MIS Quarterly

ISSUES AND OPINIONS

PROFILING THE RESEARCH PRODUCTIVITY OF TENURED INFORMATION SYSTEMS FACULTY AT U.S. INSTITUTIONS[1]

Douglas L. Dean, Paul Benjamin Lowry
Information Systems Department, Marriott School of Management, Brigham Young University,
Provo, UT 84602 U.S.A. {doug_dean@byu.edu} {Paul.Lowry.PhD@gmail.com}

Sean Humpherys
Management Information Systems Department, Eller College of Business, University of Arizona,
Tucson, AZ 85721 U.S.A. {shumpherys@cmi.arizona.edu}

How many articles in highly rated journals do Information Systems research faculty publish to earn tenure? Which journals are highly rated outlets? Tenure candidates, promotion and tenure committees, and those who are asked to write external letters are frequently called upon to answer such questions. When Dennis et al. (2006) examined all IS Ph.D. graduates entering academic careers, few faculty had published enough articles in 20 "elite" journals in six years to meet tenure research expectations at research-intensive schools. Our study builds on the dialog started by Dennis et al. In our study, we counted the number of journal articles at the point of tenure for faculty who earned tenure within five to seven years after their Ph.D. graduation date. We also examined the effect of acknowledging different sets of journals as highly rated on the publication rates of faculty who earned tenure. Specifically, we examined the effects of expanding on Dennis et al. by including ***MIS Quarterly, Information Systems Research, Journal of Management Information Systems, Journal of the AIS, Information Systems Journal, European Journal of Information Systems, Journal of Information Technology,*** *and* ***Journal of Strategic Information Systems*** *in the journal basket. We also looked at the effect of acknowledging highly rated non-IS business journals and highly rated computer science and engineering journals. Finally, we present journal publication benchmarks based on these findings for different types of research institutions.*

Keywords: Tenure standards, publication standards, publication benchmarks, faculty productivity, sciento-metrics, Carnegie classification

Introduction

Achieving tenure is important for faculty members because it represents increased job security, academic status, and influence. Although quality of teaching and service matter at research institutions, the number of highly rated journal publications produced by tenure candidates plays an especially important role in tenure decisions.[2] The tenure decision is also important to tenure-granting institutions as it represents a multimillion-dollar commitment to a faculty member (Dennis et al. 2006). Prior publication productivity serves as

[1]Detmar Straub was the accepting senior editor for this paper.

The appendices for this paper are located in the "Online Supplements" section of the *MIS Quarterly*'s website (http://www.misq.org).

[2]This is true to a lesser extent at research-teaching institutions and even enhances a faculty member's portfolio at purely teaching institutions.

an indicator of past research productivity and the potential for future academic work.

Notwithstanding the importance of tenure decisions, evaluating a tenure candidate's research portfolio in terms of quantity and quality of publications is not an easy task. Institutions vary somewhat in terms of which research outlets they acknowledge as highly rated journals. No universally accepted method exists for determining the quality of any given journal. Different categories of institutions also place different foci on teaching versus research. The importance of tenure decisions, however, drives the need for credible research performance benchmarks that are based on historical data. Moreover, since different types of institutions vary in terms of research expectations, benchmarks should likewise reflect these institutional differences.

Two studies from 2006 examined publication outlet availability and faculty publication productivity in elite journals. Valicich et al. (2006) found that the information systems discipline and the accounting discipline each have significantly less discipline-specific elite journal space per capita of faculty members than each of the following disciplines: finance, management, and marketing. In a related study, Dennis et al. (2006) examined the proportion of IS faculty who completed their Ph.D.s between 1992 and 1998 and published in elite journals. For each person who graduated during these years, the number of elite publications was counted within six years after completing the Ph.D. Elite publications were defined as coming from a basket of 20 specific business journals, two of which were *MIS Quarterly* (*MISQ*) and *Information Systems Research* (*ISR*). These 20 journals were referred to as "beyond reproach" in quality reputation by Trieschmann et al. (2000) and were used by Swanson (2004). Table 1 shows the proportion of faculty members from U.S. and Canadian institutions who published in *MISQ* and *ISR* and the 20 elite business journals, from Dennis et al. (2006).

Basing their analysis on the combination of limited elite journal space in IS and the low percentage of untenured faculty members who had published in these journals, Dennis et al. (2006) and Valacich et al. (2006) recommended that *more realistic* standards should be established for the review process in elite IS journals, that the IS field should increase the number of elite journal articles published each year, and that IS faculty should educate college and school promotion and tenure committees about the limited elite publication space available to IS faculty relative to other disciplines. From the time these articles were published, journal editors and other top scholars in the IS discipline have made a concerted effort to respond to these valuable recommendations. As shown in Table 2, when comparing the year 2009 with 2005, the editors of *MISQ* and *ISR* have increased the number of both research articles per year and pages per year.

Another positive change is that other high-quality IS journals are increasingly being recognized as top journals. Senior scholars from the Association for Information Systems (AIS) adopted a global resolution stating that to recognize only *MISQ* and *ISR* as "A [quality] journals" is highly detrimental to the IS field because accepting these two journals alone limits the publishing opportunities for the IS discipline compared to other disciplines that recognize more journals as "A quality" (as convincingly shown by Dennis et al. and Valacich et al.). This creates a crowding effect such that it will be impossible for our discipline to grow and tenure junior faculty compared to other business fields (AIS 2008). Accordingly, these scholars suggest that the field should promote a "basket" of six IS journals deemed to be "excellent," rather than continue the detrimental status quo of talking about "A" and "B" journals and limiting the A's to two elite journals. In alphabetical order, this basket includes *European Journal of IS* (*EJIS*), *Information Systems Journal* (*ISJ*), *ISR*, *Journal of the Association for Information Systems* (*JAIS*), *Journal of Management Information Systems* (*JMIS*), and *MISQ*. We refer to this group of journals as the "AIS-6." The senior scholars did not rank-order these journals in terms of quality but stated that all of these journals should be considered as making up a basket of highly rated IS journals. This list of journals has subsequently been recognized as highly rated by the AIS (AIS 2008).

An important question implied by the limited IS faculty publication performance in the 20 elite journals considered by Dennis et al. is in which journals are IS faculty members publishing in order to get tenure at different levels of institutions? Because many junior IS faculty members are indeed gaining tenure at various levels of institutions (as empirically demonstrated in the current study), the faculty members must be publishing outside this basket of 20 "elite" journals and the faculty's universities must be counting these as "good" publications—although not necessarily as "elite" publications. Specifically, three other categories of journals exist in which highly rated journals are found: other IS journals beyond the "elite" two, other business and social sciences journals, and other technical journals such as those in computer science and computer engineering. Journals in all of these categories are examined in this study in relation to successful tenure cases.

