier journals (Dennis et al. 2006). Not surprisingly, several elite institutions in Europe and Asia have followed suit, considering only *MISQ* and *ISR* to be top IS journals. If a greater number of top IS journals actually exist than this perception allows, then the pervading bias will continue to have an unfair and detrimental effect on the global IS field because North American business schools have a disproportionately heavy influence on global

[1] For brevity, we abbreviate all journal names in this paper with their common abbreviations. The journals' full names, with additional publication information, are cross-referenced in Appendix C.

rankings and accreditation standards.

Several recent IS studies have highlighted these inequities as they play out among internal and external stakeholders (Dean et al. 2011; Dennis et al. 2006; Kozar et al. 2006; Valacich et al. 2006). In response to this issue, the Association for Information Systems (AIS) Senior Scholars publicly endorsed a basket of six plus two[2] top IS journals (hereafter, the *SenS-6*[3]) (Saunders et al. 2007) and then at their meeting in December 2011 decided to include all eight of those IS journals in a single list (hereafter, the *SenS-8*) (AIS 2011).[4]

We believe that the proposed SenS-8 could win broader acceptance outside the IS community with sound empirical evidence supporting the claims. The IS community has already empirically demonstrated that it has fewer publishing opportunities in the top tier than other disciplines (Dennis et al. 2006; Kozar et al. 2006; Valacich et al. 2006); however, to date, empirical evidence to convince business school deans and other key policy-makers and constituencies that there are other elite journals beyond *MISQ* and *ISR* in the field has not been proffered. Statements by the AIS Senior Scholars alone are unlikely to provide a compelling case that the IS field has more than two top journals. Hard empirical evidence is pivotal to reify the SenS-8.

To provide such hard evidence, this paper employs a repeatable and multi-faceted methodology. Rigorous, evidence-based assessment can enable the IS discipline to make stronger arguments for the actual quality of its journals—whether it has zero, one, two, three, or a more numerous but still manageable set of premier journals. Additionally, although both

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[2] The additional two journals were said to be of comparable quality, but were placed into a second group because the Senior Scholars believed that a list of eight might be too long to be considered by some outside stakeholders.
[3] Though the AIS supports the Senior Scholars Forum, the SenS-6 and SenS-8 baskets are official recommendations of the Senior Scholars, rather than the AIS itself.
[4] Although this thoughtful recommendation carries strong merit within a major part of the IS community, broadening the basket from six to eight has not been without its own controversy.

opinion-based expert assessments of journals and bibliometric approaches have contributed to past assessments of journal quality, we aim to show that a multi-faceted bibliometric approach can effectively replace extensive and costly expert-opinion surveys of the IS academic community (e.g., Lowry et al. 2004). Rather, bibliometric measures can assess the quality of journals more easily and objectively, thereby enabling regular updates and easier replication for purposes of measurement validity.

Scientometric approaches involving bibliometrics have long been key to addressing publishing and journal quality issues in other research fields. Notably *Science* and *Nature* have published scientometric articles supported by bibliometrics (e.g., Acuna et al. 2012b; Wilhite and Fong 2012). Similarly, top business journals have published scientometric articles that provide persuasive evidence of journal quality and other related issues of significance to business fields. Examples include Trieschmann et al. (2000) in the *Academy of Management Journal;* Walsh (2011) in the *Academy of Management Review;* Chen and Huang (2007) in *Journal of Corporate Finance*, Bonner et al. (2006) in *Accounting, Organizations, and Society*; and Nerur et al. (2008) in *Strategic Management Journal*. Scientometric work in the MIS field focusing on issues related to journal quality was initiated many years ago in *MIS Quarterly* by Culnan and Swanson (1987; 1986), and more recent papers have been published in this venue by Dennis et al. (2006) and Dean et al. (2011) as well as in *Information Systems Research* by Valacich et al. (2006).

As further motivation for our scientometric approach, we first outline methodological issues not adequately addressed by existing IS-ranking studies. Then we explain our approach and address these controversies through an analysis of the largest and most diverse data collection effort to date. Next, we compare the results of bibliometric methods to that of expert opinions, including the SenS-8. We conclude by examining the unique contributions of this approach as compared to past approaches and providing recommendations for the IS field based on the implications.

METHODOLOLGICAL ISSUES WITH RANKINGS APPROACHES

The question of how to determine the relative quality of IS journals has been the subject of healthy debate for many years (e.g., Dean et al. 2011; Ferratt et al. 2007; Katerattanakul and Han 2003; Lowry et al. 2004; Rainer Jr. and Miller 2005; Straub and Anderson 2010). Despite this vibrant research stream, limitations and biases of existing approaches hamper reliable and consistent ranking of IS journals. Appendix A summarizes the three major approaches to assessing journal quality, along with their strengths and weaknesses. Based on a review of extant IS scientometrics studies, four key issues would seem to be preeminent.

Issue 1: Should Non-IS Journals and Practitioner Magazines be Bundled with Pure IS-Journals?

Prior studies have sporadically ranked purely IS-journals against non-IS journals and practitioner magazines. By including such disparate outlets in the journal basket under scrutiny, these studies add noise that undermines the validity of the rankings (Lewis et al. 2007)—particularly to external audiences within the business school. Thus, previous studies perpetuate an "apples-to-oranges" mixed comparison in journal rankings. Moreover, the opinions of the larger IS field regarding top IS journals are systematically different and inappropriately mixed with the opinions of much smaller groups of researchers who publish in journals outside IS. Such mixed approaches can lead to misleading results that undermine the face validity of these studies because they do not account for the different missions of various journal types (Adler and Bartholomew 1992). For example, one study (Peffers and Ya 2003) included *JACM* (an elite CS journal), *AMR*, and *ASQ* in their list of journals, yet these were ranked below several non-IS specific practitioner magazines and IS journals such as *The* DATABASE *for Advances in Information Systems*, *CAIS*, and *JCIS*. Another study (Rainer Jr. and Miller 2005) ranked some practitioner magazines (e.g., *CACM*, *IEEE Software*) above leading academic journals such as *JACM*, *ASQ*, *AMJ*, *Organization Science*, and *AMR*.

Issue 2: Should Diverse Global Opinions be Used to Rank Journals?

The second issue raises the question of geographic diversity of perspectives in rankings. IS scholars continually call for scientometric studies that are global in scope and that represent the general IS discipline — not just North American academics (Baskerville and Wood-Harper 1998; Dean et al. 2011; Katerattanakul and Han 2003; Lowry et al. 2004). However, the majority of extant studies remain have focused on North America (e.g., Dean et al. 2011). This issue is increasingly salient because IS scholars engage in global collaboration with colleagues, and researchers and institutions in different world regions use journal-ranking studies in distinct ways (Baskerville and Wood-Harper 1998; Iivari 2008; Willcocks et al. 2008).

Similarly, past journal ranking studies generally assume that participants are homogeneous in experience, attitude, research purpose, and type of institution (Baskerville 2008; Özbilgin 2009). However, scientometric research in other fields shows that perceptions of journal quality can be affected by geography (Galliers and Meadows 2003; Sellers et al. 2004; van Dalen and Henkens 2001), type of institution (Axarloglou and Theoharakis 2003; Svensson and Wood 2006), academic level (Axarloglou and Theoharakis 2003; Sellers et al. 2004), and an individual's educational training (e.g., IS Ph.D. vs. non-IS Ph.D.) (Axarloglou and Theoharakis 2003; Sellers et al. 2004). To date, with the exception of two studies in which global regions were considered (Lowry et al. 2004; Mylonopoulos and Theoharakis 2001), global IS journal rankings have not addressed these demographic factors.

Issue 3: Should Expert Opinion and Bibliometrics Be Used Together?

Third, extant studies of IS journal rankings have used a one-dimensional measurement approach and focused solely on expert opinion or bibliometrics, but never both. Recent discussion in our field brings this practice into question (Straub and Anderson 2010). Furthermore, scientometrics studies in other leading academic fields use both of these approaches to provide what is purported to be a more balanced assessment of journal quality (e.g., Allen et al. 2009; Butler 2008; Harnad 2008; Harvey et al. 2007; Mingers and Harzing 2007).

What exactly is the problem? Surveying scholars for their opinions is costly. It requires a huge scholarly effort and it raises an assortment of validity and measurement issues that are not simply resolved. Thus, it would be beneficial if a bibliometric approach could be devised that would yield the same results as expert assessments.

Issue 4: Does the SenS-8 Basket of Journals Well Represent the Top IS Journals?

Finally**,** can we find reasonable evidence to reify or contend the Senior Scholars basket of top IS journals? A lively debate on the assessment of IS journal quality was initiated in 2007 by the AIS Senior Scholars, who recommended the aforementioned “basket” of six plus two excellent journals. This basket, supported by 72% of researchers surveyed by Galletta (2010) included *MISQ*, *ISR*, *JMIS*, *EJIS*, *ISJ*, and *JAIS* (Saunders et al. 2007). Although *JIT* and *JSIS* were characterized as two additional journals that would not reduce the quality of the list, most researchers referred to “the basket of six.” To encourage equal treatment of the journals by the IS community, the Senior Scholars specifically avoided rank-ordering the journals. Aiming to reduce confusion from the “six plus two” approach of the SenS-6 list, and to recognize the two journals that were, in essence, not being given equal consideration, the Senior Scholars combined all of those journals into a single, official basket of eight “excellent” journals (SenS-8) in December 2011. Strikingly, to date, no research has provided external empirical validation of the global IS academic community’s assessment of this recommendation — whether the included journals are truly the top eight journals in IS and whether they should or should not be rank-ordered.

METHODOLOGIES BY ISSUE

The goal of our study was to conduct the largest and most rigorous expert-based ranking study to date and then compare the results to bibliometric methods on the same IS journal set. If the results are statistically equivalent, then one can conceivably replace the other. If not, a more complicated, balanced methodology would need to be developed, similar to what has been done in other business fields (e.g., Allen et al. 2009; Butler 2008; Harnad 2008; Harvey et al. 2007; Mingers and Harzing 2007). The remainder of this section describes our methodologies and design choices, organized by the four issues that drive this paper.

Addressing Issue 1 by Ranking Only Academic IS journals

All extant IS journal rankings studies, except one portion of the Peffers and Ya (2003) study, rank IS journals, non-IS journals, and practitioner magazines together (see Tables B.1 and B.2 in Appendix B). Although several previous studies questioned the practice of including non-IS journals in the rankings (Chua et al. 2003; Katerattanakul and Han 2003; Lewis et al. 2007; Peffers and Ya 2003), most of these studies still rank some (or many) journals that are not, strictly-speaking, IS journals. We break with this practice by specifically including *only* academic IS journals, in part because citation analysis is more valid when comparing journals within the same discipline (Harvey et al. 2007; Leydesdorff 2008).

What then constitutes an “IS journal”? Noting that no definitive criteria exist, Lewis et al.

(2007) call for an empirically validated set of such criteria. Our response to this challenge was to adopt a verifiable means of determining IS-centricity. First, similar to Lowry et al. (2004), we focused on identifying and ranking the best IS journals. Consequently, we began with a list of journals (IS and non-IS) that were ranked in all previous IS journal rankings (see Table B.1). Then, we evaluated the editorial mission and stated goals of the supporting organization for every journal on that list, which in most cases provided a clear answer regarding whether a journal was primarily an IS journal. In the few cases where this distinction was unclear, we systematically considered the research foci, educational training, and departmental affiliation of the editors and editorial boards of the journals in question. If only a small minority of a journal's editors were IS academics residing in IS departments, then we did not include the journal in our study (e.g., *AMJ*). Two hundred IS academics then reviewed our list of proposed IS journals to ensure that none were missing or listed in error[5]. We further validated these decisions and added a few more suggested journals based on this preliminary test (see Table B.1). All IS journals that were initially considered for this study are listed in Appendix C.

Addressing Issue 2 by Using the Most Global, Diverse Sample to Date

The IS academic community continually presses for more global representation in IS journal rankings (Baskerville and Wood-Harper 1998; Dean et al. 2011; Katerattanakul and Han 2003; Lowry et al. 2004), yet only two studies have addressed this need (i.e., Lowry et al. 2004; Mylonopoulos and Theoharakis 2001). A diverse sample is thus needed to reflect today's global IS community and to answer such calls (Baskerville 2008; Gallivan and Benbunan-Fich 2007; Katerattanakul and Han 2003; Özbilgin 2009).

To rigorously approach this issue, we first sought to reach the entire IS global academic

[5] These scholars were randomly targeted from the larger pool of respondents to our expert assessment research instrument.

community via population oversampling (see Appendix D for details). The goal was to reach not only elite researchers at elite institutions, but also to include all IS academics in all AIS world regions. We estimate that our survey reached a maximum of approximately 8350 eligible respondents. The 2816 responses that we received therefore represents at least a 33.7 percent response rate from the international IS academics. Accordingly, this participation rate is the largest international participation in an IS journal study to date.

Further, we collected demographics like type of institution[6] (Carnegie Foundation 2010; Dean et al. 2011; Hendrix 2009), academic position, and educational training of the respondents as controls to determine if such factors make any difference. Of the 2816 responses, 2420 were complete and usable and 2280 provided optional demographic information, as summarized in Table 1. To provide meaningful analysis by world region, we asked all respondents to state the country of their primary institution. For the first time in such a study, almost half of the respondents were from outside North America, thereby providing the most internationally diverse response to date for this type of study.[7]

Table 1. Respondent Demographics (n = 2280)

AIS region	Region 1: The Americas	51.5%
	Region 2: Europe, Africa, Other	28.7%
	Region 3: Asia and Australia	19.8%
Ph.D. training	Information Systems	65.4%

[6] We based the institution-type categorization on those used by the 2005 version of the Carnegie Classification of Institutions of Higher Learning™ (Carnegie Foundation 2010) used to classify institutions in North America based on the primary purpose of the institution (e.g., research-intensive vs. undergraduate teaching). We used this classification because of its transparency, simplicity, and similar use in previous studies (Dean et al. 2011; Hendrix 2009). Rather than use all the classifications, we reduced these to five basic types.

[7] Whereas the authors were ready and willing to conduct non-response bias tests on our final sample, the SE did not feel that these tests would yield greater confidence in the representativeness of the sample. First, it is nowhere clear what the population of IS academics is or how one would gain access to it. Second, the choice to "over" sample certain regions was based on the typically lower response rates that these areas have demonstrated in the past and this complicates the representativeness issue. Overall, the SE felt that the sampling frame was reasonable and that the realized sample was sufficient to draw credible inferences about journal quality.

	CS or Engineering	14.1%
	Non-IS business	11.1%
	Behavioral Science	3.3%
	Other	6.0%
Professorial status	Assistant (or Lecturer)[8]	27.7%
	Associate (or Senior Lecturer)	34.0%
	Full	30.7%
	Advanced doctoral candidate	6.5%
	Other or no response	1.1%
Institution type (Based on Carnegie Classification of Institutions)	Research University with very high research activity (RU/VH)	40.0%
	Research University with high research activity (RU/H)	20.0%
	Doctoral Research University/Master's level university	19.7%
	Undergraduate Teaching-oriented University	11.5%
	Other and No response	8.8%

Addressing Issue 3 by Comparing Bibliometrics and Expert Opinions

Expert assessment and bibliometric approaches could each make unique contributions in assessing journal quality; they could also show offsetting limitations that would lead to possibly different conclusions. To determine the extent to which expert opinions are redundant, we compare them to bibliometric measures such as ISI Impact Factor metrics, social network analysis (SNA) metrics derived from the ISI citations database, and the h-index (Hirsch 2005) and its derivatives (Egghe 2006; Sidiropoulos et al. 2007; Zhang 2009), which are calculated using Google Scholar™. Then, we collected bibliometric data for the top 40 journals emerging from the expert survey.

In terms of ISI Impact Factor metrics, we used the standard ISI Impact Factor but also considered the five-year impact factor, impact factor without journal self-citation, and five-year

[8] The titles "Lecturer" and "Senior Lecturer" are used in many schools in Europe and Australia and are roughly equivalent to "Assistant Professor" and "Associate Professor" in university systems in Asia and North America. These titles must not be confused with the roles of "instructor" or "adjunct" or "clinical" in Asian and North American systems; these titles involve professors in a teaching-focused role in a non-tenured status.

article influence. Because several top IS journals were not indexed by Thomson Reuters, and to account for any potential systematic error introduced by the ISI impact factor, one of our bibliometric measures is based on the h-index (Hirsch 2005). Unlike the ISI impact factor, the h-index is calculated from Google Scholar citations data, which allows us to include data for all top IS journals. Because the h-index has known shortcomings (Straub and Anderson 2010; Truex et al. 2009), we also chose to use three variants of the h-index designed to address these specific weaknesses: the hc-index, the g-index, and the e-index. The h-index and its variants are based on an entirely different formula than that of ISI, and thus can possibly account for other factors of quality that are not captured through ISI measures (Sidiropoulos et al. 2007). We calculated all measures related to the h-index systematically using Harzing's Publish or Perish™ bibliometrics software version 3.2.4150 (Harzing 2011). Appendix E provides detailed definitions of these metrics.

The third group of metrics was created through social network analysis (SNA) using the citation data available through the ISI database. Our SNA included only the 21 IS journals from our dataset that have Thomson-Reuters impact factor scores. The analysis measured the extent to which articles within a journal cite an article in another journal. Polites and Watson (2009) used SNA to demonstrate journal centrality and influence within and across disciplines. In line with their research, we used three measures of node (journal) prestige and centrality: Freeman degree, Bonacich power index, and information centrality. Notably, "Freeman degree prestige is commonly used for determining journal rankings (though not generally referred to by this name). The Bonacich power index provides more insight regarding degree prestige because it is capable of discriminating between citations received from more popular journals vs. less popular journals, based on their respective degree scores" (Polites and Watson 2009, p. 603). These scores represent the citation pattern of articles among journals and the pattern that is formed within this network structure. Articles that are cited more heavily do not bias this index; rather, the index is based on overall patterns and the manner in which the journal relates to all other journals within the dataset. We weighted these three standardized measures equally to form a single SNA score.

An advantage of our proposed method is that calculating journal composite scores follows a straightforward, repeatable procedure by recalculating scores in a straightforward fashion with updated ISI and h-index data. Table F.1 in Appendix F summarizes all bibliometric scores for each of the 21 journals. Table 2 provides a summary of factors used for the composite bibliometric measure.

Table 2. Summary of Factors Used for the Composite Measure

Bibliometric factor	**Baseline case (*MISQ*)**	**Brief description**
Expert assessment	100% region 1 100% region 2 100% region 3	Percentage of experts who assessed the journal as a tier-1 journal factoring in best-case tier-1 journal; only considered by region for each journal
2010 ISI Impact Factor	4.49	Citation impact of journal for 2010 (based on 2008–2009 data released in summer 2011)
2010 5-year ISI impact factor	9.21	5-year citation impact of journal for 2010 (based on 2005–2009 data released in summer 2011)
2010 ISI impact factor eliminating journal self-citation	3.97	Citation impact of journal for 2010 removing self-citations to the journal (based on 2008–2009 data released in summer 2011)
2010 Article Influence™	2.89	Standardized average influence of a journal's articles over the first five years after publication for 2010 (based on 2005–2009 data released summer 2011)
2011 h-index	198.00	Alternate citation impact factor based on the latest Google Scholar™ data, August 2011; the number of the last citation-rank-ordered article whose ranking is lower than or equal to the number of citations received (Hirsch 2005)
2011 hc-index	103.00	Adjusted h-index that ascribes more weight to recently published articles than older articles as a solution to the time-in-print bias (Sidiropoulos et al. 2007); based on the latest Google Scholar™ data, August 2011
2011 g-index	169.00	Adjusted h-index that ascribes more weight to highly influential articles (Egghe 2006); based on the latest Google Scholar™ data, August 2011
2011 e-index	272.12	A metric that is complementary to the h-index, accounting for differences in citation patterns among journals with the same or similar h-index score (Zhang 2009); based on the latest

		Google Scholar™ data, August 2011
SNA—Freeman Degree	56.219	A localized, within-network measure of the number of direct relationships for a given journal (Freeman 1979).
SNA—Bonacich Power (β = .075)	6.175	A localized, within-network degree measure for a journal's power, based on the power of other journals to which it is connected (Bonacich 1987).
SNA—Information centrality	1.149	A measure of all paths between pairs of journals, including the strength of ties between journals (Porta et al. 2006; Stephenson and Zelen 1989).

Addressing Issue 4 by Aggregating the Indices and Considering Self-Citation Practices

Issue 4 raises the question of which journals are the top journals in the IS field. To be able to address issue 4 fully, we aggregate the measures described previously, calculate sensitivity analysis of various weighting schemes, and perform cluster analysis to discern tiers of journals according to the measures. As part of our analysis, we also consider the issue of niche behavior and self-citation practices that are critical considerations for any journal-ranking endeavor.

Self-citation practices can be useful in assessing journal quality. Reasonable levels of self-citation are acceptable and expected, of course, but IS scholars generally agree that coercive self-citation is simply unethical and therefore unacceptable for top journals (Crews et al. 2009; Gray 2009; Straub and Anderson 2009). A recent study in *Science* showed that coercive self-citation[9] is practiced more frequently in business disciplines than in other social science fields (Wilhite and Fong 2012). With a designated few IS journals being accused of coercive self-citation (Wilhite and Fong 2012), the IS field was unfortunately highlighted as one of the "offending" business disciplines. The issue of coercive self-citation continues to be a problem because authors tend to obey such requests from editors. In Bormann and Daniel's study (2008), many authors concurred that several citations in their work were non-essential to the article but

[9] *Coercive self-citation* refers to "requests that (i) give no indication that the manuscript was lacking in attribution; (ii) make no suggestion as to specific articles, authors, or a body of work requiring review; and (iii) only guide authors to add citations from the editor's journal" (Wilhite and Fong 2012, p. 542).

were required by editors simply to approve the work for publication.

A special issue of *CAIS* discussed the problem of coercive self-citation. Some of the articles in the issue examined citation patterns of IS and business journals while others discussed the ethical implications of self-citation (Gray 2009). Still other articles presented arguments for why editors might request additional citations to the journal in which an author was submitting his/her work. However, virtually all agreed that coercive self-citation is a practice that should not be tolerated in IS journals.

Scientometric evidence also suggests that top journals do not need to engage in coercive citations and to game the system in order to boost journal impact factors (Straub and Anderson 2009). Instead, journals having high scientometric impact without forcing self-citation have a natural, strong influence on other leading journals and related leading conferences because their content is engaging and noteworthy. That is, because research in top journals tends to be interesting and compelling, it often initiates related discussions in other top journals and conferences (Straub and Anderson 2009).

Even when self-citations are ethical and appropriate, a disproportionately high number of self-citations can indicate that a journal is likely not a mainstream journal but is instead demonstrating niche behavior, which is subtly different from actually being a niche journal. Niche journals are narrower in their appeal and often serve focused research communities. Niche journals are characterized by a large number of ethical self-citations (Romano Jr. 2009; Trkman 2009) because to continue a research stream in a niche area, one often must refer to previous work in the same journal.

Operating with coercive practices and operating as a niche journal are suggested here only as two *possible* reasons for unusually high journal self-citation, which do not necessarily represent an exhaustive list. It is also possible that self-citation has voluntary, cultural, or topical origins. Voluntary self-citation might occur when many of a journal's authors believe they need to self-cite to increase their chances of acceptance based on what they believe to be unwritten rules of the journal. High self-citation could be inspired by a form of *selfish benevolence*, in which a community of interconnecting authors act to "help" a journal (and indirectly themselves) to rise in stature with more citations. Cultural self-citation might also occur when many authors conform to abundant examples of self-citation in that journal, either consciously or unconsciously. Topical self-citation occurs when a journal becomes "known" for a highly specific topic or publishes a debate on a particular topic.

Consequently, we do not assert or imply that any particular journal in our analysis is practicing coercion or is a niche journal. Further study would be required to uncover a more comprehensive list of reasons for excessive self-citation practices, and to judge each journal by examining the best evidence that could become available. Instead, our judgment in this study is that if a journal has more self-citations than meaningful external citations— rather than demonstrating the characteristics of a mainstream "excellent" journal—it instead exhibits "niche behavior." Our key operating assumption is that mainstream journals should garner both external and self-citations without a disproportionate amount of self-citations.

Journal self-citation, particularly the coercive form, is one reason some IS scholars caution against relying on raw bibliometric measures to measure journal and article quality (e.g., Sarkis 2009; Trkman 2009). Given this discussion and the intense external scrutiny of IS journals (e.g., Wilhite and Fong 2012), we decided to aggregate and cluster using a variety of measures, and to augment that analysis by also providing segmentation of the IS journal basket, including the consideration of niche behavior. The important task at this juncture was to assess self-citation rates in a systematic and unbiased manner.

Multiple articles in the *CAIS* special issue used ISI Journal Citation Report data to identify journals with significant self-citation rates (e.g., Li 2009; Straub and Anderson 2009). However, we found that ISI impact factor data is inadequate for short-term criteria because the data lags more than a couple of years and covers too large of a span of time. These data also do not account for the IS field's leading conferences (i.e., the AIS conferences and HICSS), which are important in demonstrating emerging scholarly discussions. Thus, we created two new measures based on Google Scholar citation data for all 21 IS journals indexed in the ISI between January 2011 and July 2012 and categorized the citations into seven groups (e.g., self-citations, citations in top IS journals, etc.). Appendix D details the collection and categorization procedures for this data.

We term the first measure as *short-term self-citation percentage*, and it is the number of self-citations over total citations in a recent 1.5-year period (Jan. 2011 through July 2012). The 1.5 year period was selected in alignment with the recommendations from 26 prestigious marketing journal editors to monitor short term self-citation ratios (Lynch 2012).[10] This period also gives newer journals with a shorter publication record a fairer comparison to more established journals. Based on the 21 top IS journals we targeted, the average short-term self-citation percentage was 14.3 percent with an average of 6.1 percent for the SenS-6, and with none of SenS-6 in the double-digit range. Thus, we applied the simple heuristic that to be considered as a mainstream IS journal, the short-term self-citation percentage must be in single digits. Fifteen journals met this criterion, whereas six did not (see Appendix F).

[10] In reaction to the Wilhite and Fong article (2012) exposing the self-citation practices of specific journals, 26 editors of prestigious journals identified solutions to the problems. They sent letters to more than 600 business school deans asking that research articles be judged based on individual merit rather than on the impact factor of the publishing journal and that vigilance be given to identify surges in self-citation ratios (Lynch 2012).

We term the second new measure the *short-term IS influence ratio,* and it is the total of a journal's quality IS citations (citations in IS ISI journals plus top AIS-affiliated and HICSS conference citations) divided by the journal's total self-citations in the 1.5 year period. This second new influence measure answers the question: "With whom is a journal having a scholarly conversation and to what degree does it positively impact the broader IS scientific community?" We included top IS conferences because articles from mainstream IS journals are likely to influence top IS conference articles more strongly than niche journals. That is, mainstream journals would be expected to create a near-immediate "buzz" with some of their findings and, thus, to create new scientific conversations in meaningful venues for IS scholars. Niche journals should generally create less of a "buzz" in the short-term and, thus, would likely be cited for other reasons and with a delayed effect, such as for a passing reference in a literature review and less so for strong theoretical support or theory building.

Not surprisingly, the SenS-6 journals all had influence ratios greater than 1:1 (quality IS citations to self-citations). Thus, our filtering benchmark for this ratio is that a mainstream IS journal should have a quality citations to self-citations ratio of 1:1 (100%) or higher. Essentially, journals with high ratios are having meaningful discourses with others in the IS academic community more than with themselves or non-IS communities; those with low ratios are conversing with themselves or non-IS communities more than they are with the IS community. This ratio allows us to focus on mainstream journals and journals that are central in their influence on the IS community. In total, 15 journals met this criterion, whereas 6 did not (again see Appendix F).