Careful analysis of this publishing productivity question requires that performance be considered relative to the different categories of research institutions. Namely, research-

Table 1. Percentage of IS Ph.D. Graduates in Academic Careers Who Published in Elite Journals (Dennis et al. 2006, Table 2, p. 4)

	1 or More Articles	2 or More Articles	3 or More Articles	4 or More Articles
MISQ and *ISR*	9.2%	2.5%	0.8%	0.5%
20 Elite Business Journals	11.2%	4.3%	2.1%	1.4%

Table 2. Increases in Output of *MISQ* and *ISR* from 2005 to 2009

	Research Articles	Pages
2005		
MISQ	28	751
ISR	21	405
Combined	49	1156
2009		
MISQ	43	840
ISR	29	589
Combined	72	1429
Percent Increase	46.9%	23.6%

centric universities typically require higher publication productivity than universities that make research less of a focus. Thus, our first research question is: What journal publication productivity is required for tenure at different levels of research institutions (**RQ1**)? In considering those who earned tenure across various levels of institutions, we then ask: What would be the impact on tenure cases of including a larger number of high-quality journals (**RQ2**)? Finally, we ask: What would tenure publishing benchmarks be like for different types of research institutions if a broader set of highly rated journals were included (**RQ3**)?

This paper addresses these questions by looking at the productivity of exclusively IS faculty who successfully sought and obtained tenure. It is almost tautological that because these faculty did earn tenure, their publication records are likely to have been sufficient to earn tenure;[3] thus, the actual records can paint a highly accurate portrait of what the de facto standards are for tenure publications across the sample that we studied. Counting successful research faculty avoids counting many individuals who may not have been as committed or were not successful researchers. This study answers the question about different tenure standards for institutions with different research requirements by collecting and segmenting tenure cases by type of institution. Accordingly, tenure standards of elite research institutions, research-intensive institutions, and less-research-intensive institutions can be defined as appropriate for each type of institution. Finally, this study answers the question about whether publications in other highly rated research journals and publications in other highly rated non-IS research journals were meaningful contributions to tenure cases of faculty who obtained tenure.

Importantly, this study builds on and complements the earlier study by Dennis et al., yet there are several important differences. Table 3 summarizes how the goals and approach in this study differ from those of Dennis et al.

Data Collection Approach

Scope of Study

Our study is intentionally limited to U.S. tenure standards as opposed to worldwide standards. The primary reason for this scope is that worldwide standards for tenure vary greatly. First, tenure does not exist at all institutions throughout the world. Second, even where tenure exists in non-U.S. institutions, its meaning and associated requirements and expec-

[3]While this seems to be a reasonable argument, there is the distinct possibility that at certain types of institution, faculty with outstanding teaching skills may have had their research records accepted as sufficient even if not deemed to be exceptional. For this reason, we limited our analysis to research institutions.

Table 3. High-Level Methodological Differences in the Two Studies

	Dennis et al. (2006) and Valacich et al. (2006)	The Present Study
Goal	Evaluated per capita *opportunity* of IS faculty to publish in discipline-specific elite journals relative to faculty in other business disciplines.	Examined publication productivity of faculty *who actually earned tenure.*
Granularity of type of institutions	Did not compare productivity across different levels of institutions.	Used Carnegie classifications and IS program rankings to develop productivity benchmarks specific to different types of institutions.
Sample	IS faculty who obtained tenure or did not obtain tenure (tenure status was not analyzed).	U.S. research faculty who obtained tenure between 1990 and 2008; excluded faculty who did not obtain tenure.
Source of publication productivity data	Studied IS Ph.D. graduates accepting academic positions who published in 20 elite journals.	Obtained pre-tenure publications from the vita of tenured faculty.
Journals investigated	Used a list of 20 elite business journals, including *ISR* and *MISQ*.	Investigated the same basket of 20 elite journals but added additional strata of other highly rated IS journals and non-IS journals, including the AIS-6.
Tenure window	Six years.	Five to seven years, depending on how long it took the individual to earn tenure.

tations can be entirely differently than they are in the United States. Although it is true that expectations for tenure can vary even within the United States, the differences are greater across international boundaries. Third, global journal-ranking studies show that disparities exist across world regions about which IS journals are considered premier journals (e.g., Lowry et al. 2004). For example, *EJIS* and *ISJ* are generally considered to be premier journals in Europe but are less sought by U.S. researchers (e.g., Lowry et al. 2004), although the journals' quality and citation impact are essentially equivalent to those of *MISQ* and *ISR* (Katerattanakul and Han 2003). For these reasons, we surmise that a realistic picture of actual tenure could be achieved only by limiting the sample to institutions that define tenure in the same manner. Thus, we chose to limit our study to U.S. institutions.

Sampling Procedure

To collect data for this study, we identified 210 usable tenure cases of IS research faculty who worked at U.S. universities and who received tenure between 1990 and 2008. To identify these faculty, we extracted the complete list of IS programs located in business schools at U.S. universities from the Association for Information Systems (AIS) Web site (www.aisnet.org). We then visited the Web site of each IS group or department. Next we downloaded curricula vitae from the faculty Web sites, where available. For an individual to be included in the study, the curriculum vitae had to include the individual's Ph.D. completion date, tenure date, and complete list of publications. If an individual faculty member omitted his/her graduation date, the Ph.D. completion date was obtained from the Proquest Dissertation Database. If the tenure data were not known, we contacted the faculty member and verified this information. Non-research faculty (e.g., teaching faculty, adjuncts, administrators, part-time faculty, non-Ph.D.s) and Ph.D. faculty with minimal research expectations (e.g., clinical faculty) were specifically excluded from our sample.

We looked only at tenure cases in business schools. The following types of departments were categorically excluded from our sample because of the strong likelihood of vastly different expectations: information schools, information science, computer science, information technology, and computer engineering. Our study focused on research faculty; hence, only individuals who earned tenure at schools with research requirements were included in this study.

We determined the amount of time it took each candidate to earn tenure by calculating the difference between the tenure date and the Ph.D. completion date. We included only tenured faculty members who received tenure within five to seven years of receiving their Ph.D.—whether the faculty members stayed at one school or switched schools. In addition, we included only the first successful tenure process for each academic. Thus, our sample includes individuals who remained at the same institution that hired them as new Ph.D. graduates until they received tenure, which comprised 80 percent of our sample. The remaining cases were faculty who had worked at more than one university before receiving tenure within a normal time frame of seven years or fewer (cases of eight years or longer were excluded). For example, in some cases, a person worked at one university for a few years without receiving tenure and then moved to another university where she/he was eventually awarded tenure. In such cases, the years spent and the publications earned at both universities were included, under the assumption that the publication production at both universities had been included in the tenure decision.[4] In our data, the median period of time taken to earn tenure was six years, and the average time taken was 6.13 years. This coding process resulted in 210 usable tenure cases.

Publication Count Approach

Several approaches can be utilized to provide credit for coauthored papers (Chua et al. 2003; Lowry et al. 2007b). The most common is normal-count, which gives full credit to each author regardless of the number of coauthors. Several other weighted approaches have been used (e.g., Chua et al. 2003) that give partial credit depending on number of authors, author order, number of pages, and so forth. Following several authors (Dennis et al. 2006; Hasselback and Reinstein 1995; Im et al. 1998; Vogel and Wetherbe 1984), we used the normal-count approach to coauthorship credit.