DATA ANALYSIS

Analyzing Issue 1 by Filtering Out Non-IS Journals

In terms of issue 1, we explained earlier in the methods section why only IS-mission-specific journals should be ranked. Our first analytical step was thus to create a filtered list of the IS journals by eliminating any non-IS journals and IS journals that were not highly ranked. All subsequent analysis was conducted beginning with the list of the highest-ranked journals in Appendix C.

Analyzing Issues 2 through 4 using the Composite Measures and Weightings Scheme

Because the analyses for issues 2 through 4 are intertwined, these issues are presented in the same section. Specifically, we first determined which journal had the best score for each bibliometric factor and considered this score to be the baseline (100%) score against which we compared all other journals. *MISQ* had the best score for every factor, and thus became the baseline journal against which we compared all others.[11] Next, we calculated a z-score for each journal on each factor (based on the baseline score for the factor), which we then multiplied by the composite score's weight for the factor. The composite score was simply the weighted average of the z-scores for all the journal-ranking factors. However, determining an unbiased weighting structure is untenable because each measure of quality suffers from potential biases and limitations and the overall "true score" remains unknown. Accordingly, we weighted these composites using four different weighting schemes in a sensitivity analysis, as outlined in the next section. We used the sum of ranks for each of the journals across all weighting schemes to arrive at the final composite rankings. Using this method reduces error associated with any one weighting scheme and more closely approximates the overall "true score" of a journal's relative quality, as in classical measurement theory for reliability of multiple measures.

Using our composite bibliometric ranking methodology, we created weighted rankings

[11] One exception is that *JAIS* tied *MISQ* for top rank in terms of Bonacich Power.

(see Table 3) for the 21 IS journals for which ISI data was available[12]. We also conducted a sensitivity analysis to demonstrate that ranking results were not primarily an artifact of the weighting scheme chosen and to eliminate errors related to a particular weighting scheme. To establish this statistically, we conducted a series of nonparametric paired-sample Wilcoxon signed-rank tests for the four unique combinations of paired weightings schemes. We found no statistical differences in any of the pairings, thereby indicating that each weighting scheme produced approximately the same statistical result (see Table F.2 in Appendix F for more details).

Table 3. Sensitivity Analysis Weighting Schemes			
Approach	**Composite citation scores**	**Composite h-type index Scores**	**SNA**
Alternative 1	33%	33%	33%
Alternative 2	25%	25%	50%
Alternative 3	25%	50%	25%
Alternative 4	50%	25%	25%

This sensitivity analysis approach also demonstrates that the results were not skewed to provide the best results for *MISQ*; *MISQ* simply had strong results, regardless of the measurement approach and weighting that was applied. *MISQ* was ranked first using all four weighting approaches, and thus received a score of four ($1^{st} \times 4 = 4$); *JAIS* was ranked sixth three times and fifth once, and thus received a score of 23 ($6^{th} \times 3 = 18$, + $5^{th} \times 1 = 5$, = 23). Table F.3 shows the results of the rank-sum approach. All rankings tables highlight the SenS-8 journals in grey.

This sensitivity analysis demonstrates that the top three journals (*MISQ #1*, *ISR #2*, and

[12] Our focus here is to evaluate journal quality for the highest quality IS journals. Because ISI citations data were only available for the 21 journals listed in Table 4, we were forced to exclude 19 of the 40 journals for which we collected expert assessment from our final weighted ranking. Analysis of separate h-index citations data from Google Scholar indicates that the journals that did not have ISI citations data generally had lower h-index results and, thus, were generally less cited. Hence, this is additional proof that the 21 journals best represent the current best IS journals.

JMIS #3) were completely unaffected by the changes in weights and always appeared in the same rank order, regardless of the approach used. The next four journals shifted positions between ranks four to seven, depending on the weighting scheme used. The next three journals shifted positions between ranks eight to ten, depending on the weighting scheme used. Four subsequent groups thus emerge in the rankings. The closest approximation of the true value of relative journal quality occurs by summing the ranks of each weighting approach.

Because expert assessment is the only factor that changed according to region and other demographic data, we then performed various analyses using only the expert assessment data to better ascertain the degree to which world region and other demographics influence IS journal rankings. Specifically, we assessed the top IS journals as ranked by world region, academic type, Ph.D. training, and type of university and found *little to no variation among the rankings*. This finding indicates a consensus of IS researchers across world regions in terms of ranking IS journals.

Because of the homogeneity in worldwide opinions, we further assessed whether comparing overall expert opinion to a single composite bibliometric measure made any difference. We found that overall expert assessment of top journals appeared to follow the bibliographic assessment quite closely in a paired-sample Wilcoxon signed-rank test between the overall z-scores of the expert rankings to the average z-scores of the composite bibliometric rankings (null hypothesis of no difference had a p-value of 0.958). This result indicates that collecting expert opinion on IS journals yields rankings that are <u>very similar</u> to those derived from bibliometrics (see Appendix G). In sum, data analysis establishes that composite bibliometrics is effective in ranking top IS journals and that expert opinion provides only redundant information. Similarly, because of the homogeneity of worldwide opinions with respect to ranking IS journals, we conclude that rankings by world region do not add value.

Addressing Issue 4 by Analyzing Journals With and Without Niche Behavior

Based on the approach outlined in the methods section, Table F.4 summarizes the results of our screening criteria for niche versus mainstream journals. If we exclude journals that exhibit (for whatever reason) niche behavior due to aberrant citation patterns, there remain 14 IS journals that are eligible to be further considered in the IS basket of journals (listed in alphabetical order): *ECRA, EJIS, ISJ, ISM, ISR, JAIS, JCIS, JDM, JGIM, JMIS, JOCEC, JSIS, MISQ*, and *MISQe*. The journals that were excluded for having an excessively high short-term self-citation percentage and/or an excessively low short-term IS influence ratio were (listed in alphabetical order) *DSS, I&M, IJEC, ISF, IT&M, JIT,* and *WIRT*.

Given that these results partially conflict with the SenS-8 recommendation, we performed further tests to ensure that the exclusion of the targeted journals was valid. The average short-term self-citation ratio among the 21 investigated IS journals is 8.1%, excluding *JIT* and *IT&M*, which had outlier self-citation ratios of 77.8% and 68.9% respectively. Table F.4 displays the short-term self-citation ratios for each journal. To identify journals that may be characterized as having high short-term self-citation ratios, we performed a k-means cluster analysis (n=21) using only short-term self-citation ratios as the clustering variable (Appendix H describes the assumptions of our cluster analyses). Centroids for the three clusters of short-term self-citation ratio are 4.5%, 21.4%, and 73.4%. Cluster 1 (i.e., journals with low short-term self-citation ratios) include *ECRA*, *EJIS*, *I&M*, *ISJ*, *ISM*, *ISR*, *JAIS*, *JCIS*, *JDM*, *JGIM*, *JMIS*, *JOCEC*, *JSIS*, *MISQ*, and *MISQE*. Cluster 2 (i.e., journals with high short-term self-citation ratios) includes *DSS*, *IJEC*, *ISF*, and *WIRT*. Cluster 3 (i.e., extremely high ratios) includes *IT&M* and *JIT*.

The k-means cluster analysis places *I&M* right near the border between clusters 1 (low ratios) and 2 (high ratios). The distance to cluster 1's centroid for *I&M* is 5.4% and the distance from cluster 2's center point for *DSS* is 5.6%. Consequently, these two journals constitute the border between Cluster 1 (low) and Cluster 2 (high). Although *I&M* is on the border of being clustered with higher self-citing journals, *I&M* was assigned to the niche citation pattern group because of its very low short-term IS influence ratio.

Given that the remaining 14 journals consistently rank in our sensitivity analysis in certain positions whereas others' positions vary but still rank within consistent groups, we performed an additional cluster analysis of these journals to determine if natural clusters exist. We first used the Caliński-Harabasz method to determine the optimal group size (Caliński and Harabasz 1974). The results of this test indicated that the optimal size was four groups (pseudo F = 38.57). We then used the common centroid linkage method to determine the cluster assignment for each journal (n=14).

The second of the four clusters included only one journal, *JAIS*, but a three-cluster solution placed *JAIS* among others in the second tier. Whereas the four-cluster solution suggests that *JAIS* stands in the ordered position of the fourth best journal in the field, the prior sensitivity analyses suggest an unordered second tier of IS journals. For this reason, we combined *JAIS*, as the sole representative of the second cluster, with the third cluster.

Figures 1a and 1b respectively depict the clustering of the top IS journals considering, and not considering, niche behavior.

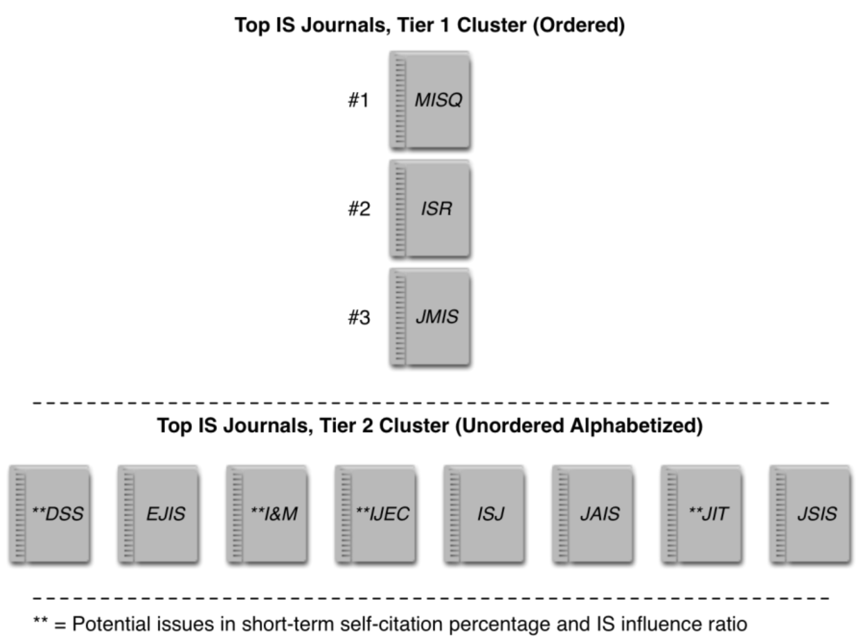

Figure 1a: Results of Cluster Analysis of Top IS Journals, for the Entire Sample of 21 Journals

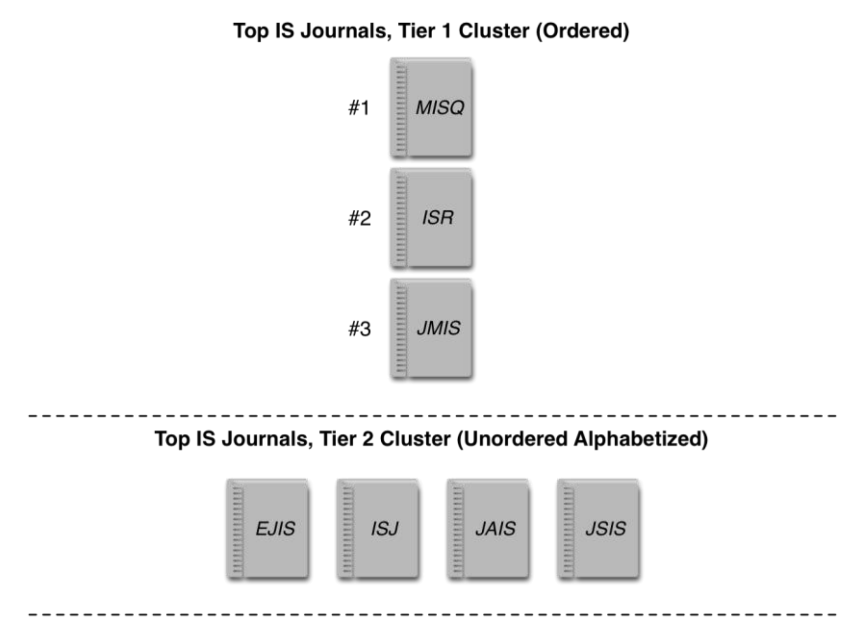

Figure 1b: Results of Cluster Analysis of Top IS Journals, Excluding those Exhibiting Niche Behavior

To validate our recommended clustering approach further, we used an alternative method to determine the sensitivity of the tiers—whether, based on high short-term self-citation or low IS influence ratios, the excluded journals would change the constitution of the top two tiers. In this alternative analysis, rather than excluding journals on the basis of the cutoffs or self-citation cluster results, we included all journals and adjusted the z-scores of each bibliometric score using the following formula: original z-score × (1 – short-term self-citation rate) × (short-term IS influence ratio), with the IS-influence ratio being capped at 1. Then, we ran the cluster analysis (n=21) and found that *MISQ*, *ISR*, and *JMIS* remained in the top, ordered tier; *JAIS*, *JSIS*, *EJIS*, and *ISJ* remained in the second, unordered tier; and none of the previously excluded journals were clustered in the top two tiers.

We then conducted a similar analysis (n=21) using the following formula: original z-score × short-term IS influence ratio, capped at one. In this solution, the same set of seven journals (*MISQ*, *ISR*, *JMIS*, *JAIS*, *JSIS*, *EJIS*, and *ISJ*) comprised the top two tiers, with none of the previously excluded journals being clustered in the top tiers. Thus, using a variety of techniques to account for short-term self-citation and IS influence, we conclude that our two-tier clustering approach most accurately represents the top (A-level) mainstream IS journals.

DISCUSSION

Journal rankings are a practical necessity in academia where perfect measures of scholastic quality are elusive and difficult, if not impossible, to attain. Yet, to be useful and reliable, journal rankings need to be updated periodically to reflect the changing nature of the discipline. Traditionally, the challenge with periodic/regular updates of such rankings is the resource-intensive nature of collecting subjective expert opinion on journal quality.

To this point, we established that expert opinion adds no significant value to readily calculable bibliometrics when the ranking's objective is to identify top, mainstream IS journals. In this paper, we developed a robust composite bibliometric measure of journal quality using ISI, h-indices, and SNA metrics to establish the current rankings of top IS journals. Because niche journal properties and potential self-citation abuse can undermine legitimate comparison, we also included a comparative analysis that used conservative filtering measures to ensure that no candidate journals had high self-citation patterns and low short-term external influence.

We trust that the measurement approach advocated here has been shown to be sound. By comparison, one common belief is that journal acceptance rates serve as acceptable surrogates for journal quality (e.g., Cabell and English 2004). Although this might seem logical on the surface, Lewis et al. (2007) found that the acceptance rates of published journals do not correlate significantly with other measures of journal quality (e.g., journal rankings studies). In contrast, using a sample of target journal lists from IS doctoral programs reveals that journal rankings studies largely correlate with measures of journal quality. Lewis et al. (2007) further support the validity of IS journal rankings studies by demonstrating that rankings studies constitute valid measurements of journal quality and demonstrate acceptable content validity, construct validity, and reliability across rankings studies included in their sample. Their contributions to the IS scientometric literature provide evidence that journal quality can, in fact, be approximated using repeatable, similarly structured rankings; for this reason, they call for more consistency in the rankings methods employed in the discipline. Our paper advances this goal by providing a highly repeatable, maximally independent rankings method that can be periodically updated as the IS discipline continues to evolve.

Contributions to the IS Field

The most important outcome of this study is that expert opinion on top IS journals equates with external bibliometrics and is statistically indistinguishable. This indicates that collecting expert opinion is no longer useful or necessary. Instead, the IS field should adopt our composite bibliometrics rankings approach that can more easily and more frequently rank IS journals. In doing so, it would be helpful to use the simple filtering guidelines we offer to help prevent gaming self-citations and exclude niche journals from broader, mainstream journal rankings.

The development and use of a consistent rankings approach are particularly useful for the IS field, a young, growing, and dynamic area of inquiry in which journal quality is continually changing and improving over time. Thus, an easily replicable rankings approach can help keep such rankings current by recognizing newer, high-quality journals and changes in journal quality over time (Allen et al. 2009). As an example, eight years after its review in Lowry et al. (2004), *JAIS* has risen even higher in its ranking and is now consistently found in the top seven in every category and form of analysis. Meanwhile, being recently added to the ISI Impact Factor index with newly released Impact Factors or soon-to-be-released Impact Factors, other IS journals are also improving in quality. This trend is promising for the IS field because the rigorous process of being selected for inclusion in the ISI Impact Factor index is a sign of quality that should help attract even better articles to be published in the journals. IS journals that were recently added or will shortly be added to the ISI Impact Factor index include *ISF* (added in 2005); *JDM* (added in 2006); *ECRA* and *JGIM* (added in 2007); *JAIS* (added in 2008); *IT&M* (added in 2009); *MISQE*, *JCIS*, and *WIRT* (added in 2010); and *DATABASE*, *EM*, *IT&P*, *ITD*, and *I&O* (added in 2011).

Recommendations

Based on our results, we offer two main recommendations to the IS community: First, we recommend further revision to the SenS-8 recommendation. Second, we recommend working to improve the ISI impact factors of existing IS journals.

Recommendation 1: SenS-8 Might Require Adjustment

Our cluster analysis demonstrates that the top-tiered IS journals are *MISQ, ISR,* and *JMIS* in that specific rank order, with a gap following that tier. This important finding establishes that the widespread tradition of only ranking one or two journals in the highest tier puts IS researchers at an unnecessary disadvantage, and is highly problematic. Our results largely support the recommendations of the AIS Senior Scholars in terms of the SenS-8, but with hard empirical evidence regarding their actual quality. Apart from validating *MISQ*, *ISR*, and *JMIS* as the top tiered (i.e., "A+") IS journals, we found evidence that *EJIS, ISJ, JAIS,* and *JSIS* occupy the next tier (i.e., "A") of the highest quality IS journals. A key concern is that we provided bibliometric evidence that *JIT* does not presently exhibit self-citation rates and IS community influence of a top, mainstream IS journal.[13] However, the remainder of its bibliometrics indicates that *JIT* would belong in the second cluster if short-term citation measures were not considered. Moreover, cluster analysis using the SNA metrics indicates that the second tier, unlike the first tier, has no natural rank order, with the exception of *JAIS* perhaps being of higher quality than the other three (having originally been in its own cluster). Hence, for enhanced external validity and greater latitude in institutional application, verifiable assertions would be that the two clusters overall are the *Select-7 (MISQ, ISR, JMIS, EJIS, ISJ, JAIS,* and *JSIS*) with no implied rank-order beyond *MISQ*, *ISR, JMIS*, and *JAIS*. Research-intensive institutions might refer to the first three journals as "A+" journals and the rest as "A" journals.

[13] *JIT* had the highest short-term self-citation percentage and the lowest short-term IS influence ratio of all 21 IS journals with ISI bibliometrics. This disparity occurred because during the 1.5 years used for the short-term measures, *JIT* had a high volume of research commentaries that cited each other and that were scarcely cited outside of *JIT at the time*. However, removing those commentaries from comparison, the self-citation statistics are still extremely high, at 40% for this chosen period.

The Senior Scholars agreed at their ICIS Shanghai meeting in 2011 to reevaluate the list every 5 years, which would see this exercise occurring in the year 2016. If self-citation patterns at *JIT* and other excluded journals dropped below the thresholds for what we have defined as niche behavior, then some of these journals could very well find themselves admitted to the Sens-listing.

Recommendation 2: Improve Impact Factors and Citation Practices of Existing Journals

A clear trend is that scholars in all fields are increasingly targeting journals with ISI Impact Factors and eschewing journals without them. Without an ISI Impact Factor similar to other top journals in a particular discipline, it is increasingly difficult to convince colleagues outside one's discipline that the journal is of high quality. Accordingly, senior faculty routinely advise Ph.D. students and young faculty to publish in top journals that are recognized by experts in the faculty's fields and journals that have substantial ISI Impact Factors. The potential downside of this trend to the broader IS field (and to science in general) is that several strong IS journals exist that have not yet earned ISI Impact Factor status, despite having an arguably strong impact on the field and on science in general. This is particularly true of niche journals that enjoy high-quality editorial boards, engage in rigorous peer-review, exhibit quality articles, rank highly in expert rankings, and demonstrate reasonable impact on metrics outside of the ISI Impact Factor (e.g., the h-index).

The broader, less selective h-indices can assess virtually all journals for their impact because Google Scholar indexes virtually every publication—online or in print—whereas Thomson Reuters indexes only journals that meet multiple quality criteria. Thus, the pragmatic solution to this dilemma is for such journals to develop and establish a sufficiently consistent, high-quality citation history—for example, using the h-index and other key metrics considered by Thomson Reuters—so that these journals can be included in the ISI Impact Factor index. Otherwise, and unfortunately, without being indexed by ISI, these journals are likely to be undervalued by those who are not familiar with them—particularly by scholars outside IS.

Because Thomson Reuters requires several years of demonstrated quality and impact to approve a journal for an ISI Impact Factor, we recommend that the IS field be more cautious regarding continually offering new journals. Such journals face increasing difficulty in gaining traction as "high-quality outlets," unless they are strategically sponsored by elite academic organizations (e.g., *AIS*, *ACM*, *IEEE*, *INFORMS*) and engage elite editorial boards.

We therefore recommend that the IS community should instead focus on developing, expanding (e.g., more print space), improving publication quality, and scrutinizing self-citation practices of existing journals. Considering the trend toward electronic publication (e.g., *JAIS*, *CAIS*, *AIS THCI*, and *JITTA*), rapid publication (e.g., *ACMTMIS*, *CAIS*, *AIS THCI*), and the ability of journals to expand the number of issues and pages with demand (e.g., recently seen with *MISQ*, *ISR*, and *JMIS*) substantial new space exists for exciting articles to appear in high-quality IS journals. Furthermore, with more focus and investment, other existing high-quality IS journals can continue to ascend in quality. Important to this cause, coercive self-citation should no longer be a practice of any IS journal; if it does occur, we agree that such a journal should be publically censured by the AIS Senior Scholars (cf, Clarke et al. 2009) or the AIS.

Toward Theoretical Development of Dissemination of Knowledge Nomologies

Although there is practical value in establishing the quality of a discipline's journals, the primary contribution to science is to methods and measures. Advancing how we measure a single construct like journal quality should be increasingly important to scholars who are interested in studying the nomologies in which this construct appears. One of these research domains is dissemination of scientific knowledge and one phenomenon that clearly needs to be studied is how research is communicated from scholar to scholar, as in journals, conference proceedings, or books (Straub 2006), and results in high impact research. Impactful research will be received favorably by colleagues, reviewers, and readers—perhaps receiving nominations for or winning awards (Campbell et al. 1982; Daft et al. 1987). Such research is generally perceived to be novel, creative, or admired for pushing boundaries and assumptions (Daft et al. 1987; Davis 1971; Straub and Anderson 2009). Impactful research is also generally highly cited, and is subsequently used as a basis for theoretical advancements within or outside one's research discipline (Daft et al. 1987; Karuga et al. 2007). Significant research can often be leveraged to resolve pressing problems of practice, thereby resulting in consulting opportunities or influencing educational curricula (Daft et al. 1987; Davis 1971; Straub and Anderson 2009). Many factors have been proposed to influence the quantity or attributes of a researcher's impact.

Here, and as summarized in Figure 2, we propose a preliminary model of what most likely influences a researcher's impact. Individual, intrinsic factors relate to characteristics of the researcher, such as proactivity or confidence (Daft et al. 1987; Judge et al. 2009; Seibert et al. 1999), intrinsic motivation (Grant 2008), cognitive or mental ability (Dreher and Bretz 1991; Judge et al. 2009), creativity (Daft et al. 1987), and past productivity or experience (Acuna et al. 2012a; Pfeffer and Langton 1993; Williamson and Cable 2003). Another set of predictors of a researcher's research output relate to his or her social network. This set includes factors such as the number or diversity of network connections (Konrad and Pfeffer 1990; Wolff and Moser 2009), the productivity or standing of the researcher's advisor or co-authors (Acuna et al. 2012a; Williamson and Cable 2003), and the extent to which a researcher engages with the community by attending and presenting at conferences (Williamson and Cable 2003).

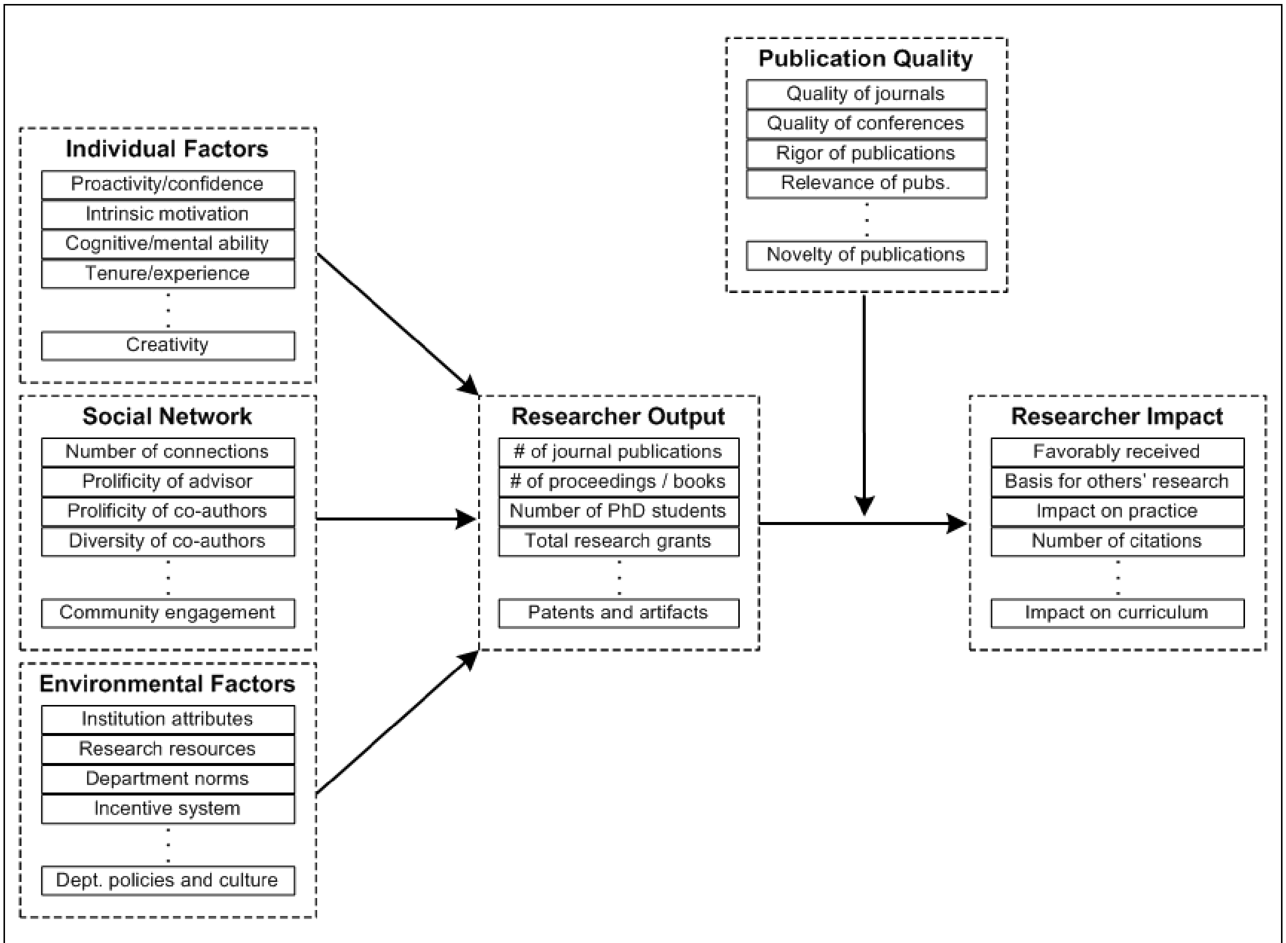

Figure 2. Model Depicting the Mediating Effect of Journal Quality on the Relationship Between Researcher's Output and Researcher's Impact.