After counting the journal articles on each faculty member's curriculum vitae, we drew a random sample of 40 to check for completeness and accuracy. This sampling allowed us to compare the journal articles listed on the curricula vitae against the tables of contents of the journals themselves and with search results for the author names in the ISI Web of Science, EBSCO, and ABI/INFORM (ProQuest). The analysis further found that the peer-reviewed journal articles shown on the curricula vitae were reported correctly and that there were no cases of false attribution. There were a few instances of minor publications (not from top journals) that had not been included on the curricula vitae but were found in the article databases; however, omission of these in our study did not significantly affect the results since our study focused primarily on top journals.

[4]Among individuals who received tenure five to seven years after completing their Ph.D., we found no significant difference in the number of publications earned by faculty members who began and completed the tenure process at the same school versus faculty who worked at more than one institution on the way to obtaining tenure.

Analysis and Results

Answering RQ1: Tenure Productivity Differences by Institution Level

To examine productivity by institution level, we grouped tenure cases using the Carnegie Classification of Institutions of Higher Learning™ (Carnegie Foundation 2005) and by ranked versus unranked IS institutions. The Carnegie Foundation classifies institutions by their degree of emphasis on different levels of degrees the institution awards (i.e., Ph.D., masters, undergraduate) and the intensity level of their research mission. Institutions that belong to four Carnegie classifications are included in this study: research universities with very high research activity (RU/VH), research universities with high research activity (RU/H), doctoral and research universities (DRU), and master's degree granting colleges and universities that produce a large number of master's degrees (Master's/L).

Other classifications of institutions are excluded from the current study because such institutions have few or no research expectations. We also combined tenure cases from DRU and Master's/L institutions into one group (DRU-MAS) because they were not significantly different in terms of the publication productivity measures examined in this study. While providing useful categories of institutions, the Carnegie classification alone was insufficient because 28 percent (59 of the 210 tenure cases) within our sample were from institutions that were ranked as the top business schools in the IS specialty by the *U.S. News and World Report* (USNWR) in 2007 and 2008. Ranked schools in the USNWR rankings include schools from all three Carnegie classifications, although most are RU/VH institutions. The tenure cases from ranked RU/H and DRU-MAS schools had productivity values well above the other schools in their Carnegie class. We thus divided the schools into unranked and ranked schools, according to this difference in productivity values. Unranked schools were divided into RU/VH, RU/H, and DRU-MAS schools. Ranked schools were divided into top-5 IS programs and top-6 through top-28 (top-6-to-28) schools. Table 4 shows the categories of schools included in this study.

The ranked schools and their rankings are shown in Appendix A. Of the 210 usable tenure cases, 14 (6.7 percent) tenure cases were from top-5 IS institutions, 45 (21.4 percent) were from top-6-to-28 IS institutions, 52 (24.8 percent) were from unranked RU/VH institutions, 60 (28.6 percent) were from unranked RU/H institutions, and 39 (18.5 percent) were DRU-MAS institutions.

Table 5 shows the pre-tenure productivity of faculty for the five different categories of institutions for *ISR* and *MISQ* and the 20 elite journals.

This analysis shows sizeable productivity differences among schools of different institutional types.

Faculty from top-5 IS institutions, in particular, stand out as the most productive publishers in *ISR*, *MISQ*, and the 20 elite business journals. In addition, top-6-to-28 IS schools out-performed unranked schools in general except in the instance of one or more articles in *ISR* and *MISQ*. As expected, publication counts diminish as you go from the most research intensive to the least intensive Carnegie classifications.

Table 5 also allows a comparison of the actual publication productivity of research-oriented schools with the research expectations stated by faculty at research-extensive schools who responded to an informal e-mail survey by Dennis et al. (2006). This comparison reveals that actual tenure cases with specific numbers of elite articles occurred far less frequently than the expectations stated by the faculty at doctoral-granting research-extensive schools.[5] Otherwise, a large percentage of these candidates should not have earned tenure—*yet they did*. This leads us to conclude that tenure expectations do not necessarily equate to tenure reality. For example, when senior faculty advise junior faculty about what is expected to earn tenure, the senior faculty often stress high expectations so that junior faculty do not embrace a minimalist perspective that could endanger their chances for tenure. Since the senior scholars in the sample were from research-extensive institutions, it is not surprising that the scholars' stated expectations were high; yet it appears that at least some of the faculty members' affiliated schools make sensible exceptions in practice. As acknowledged by Dennis et al., survey respondents may have had a difficult time limiting what they considered quality journals to the 20 specified as elite in their survey. Given the large gap between expected and actual performance, other highly rated journals comprised a meaningful component of the publications considered to be top publications in successful tenure cases.

We will show in the next section that, when we include other top publications, actual productivity becomes better aligned with the expectations of those research-extensive schools surveyed by Dennis et al. This leads to the obvious question: What other journals likely counted as the top tier (T1) in successful tenure cases?

Answering RQ2: Impact of Including a Larger Scope of Highly Rated Journals

Scenarios 1 and 2: MISQ and ISR and Other Elite Journals

Table B4 (in Appendix B) shows the journals considered T1 for each analysis scenario. Scenario 1 includes *MISQ* and *ISR*. Scenario 2 includes *MISQ*, *ISR*, and the 18 additional business journals used in the Dennis et al. study, which were taken from Trieschmann et al.'s (2000) journals list.

Three of the journals included in Scenario 2, *Operations Research*, *Real Estate Economics*, and *Journal of Risk and Insurance*, were excluded as T1s from the subsequent scenarios because the journals' average four-year ISI impact factors, 1.181, 0.574, and 0.449, respectively, were below the 1.505 threshold that we used to select T1 journals.[6] See Appendix B for details of how this threshold was determined. Our sample included no authorship for *Real Estate Economics* and *Journal of Risk and Insurance*, so their exclusion had no impact on any scenarios in the current study. These two journals are also not included in the London *Financial Times* list of top business journals. There were seven authorships in our sample for *Operations Research* that we counted as T1 in Scenario 2 (Table 6) to allow direct comparison with the Dennis et al. findings, but we did not include those authorships as T1 in any of the other scenarios.

To determine the effect of including additional highly rated journals, we analyzed four additional scenarios (labeled Scenarios 3 through 6) wherein we incrementally added groups of high-quality journals. Table 6 describes each of the scenar-

[5]The Carnegie Institute changed its classification scheme in 2005. Prior to 2005, the most research-centric category for doctoral-granting institutions was termed "research extensive." Now the category for most research-centric doctoral-granting institutions is termed "research universities with very high research activity" (RU/VH). Because of the change in the basis of classification, there is not a one-to-one correspondence between the old and new categories (Carnegie Foundation 2005). When referring to Dennis et al.'s findings from their faculty survey, we use the term *research extensive* because that is the category reported in that study.

[6]We recognize that, as stated in Trieschman et al., these three journals are top outlets for specific business specialties and can therefore be considered elite. The journals' lower impact factors are likely a partial result of fewer faculty publishing in these areas (see faculty counts per discipline in Trieschmann et al. Table 1, p. 1133). We decided to exclude these to be consistent with our journal categorization method described in Appendix B, which uses impact factors to differentiate among T1, T2, and T3 journals.

Table 4. Categories of Institutions Included in this Study

Category	Description
RU/VH	Doctoral-degree-granting research universities with very high research activity
RU/H	Doctoral-degree-granting research universities with high research activity
DRU-MAS	Doctoral-degree-granting research universities (DRU) and master's-degree-granting colleges and universities that produce a large volume of masters degrees (MAS)
Top-5	Ranked among the top-five business schools in the IS specialty by *U.S. News and World Report* in 2007 and 2008
Top-6-to-28	Ranked as the 6th through 28th top business schools in the IS specialty by *U.S. News and World Report* in 2007 and 2008

Table 5. Examining Pre-Tenure Productivity in Elite Journals by Different Institution Type (N = 210)

Institution Type	1 or More Articles	2 or More Articles	3 or More Articles	4 or More Articles	5 or More Articles
ISR* and *MISQ					
Top-5	57.1%	50.0%	28.6%	14.3%	0.0%
Top-6-to-28	35.6%	26.7%	13.3%	4.4%	0.0%
RU/VH	36.5%	13.5%	3.8%	3.8%	0.0%
RU/H	38.3%	13.3%	5.0%	1.7%	0.0%
DRU-MAS	7.7%	2.6%	0.0%	0.0%	0.0%
20 Elite Business Journals (Including *ISR* and *MISQ*)					
Top-5	78.6%	57.1%	42.6%	28.6%	14.3%
Top-6-to-28	60.0%	37.8%	26.7%	22.2%	2.2%
RU/VH	53.9%	21.2%	13.5%	11.5%	5.8%
RU/H	50.0%	18.3%	6.7%	5.0%	0.0%
DRU-MAS	15.4%	2.6%	0.0%	0.0%	0.0%
Results from Dennis et al. (2006) E-Mail Survey of Senior IS Scholars at "Top Most Research Productive Business Schools"					
Top Schools	N.R.*	N.R.*	86.1%	52.8%	30.6%

*Although these values were not reported in the earlier study, since the values in the table are cumulative from right to left, these numbers would be larger than 86.1%.

ios. In each successive scenario, the number of journals considered T1s is increased (combining elite and highly rated journals). This cumulative approach produces the ability to see how counts of journals change incrementally as specific sets of journals are acknowledged as T1 in tenure cases. The journal selection methodology detailed in Appendix B was used to select additional journals as T1. This methodology was applied to select other business, computer science and engineering (CE), and other journals at T1.

Scenario 3: Adding Other Top Business Journals

The London *Financial Times* Journal List (LFTL) is used by the London *Financial Times* to rank business schools. This list includes 38 journals that are considered top journals by business school deans. We used the method described in Appendix B to select 12 business journals from the LFTL that met our criteria for T1 that were excluded from the journals in Scenario 2.

Scenarios 4 and 5: Adding Other Top IS Journals

Our next two scenarios add IS journals, in addition to *MISQ* and *ISR*, that AIS senior scholars consider to be high-quality journals. The AIS Senior Scholars Forum recently discussed the question of whether there are truly only two A journals (*MISQ* and *ISR*) in IS (AIS 2008). This group of academics represents some of the most scholarly and accomplished IS

Table 6. Groups of T1 Journals Included in Each Scenario

Scenario	Journal Group Added	Description of Journals Added to Each Scenario
1	*MISQ* and *ISR*	Just *MISQ* and *ISR*.
2	Business-18	To Scenario 1, add 18 non-IS business journals used by Dennis et al. (2006).
3	Business-12	To Scenario 2, add 12 additional non-IS top journals from the London *Financial Times* 2006 list of top business journals.
4	*JMIS–JAIS*	To Scenario 3, add *JMIS* and *JAIS*. These two journals are in the AIS-6 (AIS 2008) journal list.
5	AIS 5-8	To Scenario 4, add the remaining four journals (*EJIS, ISJ, JIT,* and *JSIS*) in the proposed AIS top-8 journal list (AIS 2008).
6	CE and Other	To Scenario 5, add other highly rated T1 journals not in the previous five scenarios, including CE journals and non-business journals not specifically named in the table. Appendix B provides details on the rules used to determine which additional journals should be considered T1.

faculty in the world. The group is limited to senior IS academics who have served as editors-in-chief of *MISQ* and *ISR*, plus former ICIS program chairs and presidents of AIS. Arguably, this group would be the most likely of any academic IS group to consider only *MISQ* and *ISR* as the top IS journals. However, in the group's collective view, there were eight IS journals that have virtually equivalent quality and should be considered "highly rated" journals. The group's recommendations have been endorsed by the AIS. This group has called upon all business schools to universally adopt six of these journals without differentiating them by tier: *EJIS*, *ISJ*, *ISR*, *JAIS*, *JMIS*, and *MISQ*. The scholars considered the quality of *Journal of Strategic Information Systems* (*JSIS*) and *Journal of Information Technology* (*JIT*) to be virtually equivalent but out of expediency recommended the first six for universal adoption. When these two journals are added to the AIS-6, we refer to them as the AIS-8.

Given this background, we then analyzed two additional scenarios: the inclusion of *JMIS* and *JAIS* (Scenario 4) and the effect of including the remaining four journals in the AIS-8 (Scenario 5).

Scenario 4 adds *JMIS* and *JAIS* as T1s. According to Dennis et al., increasing the number of articles published in *MISQ* and *ISR* was not enough to bring the publication rate of IS faculty in line with that of other business disciplines. Instead, "the IS discipline needs additional elite journals that are widely recognized by most IS faculty members as being elite" (Dennis et al. 2006, p. 7). Past IS journal-ranking articles have ranked *JMIS* as a top journal (Hardgrave and Walstrom 1997; Lowry et al. 2004; Mylonopolous and Theoharakis 2001; Peffers and Ya 2003; Walstrom and Hardgrave 2001; Whitman et al. 1999) but not specifically as an elite journal. Meanwhile, *JMIS* and *JAIS* have dramatically improved in stature since 2004, when the last major IS journal ranking was published (Lowry et al. 2004). For example, the AIS senior scholars included *JMIS* and *JAIS* in their AIS-6 and AIS-8 basket of journals, and this decision has been formally embraced by the AIS. The ISI impact factor for *JMIS* has generally risen since 2004 (2004: 1.271; 2005: 1.406; 2006: 1.818; 2007: 1.867; 2008: 2.358; 2009: 2.098). *JAIS* has emerged over the last several years as an excellent journal with a very high-quality editorial board and standards, which can be argued to be virtually indistinguishable from those of *MISQ* and *ISR*. *JAIS*'s impact factor was first calculated in 2008. In 2008, it was 1.836. In 2009, it increased to 2.246. This further supports the inclusion of *JAIS* as a highly rated journal.