Environmental factors extrinsic to the researcher can also affect research output negatively or positively. These include academic origin and affiliations (Acuna et al. 2012a; Long et al. 1998), salary and other incentive systems (Pfeffer and Langton 1993), and the size or research orientation of the researcher's institution (Long et al. 1998; Pfeffer and Langton 1993; Williamson and Cable 2003). Productivity can be impacted by research-related resources and grants (Acuna et al. 2012a), and by departmental norms, policies, and cultures (Konrad and Pfeffer 1990; Maslach and Leiter 2008; Pfeffer and Langton 1993; Williamson and Cable 2003).

All these factors, and certainly others, likely influence researcher output. Key to researcher output is the number of academic publications (journals, proceedings, books) a researcher produces. However, research output also include key complementary factors, such as the number of Ph.D. students supervised, size and number of research grants awarded, patents, and technology artifacts.

Publication quality plays a pivotal role in terms of the extent to which a researcher's output (most commonly seen in academic journal articles) will become influential and have a lasting impact. We conceptualize the role of publication quality as playing a moderating role between raw research output and the subsequent influence of that research. Publication quality includes the quality of journals, conferences, and books in which an academic publishes. The highest quality outlets will facilitate broader dissemination, recognition, and influence of the products of researchers' efforts. High-quality journals and proceedings tend to be more highly read and cited as well as generally more authoritative on the topics addressed in their published articles. Crucially, publication quality is also found in articles themselves and is often expressed in terms of rigor, relevance, and novelty.

By assessing the quality of journals using the algorithm presented in this paper, journals can monitor their long-term efforts to improve their quality and thereby further enhance the value of research output. As Daft et al. (1987) emphasize, quantity without quality is like faith without works. Evaluations of researcher impact are not complete without a measure of quality to qualify the quantity of output. The primary contribution of this paper is the operationalization of journal quality with a relatively straightforward set of measurements, which not only aids in journal assessment, but also facilitates broader assessments of a researcher's impact.

Conclusion

We argue in this paper that solid scientometrics can establish a baseline indicator of the quality of one's research record. It is well to remember, though, that journal quality (as a surrogate for research quality) is not the only way this can be done. Many other meaningful approaches can demonstrate the quality of a research record that do not involve scientometrics and, therefore, we recognize that their absence from the current study is a limitation. We hope that in improving the scientometric evaluation of IS journals, we are not encouraging the field to downplay critical qualitative indicators of research quality. Instead, because journal rankings will always be a component of assessment, we conducted this study with the intention of bringing about useful improvement in the method of ranking IS journals and to provide necessary, hard evidence to strengthen the external case for the quality of IS journals.

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APPENDIX A. JOURNAL QUALITY RANKING METHODS

Consistent with Straub and Anderson (2010), we recognize that a journal's quality and a journal's impact, reputation, and influence are not necessarily equivalent. Similarly, an underlying nomology likely exists—that is largely unknown and unresearched—such that key factors of quality (e.g., rigor of review process, caution with respect to editorial oversight, accuracy of content, etc.) are what predict journal impact or influence (Straub and Anderson 2010). However, due to the complex and unknown nature of this nomology, and following extant practice in scientometrics research, we follow Straub and Anderson (2010) in simply equating journal quality with journal impact and reputation for pragmatic purposes.

On this basis, we categorize the various methods of assessing journal quality from this lens into three methodological approaches: expert assessment, citation analyses, and non-validated approaches. We review these approaches to better establish the foundation for our choice to combine bibliometrics with expert assessment, rather than rely on only one method, as is extant practice in the IS discipline.

Approach 1: Bibliometric Methods for Assessing Journal Quality

Bibliometric journal-ranking methods typically use citation analysis of a journal's articles to assess the journal's overall contribution to science and, subsequently, use this contribution as a surrogate for journal quality (Straub and Anderson 2010). For convenience, such methods typically limit the citation window to two or three years after the article's publication (Allen et al. 2009; Fersht 2009; González-Pereira et al. 2010); however, more recently citation methods have considered longer windows such as five years (Straub and Anderson 2010). The advantages of bibliometric methods include simplicity, objectivity, and widespread use across most disciplines (McVeigh 2004; Meho 2007; Sombatsompop and Markpin 2005).

However, bibliometric journal-ranking approaches have several drawbacks. One limitation is that they require an index database, such as Scopus™ or Thomson's ISI Web of Knowledge™. These index databases are necessarily limited in scope—completely excluding many journals of lesser quality or of unproven quality (i.e., newer journals) (Straub and Anderson 2010); however, articles in these omitted journals are still cited—some heavily so (Harvey et al. 2007). Another criticism of bibliometric measures is that a window of two or three years discounts long-term contribution (Straub and Anderson 2010). Allen et al. (2009) found that many highly rated articles are not cited in the first three years but instead become highly cited after three years. Because of this scope limitation, bibliometric approaches tend to downplay the long-term scientific contribution of certain articles (Allen et al. 2009; Fersht 2009) and, consequently, downplay the contribution and subsequent judged quality of the journals in which these deflated articles are published. For these reasons, Straub and Anderson (2010) assert that a five-year window is more appropriate than a two-year window.

Other potential issues with bibliometric approaches include the following (Harvey et al. 2007): differences in how fields use citation chains (some use lengthy chains, others favor short chains), herding (similar sets of highly cited articles are repeated for articles in a discipline), content bias (review-oriented journals are cited more heavily than journals that publish original research), journal editors who promote artificial journal self-citation, and differences in maturity of fields. These latter issues explain why leading scientometrics research has recently established that bibliometrics are highly appropriate for comparing journals *within* a discipline but highly inappropriate for comparing journals *between* disciplines (Harvey et al. 2007; Leydesdorff 2008).
We alleviate many of the above-mentioned drawbacks by using multiple bibliometrics, which approach we address in the methodology section. Nevertheless, journal rankings experts outside the IS discipline have increasingly concluded that the best overall approach is to combine journal bibliometrics with expert assessment of journal quality (e.g., Allen et al. 2009; Butler 2008; Harnad 2008; Harvey et al. 2007; Mingers and Harzing 2007).

Approach 2: Expert Assessment of Journal Quality

Studies using expert assessment of journal quality add important qualitative information and judgment that cannot be directly reflected in bibliometric indicators that solely consider impact—including an expert's knowledge of editorial practices, familiarity with a journal's peer-review process, judgment of the credentials of a journal's editorial board, and so on (Straub and Anderson 2010). The IS field uses this approach extensively (e.g., Hamilton and Ives 1980; Lowry et al. 2004; Mylonopoulos and

Theoharakis 2001; Peffers and Ya 2003). Through an extensive empirical analysis, Lewis et al. (2007) demonstrated that the best IS journal rankings studies using expert opinion in a recent 10-year period (i.e., Hardgrave and Walstrom 1997; Lowry et al. 2004; Mylonopoulos and Theoharakis 2001; Peffers and Ya 2003; Walstrom and Hardgrave 2001; Whitman et al. 1999) displayed a remarkable degree of measurement validity and reliability.

The greatest limitation of expert rankings is that they do not consider a journal's actual impact on science. Accordingly, researchers increasingly call for the combined use of bibliometrics with expert rankings. Another limitation of expert assessment is that because the IS field is relatively new and dynamic, the quality of many of its journals is in a constant state of flux. As a result, newer, quality journals can rise quickly in assessed reputation—as occurred with *JAIS*, *ISJ*, and *EJIS* (Lowry et al. 2004). Thus, newer IS journals have been absent in most expert ranking studies, thereby making a comparison to older journals difficult. For example, only three rankings include all the following IS journals in the same study: *MISQ*, *ISR*, *JMIS*, *DSS*, *I&M*, *EJIS*, *JAIS*, and *ISJ* (Lowry et al. 2004; Mylonopoulos and Theoharakis 2001; Peffers and Ya 2003). An easy solution to this problem is to conduct periodic expert-ranking studies (Lowry et al. 2004). Given the changes in the IS field and the recent controversies regarding the AIS Senior Scholars' recommendation of the SenS-6/SenS-8 baskets, a current assessment of expert opinion is warranted.

Approach 3: Other Approaches

Researchers use other approaches less frequently because of issues in the designs of the approaches that lead to multiple validity and generalizability concerns. A common but questionable practice is the use of a department- or college-specific journal rankings list for institution-specific needs. Not surprisingly, this approach typically yields lists that are highly politicized and thus lack validity and generalizability; such lists often conveniently focus on journals in which the work of associated senior faculty has been published (Harvey et al. 2007).

A second recently proposed approach is to rank journals on the basis of the ranked quality of the institutions with which the authors publishing in the journals are associated (Author Affiliation Index, or AAI) (Ferratt et al. 2007). One potential concern regarding this approach is that it shifts too much of the quality assessment away from the quality of the journal content to the quality of the authors' associated institutions. The logical fallacy here should be clear: although positive correlations exist between institution quality and article quality, a higher-quality institution does not guarantee higher-quality articles.

With AAI, it is also possible that the relationships discovered are tautological. How do we know the best schools? At least one way is to determine the journals in which they publish. How do we know the best journals? The tautology is that the AAI method says we know this by knowing where the best schools publish.

A final, more accepted approach is to simply average all previous journal rankings into one index (Rainer Jr. and Miller 2005). We believe this approach can be useful for highly stable fields. However, we are concerned with the application of this averaging approach to IS journal rankings for three reasons: (1) Virtually every IS journal rankings study to date has used a different methodology and inclusion criteria for the selected journals and respondents (e.g., some included non-IS journals, some did not); thus, the average is not from the same baseline conditions. (2) Most previous IS journal rankings used only North American respondents, so the average was biased toward these respondents. (3) The IS field and its associated journals have been in a period of rapid growth and quality improvement; thus, creating an average of rankings over a decade obfuscates contemporary knowledge of IS journal quality.

APPENDIX B. INCLUSION/EXCLUSION DECISIONS IN FINAL ANALYSIS OF JOURNALS

Table B.1 Justification for Inclusion/Exclusion Decisions in Final Analysis of Journals

Name	Abbreviation	(Rainer Jr. and Miller 2005)	(Lowry et al. 2004)	(Katerattanakul and Han 2003)	(Peffers and Ya 2003)	(Mylonopoulos and Theoharakis 2001)	(Whitman et al. 1999)	(Hardgrave and Walstrom 1997)	(Walstrom and Hardgrave 2001)	IS Journal?	Top-40 cut?	Justification (if applicable)
Academy of Management Journal	-	25	--	--	--	17	--	15	14	N	n/a	Primarily management
Academy of Management Review	-	32	--	--	--	22	--	19	16	N	n/a	Primarily management
ACM Computing Surveys	-	20	--	12	--	24	14	14	10	N	n/a	Primarily CS
ACM SIG Publications	-	27	--	--	--	26	33	--	--	N	n/a	Will not rank large aggregates like this
ACM Transactions on Database Systems	-	15	--	10	--	--	--	11	6	N	n/a	Primarily CS
ACM Transactions on Information Systems	-	9	--	--	39	--	--	--	--	N	n/a	Primarily CS
ACM Transactions on MIS	*ACM TMIS*	--	--	--	--	--	--	--	--	Y	Y	Write-in by several experts, top-40
Administrative Science Quarterly	-	24	--	--	--	21	--	16	--	N	n/a	Primarily management
African J. of Information Systems	*AFJIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
AI Magazine	-	--	--	9	--	--	--	--	--	N	n/a	Magazine; primarily CS
AIS Transactions on HCI	*AIS THCI*	--	--	--	--	--	--	--	--	Y	Y	Write-in by several experts, top-40
All ACM Transactions	-	--	10	--	--	13	12	17	--	N	n/a	Will not rank large aggregates like this
All IEEE Transactions	-	--	8	--	--	6	9	12	--	N	n/a	Will not rank large aggregates like this
Australian Journal of Information Systems	*AJIS*	--	--	--	25	46	--	--	--	Y	Y	n/a
Business Horizons	-	--	--	--	--	--	--	--	25	N	n/a	Primarily management
California Management Review	-	--	--	--	--	--	--	--	--	N	n/a	Primarily management
China J. of Information Systems (CJIS)	*CJIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Communication Research	-	--	--	--	--	--	--	43	--	N	n/a	Primarily communication
Communications of the ACM	-	2	5	3	--	2	3	4	2	N	n/a	Magazine; primarily CS
Communications of the Association for Information Systems	*CAIS*	23	--	--	5	18	--	--	--	Y	Y	n/a
Communications of the International Information Management Association	*CIIMA*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Computer Decisions	-	--	--	--	--	--	--	--	27	N	n/a	Primarily CS
Computer Journal	-	--	--	25	--	50	43	--	--	N	n/a	Primarily CS
Computers and Operations Research	-	17	--	--	--	--	24	--	--	N	n/a	Primarily OR/OM
Computers in Human Behavior	-	--	--	--	--	--	--	42	--	N	n/a	Primarily HCI journal
Computer-supported cooperative work	-	--	--	--	36	--	--	--	--	N	n/a	Primarily communication
Data Management	-	--	--	--	--	--	37	--	24	N	n/a	Primarily CS
DATABASE	-	30	--	--	--	--	--	--	--	N	n/a	Primarily CS