Scenario 5 adds the remaining four journals in the AIS-8. The difference between the count of authorships in the AIS-6 and AIS-8 was too small to warrant a separate analysis; thus, we report only the results of the scenario with AIS-8 journals. This scenario allows us to measure how much impact these journals may have had on the successful tenure cases, although we acknowledge that our study was of U.S. tenure cases and that these four journals are more popular in Europe than in the United States.

Scenario 6: Adding Computer Science and Engineering and Other Journals

Scenario 6 includes top computer science and engineering journals, which we designate as *CE*, as well as behavioral science journals that would qualify as T1 journals based on the methodology described in Appendix B. We believe it is useful to measure the impact of the inclusion of these journals since in reality IS faculty publish in such journals in high numbers.

Table 7 shows the number of T1 authorships in our sample from each journal group described in Table 6 and enumerated in Table B4.

The 12 journals named in Table 7 make up 80.9 percent of the T1 authorships. The remaining 19.1 percent of T1 journals are not named specifically in Table 7 but are listed in Appendix B. Of the 469 T1 authorships, *MISQ* and *ISR* account for 26.9 percent, non-IS business journals account for 22.6 percent, and CE and Other journals represent the balance of 23 percent. *JMIS* authorships represented 17.3 percent of authorships. *Management Science* represents 10.5 percent of all authorships. Three journals, *Journal of the American Society for Information Science and Technology* (*JASIST*), *IEEE Transactions on Software Engineering*, and *IEEE Transaction on Knowledge and Data Engineering* combined make up the majority of the CE and other journals.

Summary of All Tenure Productivity Scenarios for All Institutions

Given the preceding analysis, Table 8 depicts the impact on the percentage of faculty who had specific numbers of articles when each scenario is considered. The percentages increase as additional high-quality journals are included as T1s.

Given the more inclusive view of T1 journals included in Scenario 6, the tenured faculty in our sample achieved productivity close to, but still below, the research expectations stated by the senior scholars reported by Dennis et al. The only exception is at the top-5 schools, where actual productivity exceeded expected productivity for "four or more" and "five or more" articles.

Because the addition of these journals significantly reduces the expectation/productivity gap for actual tenure cases, we conclude that a broader set of journals counted toward tenure than the elite journals represented in the survey of the senior scholars surveyed by Dennis et al. In practice, the only schools that came close to achieving the high expectations of the 36 senior scholars were the top-5 IS institutions and then only when using the most inclusive list of journals (Scenario 6)—not the more conservative list of 20 elite journals. No other research institutions came close to these high expectations. Hence, we believe these high expectations are likely inappropriate for most institutions except for the top-5 IS institutions or institutions that strive to be top-5 IS institutions.

Because our data collection period spanned the years 1990–2008, for each category of institution, we tested whether the number of T1 publications as described in Scenario 6 was different between older tenure cases (earned before December 31, 2001) and newer tenure cases. No significant differences were found.

Answering RQ3: Suggested Tenure Productivity Benchmarks

Because our results strongly suggest that IS institutions actually embrace a broader array of journals than the list of 20 elite journals when making tenure decisions, we present tenure benchmarks that better reflect what happens in practice. These benchmarks recognize a broad array of elite and highly rated journals and account for different classifications of institutions.

Accordingly, we created an overall publication benchmark that accounts for T1 journals described in Scenario 6. In addition, since the tenure cases in this study also included lower-tier journals, our benchmark also includes counts of lower-tier journals that existed in our studied tenure cases. We used the methodology documented in Appendix B to categorize journals as T1 (including elite and highly rated journals; often referred to as "A+" and "A" journals), Tier 2 (T2) (often referred to as "A–" or "good" journals), and Tier 3 (T3) journals, which consist of all other journals (often referred to as "other" or "B" journals). Table 9 describes the T1 and T2 IS journals that were used in each of our analysis scenarios to establish de facto tenure benchmarks. Refer to Appendix B for non-IS journals included as T1 and T2 for each scenario.

As the first step in establishing de facto tenure standards for each level of institution type, we calculated the means and standard deviations of actual publication counts for each major institution classification and for each level of journal quality (T1, T2, T3). Again, since our most liberal T1 classification scenario (Scenario 6) appeared to most closely mirror actual tenure practice, we used Scenario 6 for our de facto standards. Table 10 shows the means and standard deviations of the T1, T2, and T3 publications of the successful tenure cases in our sample.

Discussion

This study brings IS journal publication productivity standards for tenure into clearer focus. By using actual successful tenure-case data from faculty at several levels of institutions, our study shows a large gap between the productivity expectations stated by the research-extensive schools in the Dennis et al. (2006) study and what happens in practice. Specifi-

Table 7. Sources of T1 Journals

In Aggregate	Articles	Percent	Detail	Articles	Percent
Total IS	**255**	**54.4**	**Total IS**	**255**	**54.4**
MISQ and *ISR*	126	26.9	*MISQ*	65	13.9
JMIS and *JAIS*	93	19.8	*ISR*	61	13.0
AIS 5-8	36	7.7	*JMIS*	81	17.3
Total Business	**106**	**22.6**	*JAIS*	12	2.6
Business 18	88	18.8	*ISJ* and *EJIS*	21	4.5
Business 12	18	3.8	*JSIS* and *JIT*	15	3.2
CE and Other	**108**	**23.0**	**Total Business**	**106**	**22.6**
Total	**469**	**100.0**	*Management Science*	49	10.5
			Remaining Business 18	39	8.3
			Business 12	18	3.8
			CE and Other	**108**	**23.0**
			JASIST	40	8.5
			IEEE T SW Eng	14	3.0
			IEEE T Know & Data Eng	21	4.5
			Remaining CE and Other	33	7.0
			Total	**469**	**100.0**

Table 8. Tenure Productivity Profiles Scenarios 3 Through 6 (N = 210)

Institution Type	Faculty with 1 or More Articles	2 or More Articles	3 or More Articles	4 or More Articles	5 or More Articles
Scenario 3: Add 12 LFT Business Journals					
Top-5	78.6%	64.3%	42.9%	28.6%	21.4%
Top-6-to-28	60.0%	35.6%	28.9%	20.0%	6.7%
RU/VH	57.7%	25.0%	15.4%	11.5%	7.7%
RU/H	50.0%	20.0%	8.3%	3.3%	0.0%
DRU-MAS	17.9%	2.6%	0.0%	0.0%	0.0%
Scenario 4: Add *JMIS* and *JAIS*					
Top-5	85.7%	78.6%	57.1%	35.7%	28.6%
Top-6-to-28	68.9%	46.7%	33.3%	24.4%	8.9%
RU/VH	76.9%	40.4%	21.2%	17.3%	11.5%
RU/H	56.7%	30.0%	15.0%	11.7%	3.3%
DRU-MAS	35.9%	15.4%	0.0%	0.0%	0.0%
Scenario 5: Add the Rest of AIS-8					
Top-5	85.7%	78.6%	57.1%	42.9%	28.6%
Top-6-to-28	71.1%	46.7%	37.8%	24.4%	13.3%
RU/VH	80.8%	50.0%	30.8%	21.2%	15.4%
RU/H	56.7%	31.7%	16.7%	15.0%	5.0%
DRU-MAS	35.9%	15.4%	2.6%	0.0%	0.0%
Scenario 6: Add All T1 Journals					
Top-5	100.0%	92.9%	78.6%	71.4%	42.9%
Top-6-to-28	86.7%	60.0%	48.9%	33.3%	22.2%
RU/VH	90.4%	65.4%	46.2%	28.8%	19.2%
RU/H	73.3%	41.7%	21.7%	16.7%	8.3%
DRU-MAS	51.3%	28.2%	10.3%	2.6%	0.0%
Results from Dennis et al. (2006, p. 4) Informal E-Mail Survey of Senor IS Scholars at "Top Most Research Productive Business Schools"					
	N.R.*	N.R.*	86.1%	52.8%	30.6%

*Although these values were not reported in the earlier study, since the values in the table are cumulative from right to left, these numbers would be larger than 86.1%.

Table 9. Top Information Systems Journals Counted as T1 and T2 in the Six Scenarios

Journal Name	Scenario		
	1, 2, & 3	4	5 & 6
MIS Quarterly	T1	T1	T1
Information Systems Research	T1	T1	T1
J of Management Information Systems	T2	T1	T1
J of the AIS	T2	T1	T1
Information Systems Journal	T2	T2	T1
European Journal of Information Systems	T2	T2	T1
J of Information Technology	T2	T2	T1
J of Strategic Information Systems	T2	T2	T1
Information & Management	T2	T2	T2
J of Database Management	T2	T2	T2
J of Global Information Management	T2	T2	T2
International Journal of Electronic Commerce	T2	T2	T2
Decision Support Systems	T2	T2	T2
Behavior and Information Technology	T2	T2	T2
J of Computer Information Systems	T2	T2	T2
Electronic Commerce Research and Applications	T2	T2	T2
Communications of the AIS	T2	T2	T2
Data Base for Advances in Information Systems	T2	T2	T2

Table 10. Means and Standard Deviations for T1, T2, and T3 Journal Publications of Tenure Cases in this Study

Institution Classification	T1 Journals Mean (SD)	T2 Journals Mean (SD)	T3 Journals Mean (SD)
Top-5 IS	4.9 (2.8)	6.2 (4.5)	4.4 (2.3)
Top-6-to-28 IS	2.8 (2.4)	4.0 (2.7)	3.7 (2.5)
RU/VH	2.7 (2.2)	4.5 (3.3)	5.1 (3.9)
RU/H	1.7 (1.7)	4.4 (3.0)	6.5 (9.9)
DRU-MAS	.09 (1.0)	3.0 (2.6)	5.1 (5.6

cally, we considered the impact of including six different scenarios of elite and highly rated journals and found that the most inclusive approach (using the AIS-8 list) came closest to bridging the gap between stated tenure expectations in the Dennis et al. study and actual tenure performance. This finding supports the AIS senior scholars' recommendation that, overall, the IS community should promote eight IS journals as highly rated journals of excellent quality.[7] Likewise, our data indicate that institutions that reject the AIS senior scholars' recommendations—particularly those that consider only *ISR* and *MISQ* to be top IS journals—may be setting themselves and their faculty up for difficulty. Accordingly, such narrow expectations may be appropriate for only a small number of schools.

In addition, our study examines not only elite and highly rated journals but also other levels of journals. Our journal categorization approach used information from multiple sources to determine whether journals should be included as T1, T2, or T3 journals. Sources include journal-ranking

[7]Recent ISI impact factors show that while *MISQ* has a markedly higher impact than the other AIS-8 journals, the remaining journals in the AIS-8 compare well to the top 40 business journals and relatively close to each other. For example, the 2008 ISI impact factors for the AIS-8 would order these journals as follows: *MISQ* (5.183), *ISJ* (2.375), *JMIS* (2.358), *ISR* (2.261), *JIT* (1.966), *JAIS* (1.836), *JSIS* (1.484), and *EJIS* (1.202). As shown in Table B1, several of the top business journals have impact factors in the range of 0.500 to 1.200; thus, the range for the AIS-8 is in keeping with the other top 40 business journals.

studies, lists from senior scholars, top journal lists derived from university deans, and ISI impact factors. All of these sources were used to compile a reasonably comprehensive list that further stratifies journals. While we acknowledge that no journal-ranking method is perfect, ours is a practical, consistent, and useful approach that considers several salient ranking factors. Moreover, our approach can easily be refined in the future as journal-quality data change over time.

Our benchmarking data can help institutions set realistic and objective productivity targets for faculty. It can also help calibrate external scholars who are called upon to evaluate tenure cases outside the scholars' own institutions. This data can help scholars evaluate productivity based on the category of the target institution and make them less susceptible to biases that may arise from knowledge of their own institutions' standards.

Overall, the findings of our study are encouraging. Although *MISQ* and *ISR* are universally considered to be elite IS journals, other highly rated IS journals have and will continue to play an increasingly important role in successful IS tenure cases. *JMIS* authorships were very significant in IS tenure cases, making up almost 20 percent of the authorships in our sample. Fewer *JAIS* authorships exist in the current sample because *JAIS* is a newer journal. However, *JAIS* is well positioned to be increasingly recognized as a top journal. Its excellent editorial board, high initial ISI impact factor, and low acceptance rates suggest that this journal will continue to increase in stature and play a larger role in tenure cases in the future. It is encouraging to note that, being electronic, *JAIS* has no physical limits on how many pages it can print and has virtually no publication backlog.

Authorships in *ISJ, EJIS, JIT,* and *JSIS* made up only 7.7 percent of authorships in our sample. However, the recent acknowledgment by AIS senior scholars of these journals as highly rated outlets—along with their rising ISI impact factors—should further increase their visibility and reputation. The growing recognition of these journals is yet another encouraging sign of the evolution of the IS journal landscape.

A final contribution of this study was to examine the distribution of IS journals, non-IS business journals, and CE and other journals in successful IS tenure cases. A total of 54.4 percent of the T1 journals were from IS journals; meanwhile, the proportion of T1s from CE journals (23 percent) was about the same as non-IS business journals (22.6 percent) in tenure cases. Given the quality of the non-IS T1 journals and the fact that they made up 45.6 percent of the T1 journals of successful IS tenure cases, these journals clearly play an important role in determining tenure. Having said that and given that the IS field is a distinct discipline from management, CS, engineering, etc., IS tenure candidates should be required to publish in some IS journals just as discipline-specific publications are required in virtually all other disciplines.

Recommendations

Based on our findings and contributions, we offer several recommendations. First, our results further support the collective view of the AIS senior scholars that *MISQ* and *ISR* are not the only highly rated journals in IS and that it unnecessarily straitjackets the field to focus only on these two journals as the highest rated journals. We embrace the senior scholars' recommendation that most IS programs should consider the AIS-8 to be highly rated journals. This specifically means that for most institutions, the AIS-8 journals should count toward tenure as T1 journals. Institutions that grant a greater degree of publishing freedom to their departments should seriously consider adopting the AIS-8 list. The AIS-4 list—*MISQ, ISR, JMIS,* and *JAIS*— should be used at institutions where promotion and tenure committees are more restrictive.