Datamation	-	--	--	--	--	--	--	51	23	N	n/a	Magazine
Decision Sciences	-	7	6	--	--	8	5	6	8	N	n/a	Primarily decision science
Decision Support Systems	*DSS*	8	7	20	7	9	13	10	11	Y	Y	n/a
Electronic Commerce Research and Applications	*ECRA*	--	--	--	41	--	--	--	--	Y	Y	n/a
Electronic Government, An International Journal (EG)	*EG*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Electronic J. of Information Systems Evaluation	*EJISE*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Electronic J. of Information Systems in Developing Countries	*EJISDC*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Electronic Markets	*EM*	--	--	--	29	40	--	--	--	Y	Y	n/a
Enterprise Information Systems	*EIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Enterprise Modeling and Information Systems Architectures, An International J.	*EMISA*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
E-services Journal	*e-SJ*	--	--	--	45	--	--	--	--	Y	Y	n/a
European Journal of IS	*EJIS*	13	11	14	4	11	--	--	--	Y	Y	n/a
European Journal of Operations Research	-	--	--	--	--	42	--	--	--	N	n/a	Primarily OR/OM
Expert Systems Review	-	--	--	--	--	--	--	38	--	N	n/a	Primarily CS
Expert Systems with Applications	-	--	--	24	--	--	--	34	--	N	n/a	Primarily CS
Harvard Business Review	-	6	15	--	--	7	6	9	9	N	n/a	Primarily management
Human-Computer Interaction	-	--	--	7	--	32	--	23	--	N	n/a	Primarily HCI
IBM Systems Journal	-	42	--	8	--	28	--	--	--	N	n/a	Primarily CS
IEEE Computer	-	19	25	16	--	19	11	--	--	N	n/a	Magazine; primarily CS
IEEE Software	-	11	--	--	--	--	--	--	--	N	n/a	Magazine; primarily CS
IEEE Transactions on Computer	-	18	--	--	--	--	--	--	--	N	n/a	Primarily CS
IEEE Transactions on Knowledge and Data Engineering	-	--	--	--	--	--	--	--	--	N	n/a	Primarily CS
IEEE Transactions on SE	-	10	22	5	--	--	--	7	5	N	n/a	Primarily CS
IEEE Transactions on SMC	-	14	--	--	--	--	--	--	--	N	n/a	Primarily CS
INFOR	-	--	--	--	--	--	--	37	--	N	n/a	Not in print
Information & Management	*I&M*	12	9	15	5	10	15	20	12	Y	Y	n/a
Information & Organization	*I&O*	40	20	--	28	25	--	--	--	Y	Y	n/a
Information and Software Technology	-	--	--	--	--	--	45	--	--	N	N	Primarily CS
Information Knowledge Systems Management	*IKSM*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Information Management & Computer Security	*IM&CS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Information Processing and Management	*IP&M*	--	--	--	46	--	35	--	--	Y	N	Not top-40
Information Research	*IR*	--	--	--	43	--	--	--	--	Y	N	Not top-40
Information Resources Management Journal	*IRMJ*	50	--	--	11	38	31	35	--	Y	Y	n/a
Information Sciences	-	--	--	--	24	--	--	--	--	N	n/a	Primarily CS / Information Sciences
Information Systems	-	--	21	18	21	--	--	--	--	N	n/a	Primarily CS
Information Systems and eBusiness Management	*ISeB*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Information Systems Education J.	*ISEJ*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Information Systems Frontiers	*ISF*	--	--	--	18	--	--	--	--	Y	Y	n/a
Information Systems Journal	*ISJ*	36	13	17	10	16	16	--	--	Y	Y	n/a
Information Systems Management	*ISM**	43	--	19	35	33	26	30	17	Y	Y	n/a
Information Systems Research	*ISR*	3	2	2	2	3	4	2	3	Y	Y	n/a
Information Technology & People (IT&P)	*IT&P*	--	--	--	15	27	--	--	--	Y	Y	n/a
Information Technology and Management (IT&M)	*IT&M*	--	--	--	27	--	--	--	--	Y	Y	n/a
Infosytems	-	--	--	--	--	--	--	--	26	N	n/a	Not in print

Interfaces (INFORMS)	-	39	--	--	--	39	20	28	19	N	n/a	Primarily OR/OM
International J. of Business Information Systems	*IJBIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Electronic Commerce	*IJEC*	--	--	--	12	23	--	--	--	Y	Y	n/a
International J. of Enterprise Information Systems	*IJEIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Information and Decision Sciences	*IJIDS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Information Management	*IJIM*	--	--	--	37	--	--	--	--	Y	N	Not top-40
International J. of Information System Modeling and Design	*IJISMD*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Information Technologies and Systems Approach	*IJITSA*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Intercultural Information Management	*IJIIM*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
International J. of Technology Management	*IJTM*	41	--	--	--	--	41	--	--	Y	N	Not top-40
International Journal of Human-Computer Studies	-	--	--	11	42	44	--	22	--	N	n/a	Primarily HCI
International Journal of Man-Machines Studies	-	34	--	--	--	34	25	--	--	N	n/a	Now IJHCS (HCI journal)
Issues in Information Systems	*ISS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Education for Management Information Systems	*JEMIS*	38	--	--	--	--	39	--	--	Y	N	Not in print
J. of Computer Information Systems	*JCIS*	--	23	26	13	41	22	27	22	Y	Y	n/a
J. of Database Management	*JDM*	--	--	--	14	--	19	26	--	Y	Y	n/a
J. of Enterprise Information Management	*JEIM*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Global Information Management	*JGIM*	--	--	--	19	--	--	--	--	Y	Y	n/a
J. of Global IT Management	*JGITM*	--	--	--	23	--	--	--	--	Y	Y	n/a
J. of Information Privacy and Security	*JIPS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Information System Security	*JISS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Information Systems and Technology Management	*JISTEM*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Information Systems Applied Research	*JISAR*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Information Systems Education	*JISE*	33	--	--	31	--	36	41	--	Y	Y	n/a
J. of Information Technology	*JIT*	--	--	23	40	--	--	--	--	Y	Y	n/a
J. of Information Technology Case and Application Research	*JITCAR**	--	--	--	33	--	--	--	--	Y	Y	Write-in by several experts, top-40
J. of Information Technology for Development	*ITD*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of Information Technology Management	*JITM*	36	--	--	--	--	38	--	--	Y	Y	n/a
J. of Information Technology Theory and Applications	*JITTA*	--	--	--	26	--	--	--	--	Y	Y	n/a
J. of Information, Technology, and Organizations	*JITTO*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of International Technology and Information Management	*JITIM*	45	--	--	--	--	42	--	--	Y	Y	Write-in by several experts, top-40
J. of Management Information Systems	*JMIS*	5	3	--	3	4	7	5	7	Y	Y	n/a
J. of Management Systems	*JMS*	21	--	--	--	--	27	--	--	Y	N	Not top-40
J. of Organizational and End-User Computing	*JOEUC*	--	--	--	22	37	40	44	--	Y	Y	n/a
J. of Organizational Computing and Electronic Commerce	*JOCEC*	--	--	--	34	31	--	--	--	Y	Y	n/a
J. of Strategic IS	*JSIS*	27	18	22	16	20	30	25	--	Y	Y	n/a
J. of Systems and Information Technology	*JSIT*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
J. of the Association for Information Systems	*JAIS*	--	12	--	9	30	--	--	--	Y	Y	n/a

Journal of Computer and System Sciences	-	--	--	13	--	--	--	--	--	N	n/a	Primarily CS
Journal of Database Administration	-	22	--	--	--	--	28	--	--	N	n/a	Primarily CS
Journal of Information Management	-	27	--	--	--	--	21	--	--	N	n/a	n/a
Journal of Information Science	-	49	--	--	--	--	23	--	--	N	n/a	Primarily information science
Journal of Information Systems (Accounting)	-	44	19	--	--	35	18	39	--	N	n/a	Primarily accounting
Journal of Operations Research	-	--	--	--	--	--	--	32	--	N	n/a	Primarily OR/OM
Journal of Systems and Software	-	--	--	27	--	--	--	33	--	N	n/a	Primarily CS
Journal of the ACM	-	26	--	4	17	45	10	--	--	N	n/a	Primarily CS
Journal of the American Society for Information Science	-	--	--	--	--	--	34	--	--	N	n/a	Primarily information science
Journal on Computing	-	--	16	--	--	--	--	--	--	N	n/a	Primarily CS
Knowledge Based Systems	-	--	--	21	--	--	--	31	--	N	n/a	Primarily CS
Management Science	-	4	4	--	--	5	2	3	4	N	n/a	Primarily management
MIS Quarterly	*MISQ*	1	1	1	1	1	1	1	1	Y	Y	n/a
MIS Quarterly Executive	*MISQE*	--	--	--	--	--	--	--	--	Y	Y	Write-in by several experts, top-40
MISQ Discovery	-	--	--	--	20	--	--	--	--	N	n/a	No longer in print
Omega	-	48	--	--	--	29	32	24	15	N	n/a	Primarily OR/OM
Operations Research	-	--	17	--	--	43	--	18	18	N	n/a	Primarily OR/OM
Organization Science	-	31	14	--	--	15	--	8	--	N	n/a	Primarily OB / management
Organizational Behavior and Human-Decision Processes	-	--	--	--	--	47	--	21	--	N	n/a	Primarily OB / management
Pacific Asia J. of the Association for Information Systems	*PAJAIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Review of Business Information Systems	*RBIS*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
Revista Latinoamericana y del Caribe de la Asociación de Sistemas de Latinoamericana y del Caribe de la Asociación de Sistemas de Información	*RELCASI*	--	--	--	--	--	--	--	--	Y	Y	Write-in by several experts, top-40
Scandinavian J. of Information Systems	*SJIS*	--	--	--	--	--	--	--	--	Y	Y	Write-in by several experts, top-40
Simulation	-	--	--	--	--	--	--	45	--	N	n/a	Primarily CS
Sloan Management Review	-	16	--	--	--	12	8	13	13	N	n/a	Primarily management
Systèmesd'information et management	*SIM*	--	--	--	--	--	--	--	--	Y	N	Write-in; not ranked before; not top-40
The DATABASE *for Advances in Information Systems*	*DATABASE*	35	--	--	8	14	17	29	20	Y	Y	n/a
The Information Society	-	--	--	--	49	36	--	--	--	N	n/a	Primarily OR/OM
Wirtschaftsinformatik	*WIRT*	--	24	--	32	--	--	--	--	Y	Y	n/a

Table B.2 Summary Statistics for Previous Rankings Studies' Use of IS-Centric Journals

Summary Item	(Rainer Jr. and Miller 2005)	(Lowry et al. 2004)	(Katerattanakul and Han 2003)	(Peffers and Ya 2003)	(Mylonopoulos and Theoharakis 2001)	(Whitman et al. 1999)	(Hardgrave and Walstrom 1997)	(Walstrom and Hardgrave 2001)
IS journals ranked	19	12	10	36	21	20	13	8
Total journals ranked	48	25	27	45	49	43	45	26
IS journals as percent of total in study	39.6%	48.0%	37.0%	80.0%	42.9%	46.5%	28.9%	30.8%

APPENDIX C. CONSIDERED PUBLICATIONS

Table C.1 IS-Centric Journals Considered with Publishing Information

Journal Name	Publisher	Sponsoring Organization
ACM Transactions on MIS (ACM TMIS)	ACM	ACM
African J. of Information Systems (AFJIS)	The International Center for IT and Development, College of Business, Southern University	Same as publisher
AIS Transactions on HCI (AIS THCI)	The Association for Information Systems (AIS)	Same as publisher
Australasian J. of Information Systems (AJIS)	Australasian Association for Information Systems (AAIS) through the Australian Computer Society Digital Library (ACS)	University of Canberra (UC)
China J. of Information Systems (CJIS)	School of Economics and Management, Tsinghua University, Beijing, "Information Systems Journal"	Same as publisher
Communications of the AIS (CAIS)	The Association for Information Systems (AIS)	Same as publisher
Communications of the International Information Management Association (CIIMA)	International Information Management Association, Inc.	Same as publisher
Decision Support Systems (DSS)	Elsevier	Same as publisher
Electronic Commerce Research and Applications (ECRA)	Elsevier	Same as publisher
Electronic Government, An International Journal (EG)	Inderscience Enterprises Limited	Same as publisher
Electronic J. of Information Systems Evaluation (EJISE)	Academic Conferences Limited	Same as publisher
Electronic J. of Information Systems in Developing Countries (EJISDC)	City University of Hong Kong, Erasmus University of Rotterdam, University of Nebraska, Omaha	Same as publisher
Electronic Markets (EM)	Springer	University of St. Gallen, Switzerland and the University of Leipzig, Germany
Enterprise Information Systems (EIS)	Taylor & Francis Group	Same as publisher
Enterprise Modeling and Information Systems Architectures, An International J. (EMISA)	Special Interest Group on Modeling Business Information Systems within the German Informatics Society (GI-SIGMoBIS)	Same as publisher
e-Service J. (e-SJ)	Indiana University Press	The Trustees of Indiana University
European J. of Information Systems (EJIS)	Palgrave Macmillan, a division of Macmillan Publishers Limited	Same as publisher
Information & Management (I&M)	Elsevier	Same as publisher
Information and Organization (I&O)	Elsevier	Same as publisher
Information Knowledge Systems Management (IKSM)	IOS Press	Same as publisher

Table C.1 IS-Centric Journals Considered with Publishing Information (Continued)		
Information Management & Computer Security (IM&CS)	Emerald Group Publishing Limited	Same as publisher
Information Processing & Management (IP&M)	Elsevier	Same as publisher
Information Research (IR)	Professor T.D. Wilson, Professor Emeritus of the University of Sheffield	Lund University Libraries
Information Resources Management J. (IRMJ)	IGI Global	The Information Resource Management Association (IRMA)
Information Systems and eBusiness Management (ISeB)	Springer	Same as publisher
Information Systems Education J. (ISEJ)	EDSIG, the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois)	Same as publisher
Information Systems Frontiers (ISF)	Springer	Same as publisher
Information Systems J. (ISJ)	John Wiley & Sons, Inc.	Same as publisher
Information Systems Management (ISM)	Taylor & Francis Group	Same as publisher
Information Systems Research (ISR)	The Institute for Operations Research and the Management Sciences (INFORMS)	Same as publisher
Information Technology & People (IT&P)	Emerald Group Publishing Limited	Same as publisher
Information Technology and Management (IT&M)	Springer	Same as publisher
International J. of Business Information Systems (IJBIS)	Inderscience Enterprises Limited	Same as publisher
International J. of Electronic Commerce (IJEC)	M.E. Sharpe	Same as publisher
International J. of Enterprise Information Systems (IJEIS)	IGI Global	Same as publisher
International J. of Information and Decision Sciences (IJIDS)	Inderscience Enterprises Limited	Same as publisher
International J. of Information Management (IJIM)	Elsevier	Same as publisher
International J. of Information System Modeling and Design (IJISMD)	IGI Global	IRMA
International J. of Information Technologies and Systems Approach (IJITSA)	IGI Global	IRMA
International J. of Intercultural Information Management (IJIIM)	Inderscience Enterprises Limited	Same as publisher
International J. of Technology Management (IJTM)	Inderscience Enterprises Limited	Same as publisher
Issues in Information Systems (ISS)	International Association for Computer Information Systems (IACIS)	Same as publisher
J. of Computer Information Systems (JCIS)	International Association for Computer Information Systems (IACIS)	Same as publisher
J. of Database Management (JDM)	IGI Global	IRMA

Table C.1 IS-Centric Journals Considered with Publishing Information (Continued)		
J. of Enterprise Information Management (JEIM)	Emerald Group Publishing Limited	Same as publisher
J. of Global Information Management (JGIM)	IGI Global	IRMA
J. of Global Information Technology Management (JGITM)	Ivy League Publishing	Same as publisher
J. of Information Privacy and Security (JIPS)	UW-Whitewater, Global Business Resource Center	Same as publisher
J. of Information System Security (JISS)	The Information Institute	Same as publisher
J. of Information Systems and Technology Management (JISTEM)	TECSI - Laboratório de Tecnologia e Sistemas de Informação - FEA USP/ TECSI - Research Lab on Information Systems and Technology, Universidade de São Paulo-USP	Same as publisher
J. of Information Systems Applied Research (JISAR)	EDSIG, the Education Special Interest Group of AITP, the Association of Information Technology Professionals (Chicago, Illinois)	Same as publisher
J. of Information Systems Education (JISE)	Education Special Interest Group (EDSIG) of the Association of Information Technology Professionals (AITP)	Same as publisher
J. of Information Technology (JIT)	Palgrave Macmillan, a division of Macmillan Publishers Limited	Same as publisher
J. of Information Technology Case and Application Research (JITCAR)	Ivy League Publishing	Same as publisher
J. of Information Technology for Development (ITD)	Taylor and Francis	College of Information Science and Technology at the University of Nebraska Omaha
J. of Information Technology Management (JITM)	Association of Management	Same as publisher
J. of Information Technology Theory and Application (JITTA)	The Association for Information Systems (AIS)	Same as publisher
J. of Information, Technology, and Organizations (JITTO)	Informing Science Institute	Same as publisher
J. of International Technology and Information Management (JITIM)	The International Information Management Association	Same as publisher
J. of Management Information Systems (JMIS)	M.E. Sharpe Inc.	Same as publisher
J. of Management Systems (JMS)	Association of Management (AoM) / International Association of Management (IAoM)	Same as publisher
J. of Organizational and End User Computing (JOEUC)	Information Resources Management Association	Same as publisher
J. of Organizational Computing and Electronic Commerce (JOCEC)	Taylor & Francis	Same as publisher
J. of Strategic Information Systems (JSIS)	Elsevier	Same as publisher

Table C.1 IS-Centric Journals Considered with Publishing Information (Continued)

J. of Systems and Information Technology (JSIT)	Emerald Group Publishing Limited	Same as publisher
J. of the Association for Information Systems (JAIS)	The Association for Information Systems (AIS)	Same as publisher
MIS Quarterly (MISQ)	Management Information Systems Research Center (MISRC) of the University of Minnesota	Same as publisher
MIS Quarterly Executive (MISQE)	The Association for Information Systems (AIS)	Society for Information Management; MISQ, AIS, Indiana University; University of St. Gallen, City University of Hong Kong
Pacific Asia J. of the Association for Information Systems (PAJAIS)	The Association for Information Systems (AIS)	Same as publisher
Review of Business Information Systems (RBIS)	Clute Institute	Same as publisher
Revista Latinoamericana y del Caribe de la Asociación de Sistemas de Latinoamericana y del Caribe de la Asociación de Sistemas de Información (RELCASI)	The Association for Information Systems (AIS)	Same as publisher
Scandinavian J. of Information Systems (SJIS)	IRIS Association	The Association for Information Systems (AIS)
Systèmesd'information et management (SIM)	Editions Eska	Association Information et Management (AIM)
The DATABASE *for Advances in Information Systems (DATABASE)*	ACM SIGMIS	University of Memphis Management Information Systems Department
Wirtschaftsinformatik (WIRT); also published in English as Business & Information Systems Engineering	GablerVerlag	Springer

APPENDIX D. DETAILS ON DATA COLLECTION PROCEDURES

Population Oversampling for Expert Survey Data Collection

For the expert assessment portion of our research, we designed the data collection methodology with an oversampling method that included almost the entire population of IS academics in the world. We followed the methodology used in Lowry et al. (2004), but included more sample sources to ensure population oversampling. Thus, we assume that our statistics are based on the population of IS researchers—not a subsample of the population. To achieve this global representation, we first used the target and respondent list from Lowry et al. (2004). We added to this group all faculty listed in the AIS membership directory, those who published in the last five years in the traditionally acknowledged top-4 IS journals from previous studies (i.e., *MISQ*, *ISR*, *JMIS*, and *JAIS*), those who attended ICIS in the last five years, and anyone listed as a member of any IS department in the world (based on the AIS website listings).

This oversampling method resulted in 16,202 purportedly unique individuals and email addresses. An examination of the pool revealed that many entries were duplicates (e.g., the same person with different name spellings, additional entries with various email addresses, or multiple records for the same person representing different institutions over time). We thus eliminated 1,847 potential respondents whom we could verify as having duplicate identities. We then sent invitations to the remaining potential 14,355 respondents. Of these, 4,994 email addresses were invalid, generally for people who no longer resided at the institution and/or had their account suspended; spam filters blocked a much smaller portion. In addition, 372 valid email addresses existed for respondents who were on long-term leave (e.g., maternity, health, and industry) or were not otherwise available. Thus, we estimate that our survey successfully reached 8989 unique academics.

Of the 8989 academics whom we reached, 83 noted that they were too busy or uninterested to respond; 56 noted that they were retired and thus not eligible; and 444 noted that, although they published in IS journals or resided in IS departments, they did not consider themselves to be IS academics but instead members of another field (thus, we eliminated them in our attempt to restrict our sample to IS researchers). Most of these were academics in IS departments with academic training in computer science, statistics, and operations.[14]

From among the 8406 remaining target respondents, we received 2816 responses. Of these responses, 139 were omitted because the respondents did not consider themselves to be *active* IS academics. To be conservative, we retained the 83 uninterested/busy respondents as potential respondents; thus, we estimate that our survey reached a maximum of 8350 eligible respondents, and given the 2816 responses that we received, we achieved a minimum 33.7 percent response rate from international IS academics. Accordingly, this participation rate was the largest international participation in an IS journal study to date. We believe that 8350 is the most accurate estimate of the actual population of IS researchers in the world at the time our data was collected (i.e., 2010).

To increase the quality and validity of our results, our survey software prevented duplicate entries from the same person or same computer, while allowing responses only from explicitly invited participants. Finally, we omitted responses for 396 people who left portions of the survey blank without explanation. This process left 2420 responses that were used to conduct our full data analysis. By comparison, after a similar winnowing process, Lowry et al. (2004) had 1572 responses remaining in their analysis.

Self-citation Google Scholar Data Collection

In order to better understand *short-term* citation activity, we identified all articles published from January 2011 through July 2012 in the 21 IS journals considered in our study, thereby resulting in 1358 articles. Using Google Scholar, we identified every article that cited each of the identified 1358 articles, thereby resulting in 2548 *citing* articles. We coded each of the 2548 citing articles into one of seven mutually exclusive categories listed below:

1. **Self-cites**: Citing article was published by the same journal as the cited article
2. **Non-peer**: Citing article was published in a non-peer reviewed outlet, or non-journal non-conference outlet such as dissertations, books, SSRN, sprouts, working paper, etc.
3. **AIS/HICSS Conference**: Citing article was published in one of the following eight conferences:
    a. *HICSS* (Hawaii International Conference On System Sciences)
    b. AIS Conferences:

[14] We conducted a random audit of 300 (out of 444) of these individuals and found that 90 (30%) were listed as “IS academics” in the AIS membership directory. This result is to be expected because the IS field is an interdisciplinary field and IS academics routinely are members of related organizations such as the ACM, IEEE, and Academy of Management.

        i. *ICIS* (International Conference on Information Systems)
        ii. *AMCIS* (Americas Conference on Information Systems)
    c. Affiliated AIS Conferences:
        i. *ECIS* (European Conference on Information Systems)
        ii. *CONF-IRM* (International Conference on Information Resources Management)
        iii. *ICMB* (International Conference on Mobile Business)
        iv. *MCIS* (Mediterranean Conference on Information Systems)
        v. *PACIS* (Pacific-Asia Conference on Information Systems)

4. **Non-AIS/HICSS Conference**: Citing article was published in a conference not listed in #3, including symposiums, workshops, and colloquiums.
5. **IS ISI Journal**: Citing article was published in one of the 29 IS journals indexed by the ISI in 2011: *DATABASE, DSS, ECRA, EIS, EJIS, EM, I&M, I&O, IJEC, IJIM, IJTM, ISF, ISJ, ISM, ISR, IT&M, IT&P, JAIS, JCIS, JDM, JGIM, JIT, JMIS, JOCEC, JSIS, MISQ, MISQE, WIRT*.
6. **Other ISI Journal**: Citing article was published in a journal indexed by the ISI, but is not one of the IS journals referred to in #5 (e.g., Journal of Psychology).
7. **Non ISI Journal**: Citing article was published in any peer-reviewed journal not currently indexed by the ISI.

An error in citation counts could significantly bias results. Accordingly, we desired 100% reliability in our coding efforts. In establish 100% reliable coding, two coders were initially assigned to each of the 21 journals under review. The coders independently categorized each of the citing articles for each of the cited articles for their assigned journals. An independent third coder (reconciliation coder) identified discrepancies between the two original coders. The reconciliation coder manually investigated the un-reconciled article following the same procedures of categorizing the citing articles as followed by the original coders. If his categorization counts agreed with one of the two original coders, the agreeing counts were retained. If the three coders' counts disagreed, a fourth coder worked with the reconciliation coder until the discrepancy was verbally resolved. Following this procedure ensured 100% reliability among coders. These citation counts were then used as input to calculate the final measures.

APPENDIX E. DETAILED DEFINITIONS OF CITATION METRICS USED

ISI Impact Factor

The Thomson Reuters ISI Impact Factor™ of a journal is the average number of citations received per paper published in that journal during the two preceding years, accounting for the number of "citable items" published (Fersht 2009). For example, the 2010 impact factor for *MISQ* (released summer 2011) is the number of citations that *MISQ* received during 2009 and 2008, divided by the number of "citable items" (or actual articles) the journal published during those same two years. "Citable items" are articles, proceedings, or research notes; and do not include editorials, letters, or book reviews. More specifically, the 2010 Impact Factor of a journal would be calculated in the following manner:

> A = the number of times articles published in 2009 and 2008 were cited by indexed journals during 2010
> B = the total number of "citable items" published by that journal in 2009 and 2008
> 2010 impact factor = A/B

Importantly, the 2010 Impact Factor could not be released until summer 2011 because the Impact Factor could not be calculated until all the 2010 publications were processed by Thomson Reuters.

Proponents of this measure admit that it is not perfect, but it is one of the most reliable in existence, being widely used for several years (Garfield 2005). A significant advantage of this measure is the ability to compare journals from different fields and disciplines fairly and consistently. A strength and a limitation of the ISI Impact Factor is that a journal has to attain a certain threshold of citations and general publisher quality indicators to be allowed to have an ISI Impact Factor. This is useful because having an ISI Impact Factor is an indicator of quality; unfortunately, this makes it difficult to assess the citation impact of journals that do not have an ISI Impact Factor.

ISI five-year impact factor

The five-year impact factor is an ISI Thomson Reuters metric that uses five years of data instead of two in the standard calculation. Thus, the 2010 Five-Year Impact Factor uses years 2005–2009. Using this factor helps consider longer-term citation impact.

ISI impact factor without journal self-citation

The ISI impact factor without journal self-citation is an ISI Thomson Reuters metric that is based on their Impact Factor calculation but eliminates any self-citations from the journal in question. Specifically, any citations within any article in the journal that refer to an article published in the same journal are eliminated. Thus, we included this metric to adjust further for any potential differences in self-citation rates of top IS journals.