Moreover, given the de facto publication productivity means and standard deviations in Table 10, we devised a simple approach to articulate suggested publication benchmarks to the IS community. Considering that tenure candidates publish only whole numbers of articles rather than fractions, we rounded the means and standard deviations from Table 10 to the nearest whole number to create the suggested productivity benchmarks. We also embrace the commonly held view that tenure candidates need to push to meet or exceed general standards at their institutions and that meeting bare minimums (i.e., successful cases that were below average in performance) is generally not viewed positively by internal or external reviewers—regardless of a candidate's institution classification. Furthermore, tenure standards often rise over time—especially at highly competitive institutions and institutions trying to improve their stature—thus we feel it is a disservice to candidates and institutions to embrace bare minimum standards reflecting below-average performance. Below average performance usually represents riskier tenure cases that institutions and academics ideally try to avoid. Accordingly, our recommended benchmarks reflect average- and above-average successful tenure cases. Table 11 provides these recommended benchmarks. We specifically suggest that individuals who wish to greatly increase the likelihood of their tenure should aim for above-average per-

Table 11. Suggested Benchmarks of Tenure Productivity for Different Types of U.S. Institutions

School Category	Productivity Benchmarks by Journal Tiers					
	T1 Journals		T2 Journals		T3 Journals	
	Average Performer	High Performer	Average Performer	High Performer	Average Performer	High Performer
Top-5 IS	5	8+	6	11+	4	7+
Top-6-to-28 IS	3	5+	4	7+	4	7+
RU/VH	3	5+	5	8+	5	9+
RU/H	2	4+	4	7+	7	17+
DRU-MAS	0	1+	3	6+	5	11+

formance according to their school category. Likewise, institutions that wish to raise their profile should encourage candidates to strive for above-average performance in their school category.

As a critical point of clarification, we recognize that T1 publications are generally viewed as the most important publications in academia because they are seen to represent the most rigorous review process and the greatest contributions to science and practice, and are cited at the highest rate when compared to T2 and T3 publications. Hence, the importance of T1 publications can be exponentially greater than T2 and T3 publications—particularly at top schools. As the senior editors reviewing our paper indicated, at top institutions, T3 publications would not help one's tenure case and even T2 publications are often seen as "failed" T1 studies that only weakly support one's tenure case—if at all.[8] Accordingly, at top institutions, having a large number of T2 publications without any T1 publications would result in almost certain denial of tenure.

We also do not believe these data should be used to equate different tiers of journals; they are not substitutable. For example, in creating institutional standards, two T2s should not be deemed as equivalent to one T1. Different tiers of journals represent different underlying journal purposes and quality. They should not be mixed and matched; they are different.

Given these disparate valuation differences, we urge untenured faculty at research institutions (i.e., RU/VH and RU/H institutions) to place their primary emphasis on T1 articles, and to publish T2 and T3 articles primarily to support T1 research streams—never at the expense of focusing on T1 articles. While such a solitary emphasis on T1 articles is less desirable (if not undesirable) at master's and teaching-oriented universities, tenure candidates at such institutions can still make their tenure cases stronger and have more influence and respect in their colleges if they publish T1 articles above the norm at their institutions. T1 hits universally help all tenure candidates.

However, given the strong preference for T1 publications in tenure decisions—especially at the most research-intensive schools—the question could be rasied as to why tenure candidates at all levels of institutions publish in T2 and T3 journals at all. If T1 articles were all that mattered to science, then most top IS researchers would not waste their time publishing in lower-tier journals. Yet, almost all IS researchers publish in these journals (before and after tenure)—virtually without exception, and typically in greater quantities than in T1s. Likewise, T1 journal articles (virtually all) are replete with references to T2 and T3 articles. Many T1 articles and associated theory could not have been built without the foundation work provided by T2 and T3 articles. Articles in T2 and T3 journals are often less consistent in quality and may not contribute as much to science as T1s, but these lower-ranked journals often contribute in meaningful and sometimes unexpected ways. Thus, while T2 and T3 journals may be less prestigious and influential than T1 journals, they often contribute meaningfully to the advancement of science. Again, we recommend that tenure candidates at research institutions focus on T1 articles, but use T2 and T3 articles when needed to strategically build the necessary foundation for writing T1 articles (e.g., exploratory studies with interesting questions, literature reviews that create useful construct definitions, etc.).

[8]Nevertheless, it is interesting to note that high-performing tenure candidates at top-5 IS institutions produce not just more T1 articles than everyone else (at 8) but also they produced more T2 articles than anyone else (at 11). They did not produce more T3 articles. Clearly, the road to high achievement and success at elite institutions is littered with papers that did not achieve T1 status. This requires individuals at such institutions to continually be producing a large pipeline of high-potential research. Namely, they must attempt around 20 high-quality research projects to result in eight T1 articles.

Finally, we recommend that external reviewers consult these productivity benchmarks when writing external letters that contain recommendations pertaining to promotion and tenure decisions. Specifically, external recommenders should tailor their letters to the specific type of institution that requests the letter as opposed to imposing the recommender's own institutional standards on another institution. Otherwise, external reviewers might measure productivity against an inappropriate set of expectations. This can be especially damaging if the self-imposed standards used by most top IS institutions are inappropriately applied to other types of institutions that have different research goals and fewer research resources.

Conclusion

In closing, we caution that productivity benchmarks should be used wisely.[9] They do not obviate the need for common sense and are only one—albeit an important—factor in considering academic productivity. Other qualitative and subjective factors should also be used in determining actual tenure cases. For example, quality and contribution should be assessed by having senior institutional members review articles and by having external experts review faculty members' work. Other sources of input that can further describe a faculty member's research quality include citation counts, journal rankings, external awards, assessment of editorial board quality, article downloads, related patents and commercial software, adoption by practitioners, and citations in national news media outlets (Lowry et al. 2007a; Lowry et al. 2004).

Acknowledgments

This article was a formal project as part of the Information Systems Ph.D. Preparation Program, Information Systems Department, Marriott School of Management, at Brigham Young University. Part of this project was also funded by a Mentored Environment Grant (MEG) from Brigham Young University. We thank the following Ph.D. preparation students who partially contributed to the project: John Romney, Marlo Bell, and Mirella Petersen. We also appreciate suggestions and reviews from Detmar Straub, Carol Saunders, Laura Rawlins, and the anonymous reviewers at *MISQ*.

[9] Moreover, although promotion and tenure committees do not always read and evaluate the quality of articles in a tenure packet, in many ways this would be preferable to using journal quality as a surrogate for article quality. The fact of the matter is, however, that this surrogacy is not going away and, indeed, may become even more prominent as time goes by.

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About the Authors

Douglas L. Dean is an associate professor of Information Systems at the Marriott School of Management, Brigham Young University. He received his Ph.D. in MIS from the University of Arizona in 1995. He has published in *Management Science*; *Journal of the Association for Information Systems*; *Journal of Management Information Systems*; *IEEE Transactions on Systems, Man, and Cybernetics*, *Information & Management*; *Group Decision and Negotiation*; *Expert Systems with Applications*; *Communications of the AIS*, and others. His research interests include academic promotion, scientometrics, research journals, e-commerce technologies, idea generation, and tools and methods to support collaboration.