ISI five-year article influence

The Article Influence™ score is another bibliometric factor created by ISI Thomson Reuters adopted here. It determines the average influence of a journal's articles over the first five years after publication. This score is calculated by dividing a journal's Eigenfactor Score by the number of articles in the journal, normalized as a fraction of all articles in all indexed publications. This measure is roughly analogous to the Five-Year Journal Impact Factor in that it is a ratio of a journal's citation influence to the size of the journal's article contribution over a period of five years. The mean Article Influence Score is 1.00; thus, a score greater than 1.00 indicates that each article in the journal has above-average influence. A score less than 1.00 indicates that each article in the journal has below-average influence. Of course, this measure is relative to all publications indexed by Thomson Reuters; thus, the influence is compared to the influence of other leading journals—not all journals.

h-index

The h-index (Hirsch 2005) is a measure of a journal's quality based on its most highly cited articles since inception. To compute the h-index for a journal, all articles in the lifetime of the journal are ranked by the number of times other articles cite them. The most-cited article receives a rank of one and the ranking number increases as the number of citations decreases. A journal with an index of h has published h papers each of which has been cited in other papers at least h times. For example, if the fifth most cited article of a journal is cited at least five times (but the next most cited article is less than five), the journal has an h-index of five. If the 20th most cited article of a journal is cited at least 20 times, the h-index is 20. The advantage of the h-index over the impact factor is that higher priority is given to the quality of articles rather than solely the number of times a journal is cited (Miller 2006). A journal with highly cited articles will have a higher h-index than highly cited journals with few high-quality articles. This prevents bias toward journals that tend to self-cite. Moreover, the h-index uses Google Scholar™ data on journals; thus, this version of impact can be computed for more published journals than the ISI Impact Factors.

hc-index

The hc-index is an adjusted h-index which gives more weight to recently published articles than older articles as a solution to the time-in-print bias (Sidiropoulos et al. 2007); it is based on the latest Google Scholar™ data. The h-index has been criticized for several limitations, all of which cannot be addressed in our paper because of space limitations. For more complete treatment, see (Bar-Ilan 2008; Bornmann and Daniel 2009; Bornmann et al. 2008). We have chosen to address three core limitations that have been noted in previous IS literature (Truex et al. 2009), and are most applicable to our journal-level comparison (Truex et al. 2009; Zhang 2009). First, the h-index metric considers journals over their lifetime (rather than the most recent years). As a result, journals that have been in publication for several years have a significant citation advantage over those with a shorter history of publication (Truex et al. 2009). Further, a journal that published several highly cited articles in the past will continue to have a large h-index even if the quality of the journal changes. To overcome this time-in-print bias, Sidiropoulos et al. (2007) proposed a variation of the h-index that they term the contemporary h-index, or hc-index. This metric adjusts the h-index by increasing the weight for more recently published articles and decreasing the weight for older papers.

g-index

The g-index is an adjusted h-index that ascribes more weight to highly influential articles (Egghe 2006);it is based on the latest Google Scholar™ data. A second limitation of the h-index important for our consideration is its inability to recognize highly influential papers. Because the h-index is based on rank-ordered citations counts, it does not differentiate between a paper with 50 citations and one with 50,000 citations once the rank order is established (Truex et al. 2009). The g-index (Egghe 2006) was developed to overcome this limitation by more heavily weighting highly cited articles. This is accomplished by incorporating a squared rank to ascribe accurate weight to highly influential articles.

e-index

The e-index is a metric that is complementary to the h-index, accounting for differences in citations patterns among journals with the same or similar h-index score (Zhang 2009);it is based on the latest Google ScholarTM data. The h-index is also limited by its lack of granularity and its information loss (Zhang 2009). Because the h-index is computed as the intersection of publication rank and citation count (Hirsch 2005), the h-index often results in ties when comparing several authors. In addition, aside from the h2 citations that can be inferred from the h-index score, excess citations are ignored (Zhang 2009). Ties are not as common when comparing h-indices for journals, but the loss of information regarding excess citations can be an issue. For example, two journals might have the same or similar h-indices because they have similar numbers of citations for articles near the same place in their rank ordering (i.e., their intersection points of publication rank and citation count are similar). However, one journal might have many more citations in the rest of its set of articles than the other journal (i.e., the journal has a larger "tail"). This difference is lost in the h-index. Zhang (2009) proposed the e-index to address this limitation. It is calculated using citation information not included in the h-index, thus capturing differences in excess citations.

SNA—Freeman Degree

The Freeman Degree is a localized, within-network measure of the number of direct relationships for a given journal (Freeman 1979).

SNA—Bonacich Power

The Bonacich Power is a localized, within-network degree measure for a journal’s power, based on the power of other journals to which it is connected (Bonacich 1987).

SNA—Information centrality

Information centrality is a measure of all paths between pairs of journals, including the strength of ties between journals (Porta et al. 2006; Stephenson and Zelen 1989).

APPENDIX F. DETAILS OF ANALYSIS

Table F.1. Summary of Expert Assessment, Bibliographic, and SNA Data for 21 IS Journals Included in Final Composite Rankings (Listed Alphabetically)

Journal	Expert Opinion (z-score)	ISI impact	5-year impact	ISI impact w/o self cites	Article influence	h-index	hc-index	g-index	e-index	Freeman Degree	Bonacich's Power	Information Centrality
*DSS***	0.23	2.14	2.57	1.63	0.71	94	54	147	92.94	21.55	5.82	0.92
ECRA	-0.91	1.95	1.73	1.66	0.40	3	1	3	1.00	4.41	2.87	0.67
EJIS	0.93	1.77	2.21	1.40	0.55	69	40	113	75.71	13.03	5.45	0.79
*I&M***	0.08	2.63	3.90	2.43	0.83	114	65	179	113.36	18.10	5.87	0.87
*IJEC***	-0.64	0.85	2.17	0.55	0.60	62	39	117	87.03	6.58	5.44	0.70
*ISF***	-0.80	1.60	1.46	1.23	0.42	38	26	63	41.84	4.95	4.33	0.69
ISJ	0.22	2.18	3.02	1.96	0.72	65	38	104	68.65	5.96	4.43	0.68
ISM	-0.47	1.03	1.28	0.91	0.32	42	27	64	39.45	4.03	4.55	0.66
ISR	2.17	3.36	5.46	3.09	2.02	150	87	271	198.27	25.30	5.99	0.92
*IT&M***	-0.67	0.73	0.97	0.67	1.60	30	23	56	41.34	0.98	1.54	0.62
JAIS	0.92	2.22	2.96	2.15	1.18	53	35	84	53.52	19.80	6.18	0.88
JCIS	-0.64	0.82	0.89	0.52	0.18	35	22	47	24.35	5.24	3.27	0.72
JDM	-0.80	2.12	1.98	1.09	0.42	29	20	49	33.96	1.78	1.59	0.62
JGIM	-0.86	1.22	1.83	1.03	0.34	30	21	48	32.02	1.87	2.40	0.65
*JIT***	-0.35	2.91	3.45	2.78	0.82	62	35	98	62.74	8.43	5.20	0.75
JMIS	1.22	2.66	4.05	2.30	1.16	123	64	210	142.87	28.28	5.99	0.96
JOCEC	-0.93	0.79	1.00	0.72	0.23	31	18	57	41.02	0.71	0.92	0.63
JSIS	-0.29	2.90	3.80	2.00	0.69	58	34	101	70.28	8.19	5.21	0.74
MISQ	2.61	5.04	9.82	4.72	2.76	198	103	369	272.12	56.22	6.18	1.15
MISQE	-0.14	1.56	2.09	1.19	0.58	25	21	55	45.10	8.83	4.32	0.79
*WIRT***	-0.89	0.88	0.67	0.00	0.05	9	11	14	8.94	0.77	1.70	0.60

Notes:
1. Grey background indicates membership in the Senior Scholars' Basket (either SenS6+2 or SenS8)
2. Double-asterisks indicate high levels of short-term self-citations and/or low short-term IS influence, which indicates potential omission. See Table F.4

Table F.2. Wilcoxon Results (p-values) for Each Weightings Scheme Comparison			
Weighting scheme	**Alt-2**	**Alt-3**	**Alt-4**
Alt-1	0.903	0.455	0.958
Alt-2		0.986	0.903
Alt-3			0.794

Table F.3. Preliminary Weighted Rankings Using Rank-Sums Across All Weighting Strategies										
Rank	Alt1	z	Alt2	z	Alt3	z	Alt4	z	Composite	rank sum
1	*MISQ*	2.910	*MISQ*	2.803	*MISQ*	2.920	*MISQ*	3.007	*MISQ*	4
2	*ISR*	1.563	*ISR*	1.457	*ISR*	1.660	*ISR*	1.572	*ISR*	8
3	*JMIS*	1.044	*JMIS*	1.106	*JMIS*	1.076	*JMIS*	0.951	*JMIS*	12
4	*I&M***	0.757	*I&M***	0.770	*I&M***	0.799	*I&M***	0.701	*I&M***	16
5	*DSS***	0.499	*DSS***	0.619	*DSS***	0.508	*JAIS*	0.384	*DSS***	21
6	*JAIS*	0.380	*JAIS*	0.526	*JAIS*	0.229	*DSS***	0.372	*JAIS*	23
7	*JIT***	0.227	*JIT***	0.207	*JIT***	0.145	*JIT***	0.327	*JIT***	28
8	*JSIS*	0.149	*EJIS*	0.161	*JSIS*	0.089	*JSIS*	0.215	*JSIS*	33
9	*EJIS*	0.076	*JSIS*	0.144	*EJIS*	0.079	*ISJ*	0.008	*EJIS*	36
10	*ISJ*	-0.038	*ISJ*	-0.091	*ISJ*	-0.031	*EJIS*	-0.012	*ISJ*	39
11	*IJEC***	-0.175	*IJEC***	-0.111	*IJEC***	-0.108	*IJEC***	-0.306	*IJEC***	44
12	*MISQE*	-0.348	*MISQE*	-0.268	*MISQE*	-0.421	*MISQE*	-0.357	*MISQE*	48
13	*ISF***	-0.436	*ISF***	-0.400	*ISF***	-0.453	*ISF***	-0.455	*ISF***	52
14	*ISM*	-0.527	*ISM*	-0.471	*ISM*	-0.515	*ISM*	-0.595	*ISM*	56
15	*JCIS*	-0.757	*JCIS*	-0.701	*IT&M***	-0.726	*ECRA*	-0.654	*JCIS*	65
16	*JDM*	-0.767	*ECRA*	-0.767	*JCIS*	-0.737	*JDM*	-0.665	*JDM*	67
17	*IT&M***	-0.768	*JGIM*	-0.824	*JDM*	-0.747	*IT&M*	-0.677	*IT&M***	68
18	*JGIM*	-0.770	*JDM*	-0.890	*JGIM*	-0.748	*JGIM*	-0.739	*ECRA*	69
19	*ECRA*	-0.774	*IT&M***	-0.900	*ECRA*	-0.903	*JCIS*	-0.833	*JGIM*	71
20	*JOCEC*	-1.030	*JOCEC*	-1.138	*JOCEC*	-0.934	*JOCEC*	-1.017	*JOCEC*	80
21	*WIRT***	-1.214	*WIRT***	-1.232	*WIRT***	-1.182	*WIRT***	-1.227	*WIRT***	84

Notes:
1. Grey background indicates membership in the Senior Scholars' Basket (either SenS6+2 or SenS8)
2. Double-asterisks indicate high levels of short-term self-citations and/or low short-term IS influence, indicating potential omission. See Table F.4

Table F.4. Results of Applying Filtering Criteria to Top-21 IS Journals (alphabetical order)							
Journal	**# Cites**	**Self-cites**	**IS quality cites**	**Other cites**	**Short-term self-cite percentage**	**Short-term IS influence ratio**	**Exhibits potential niche behavior?**
*DSS***	653	103	58	492	15.8%	56.3%	Yes
ECRA	155	10	13	132	6.5%	130.0%	No
EJIS	88	7	20	61	8.0%	285.7%	No
*I&M***	91	9	3	79	9.9%	33.3%	Yes
*IJEC***	29	7	4	18	24.1%	57.1%	Yes
*ISF***	209	57	17	135	27.3%	29.8%	Yes
ISJ	93	6	22	65	6.5%	366.7%	No
ISM	10	0	3	7	0.0%	n/a	No
ISR	343	16	78	249	4.7%	487.5%	No
*IT&M***	103	71	2	30	68.9%	2.8%	Yes
JAIS	53	5	16	32	9.4%	320.0%	No
JCIS	19	1	2	16	5.3%	200.0%	No
JDM	17	0	2	15	0.0%	n/a	No
JGIM	6	0	1	5	0.0%	n/a	No
*JIT***	36	28	2	6	77.8%	7.1%	Yes
JMIS	94	3	24	67	3.2%	800.0%	No
JOCEC	16	1	3	12	6.3%	300.0%	No
JSIS	98	3	31	64	3.1%	1033.3%	No
MISQ	375	19	130	226	5.1%	684.2%	No
MISQE	11	0	6	5	0.0%	n/a	No
*WIRT***	49	9	11	29	18.4%	122.2%	Yes

**Double-asterisks indicate high levels of short-term self-citations and/or low short-term IS influence, which indicates possible niche behavior.

APPENDIX G. COMPARING METHODS FOR PURPOSES OF CONSTRUCT AND NOMOLOGICAL VALIDITY

What we have done with these expert assessment and bibliometric methods is consistent with the logic of Campbell and Fiske (1959) regarding construct validity. As in Campbell and Fiske (1959), the methods are “maximally different” (p. 83). In that our methods agree on the results—thereby being a form of nomological validity, as described in Straub et al. (2004)—we can also argue that the methods “converge.”

When methods converge, they validate each other, but with only two methods, there can be no sense that one method is superior or inferior to the other. As Campbell (1960) says, the methods are “symmetric and egalitarian” (p. 548). To determine that a set of methods are better representations of the constructs, we would need multiple methods converging and discriminating in contradistinction to one of the methods. Even then, we cannot be certain in a post-positivist world that the convergence of the methods was not due to chance or varying forms of measurement error of other kinds.

APPENDIX H. ASSUMPTIONS AND DETAILS OF OUR CLUSTER ANALYSES

Cluster analysis does not have “hard” sample size rules because it a data mining technique that does not need to satisfy parametric or even non-parametric statistical test assumptions. Hair et al. (Hair Jr. et al. 2009) note that if cluster analysis is based on a sample of a population then the sample size needs to be “sufficiently large” to represent the population (p. 504). However, in our case, we are not dealing with statistical assumptions of a normal distribution nor are we inferring from a sample of journals to a larger population of journals. The only journals of interest (i.e., our defined population) are the 21 candidate journals. That being said, a conservative critique of cluster analysis assumptions emphasizes that researchers should be most concerned as to whether there are too many dimensions for the number of cases that need to be grouped (Dolnicar 2002). This conservative approach, not yet universally adopted, suggests that the minimal sample size to include no less than 2^k cases (k = number of variables), preferably $5*2^k$. In our analysis, k=1, and thus we need a minimum sample size of n=10 to meet this criterion.

Note that Sarle and Kuo (1993) document an approximate nonparametric test for the number of clusters that has been implemented in the MODECLUS procedure of SAS. The SAS documentation notes the following (SAS 1999): “This test sacrifices statistical efficiency for computational efficiency. The method for conducting significance tests is described in the chapter on the MODECLUS procedure. This method has the following useful features:

- No distributional assumptions are required.
- The choice of smoothing parameter is not critical since you can try any number of different values.
- The data can be coordinates or distances.
- Time and space requirements for the significance tests are no worse than those for obtaining the clusters.
- The power is high enough to be useful for practical purposes.

The method for computing the *p*-values is based on a series of plausible approximations. There are as yet no rigorous proofs that the method is infallible. Neither are there any asymptotic results. However, simulations for sample sizes ranging from 20 to 2000 indicate that the *p*-values are usually conservative. The only case discovered so far in which the *p*-values are liberal is a uniform distribution in one dimension for which the simulated error rates exceed the nominal significance level only slightly for a limited range of sample sizes.”