Paul Benjamin Lowry is an associate professor of Information Systems at the Marriott School, Brigham Young University, and a Kevin and Debra Rollins Faculty Fellow. He also directs the Information Systems Ph.D. Preparation Program at the Marriott School. His research interests include human–computer interaction (collaboration, culture, communication, adoption, entertainment, decision support, deception), e-commerce (privacy, security, trust, branding, electronic markets), and scientometrics of Information Systems research. He received his Ph.D. in Management Information Systems from the University of Arizona. He has articles published or forthcoming in *MIS Quarterly, Journal of Management Information Systems*; *Journal of the Association for Information Systems*; *Information Systems Journal*, *European Journal of Information Systems*; *Communications of the ACM*, *Information Sciences*; *Decision Support Systems*; *IEEE Transactions on Systems, Man, and Cybernetics*; *IEEE Transactions on Professional Communication*; *Small Group Research*; *Expert Systems with Applications*; *Communications of the AIS*, and others. He serves as an associate editor for the *European Journal of Information Systems, AIS Transactions on HCI, Communications of the AIS,* and *Electronic Commerce Research and Applications*.

Sean Humpherys is a postdoctoral MIS researcher with the Center for Management of Information Systems at the Eller College of Management, University of Arizona. Sean also graduated from the MISM program at the Marriott School of Management, Brigham Young University, where he was enrolled in the IS Ph.D. Preparation Program. His primary research interests include decision support systems for fraud detection, credibility assessments and rapid screening for hostile intent, human–computer interaction, machine learning algorithms, data mining, and computational linguistics. He research is funded by Department of Defense, Department of Homeland Security, National Science Foundation, Center for Identification Technology Research, National Center for Border Security and Immigration, and Pricewaterhouse Coopers. Sean has articles published or forthcoming in *Decision Support Systems, IEEE Transactions on Professional Communication,* and *Communication of the AIS.*

MIS Quarterly

ISSUES AND OPINIONS

PROFILING THE RESEARCH PRODUCTIVITY OF TENURED INFORMATION SYSTEMS FACULTY AT U.S. INSTITUTIONS

Douglas L. Dean, Paul Benjamin Lowry
Information Systems Department, Marriott School of Management, Brigham Young University,
Provo, UT 84602 U.S.A. {doug_dean@byu.edu} {Paul.Lowry.PhD@gmail.com}

Sean Humpherys
Management Information Systems Department, Eller College of Business, University of Arizona,
Tucson, AZ 85721 U.S.A. {shumpherys@cmi.arizona.edu}

Appendix A

U.S. News & World Report's Ranking of Top Business Specialties: Information Systems

2008	2007	School	Carnegie Classification
1	1	Massachusetts Institute of Technology (Sloan)	RUVH
2	2	Carnegie Mellon University (Tepper) (PA)	RUVH
3	3	University of Texas–Austin (McCombs)	RUVH
4	4	University of Minnesota–Twin Cities (Carlson)	RUVH
5	5	University of Arizona (Eller)	RUVH
6	6	University of Maryland–College Park (Smith)	RUVH
10	7	University of Pennsylvania (Wharton)	RUVH
7	8	Stanford University (CA)	RUVH
8	9	New York University (Stern)	RUVH
9	10	Georgia State University (Robinson)	RUH
11	11	Indiana University–Bloomington (Kelley)	RUVH
15 (tie)	12	University of Michigan–Ann Arbor (Ross)	RUVH
13 (tie)	13	University of California–Berkeley (Haas)	RUVH
12	14	Purdue University–West Lafayette (Krannert) (IN)	RUVH
13 (tie)	15 (tie)	Arizona State University–Main Campus (Carey)	RUVH
17	15 (tie)	University of Georgia (Terry)	RUVH
	18 (tie)	University of California–Irvine (Merage)	RUVH
18 (tie)	18 (tie)	University of Pittsburgh (Katz)	RUVH

2008	2007	School	Carnegie Classification
18 (tie)	20 (tie)	Bentley University (McCallum) (MA)	Master's/L
	20 (tie)	Case Western Reserve University (Weatherhead) (OH)	RUVH
	20 (tie)	Northwestern University (Kellogg) (IL)	RUVH
	20 (tie)	University of Washington	RUVH
	24 (tie)	Georgia Institute of Technology	RUVH
	24 (tie)	Harvard University (MA)	RUVH
	24 (tie)	University of California–Los Angeles (Anderson)	RUVH
	24 (tie)	University of Connecticut	RUVH
	24 (tie)	University of Southern California (Marshall)	RUVH
19	28	Count of Top Schools Shown in Ranking	

Note: When multiple schools receive an equivalent score in the USNWR ranking algorithm, they are given the same ranking (marked "tie" in the table). Rankings for subsequent schools are incremented for all tied institutions. For example, in the 2007 ranking, Arizona State University received the same algorithm score as University of Illinois—Urbana Champaign. Both are given the ranking of 15. No school is shown as having a rank of 16. Both are given the rank of 15 and the next ranked school, University of Georgia, is ranked as 17. The 2005 Carnegie Classification of Institutions of Higher Learning™ is as follows: research universities with very high research activity (RU/VH), research universities with high research activity (RU/H), doctoral and research universities (DRU), and master's colleges and universities with large programs (Master's/L). Note that Bentley College changed its name to Bentley University in 2008 and has dramatically increased its focus on doctoral studies and research so that the school now behaves much more like an RUVH/RUH university than a Master's/L university.

Appendix B

Journal Categorization Methodology

As noted in the article, the historical data in Table 10 and the benchmarks in Table 11 are based on journals assigned to tiers in Scenario 6. This appendix describes the method used to assign journals to tiers T1, T2, and T3 for Scenario 6. We categorized journals as Tier 1 (T1), Tier 2 (T2), or Tier 3 (T3), where T1 journals are the best, most difficult outlets in which to publish (i.e., premier journals). We categorized each journal outlet based on the outlet's dominant content into these three categories: information systems (IS); business, which includes journals on traditional business disciplines and other behavioral fields; and computer science and engineering (CE), which includes information science and other technical fields. To do this, we used a combination of journal rankings and citation impact factors. Notably, we used IS journal rankings to find the best journals in which IS faculty normally publish. IS journal rankings have recently been shown to be empirically sound and excellent indicators of quality that are consistent over time (Lewis et al. 2007; Straub 2008). To this baseline, we add ISI impact factor ratings, which have been empirically shown to be a quality surrogate that provides a valid manner in which to consistently compare the scientific impact of journals between disciplines (something that cannot be well accomplished with discipline-specific journal rankings), and likewise to be able to compare contributions of individual scientists (Mangematin and Baden-Fuller 2008; Straub 2008).

To ensure that we included the major journals in which IS researchers publish (IS or otherwise), we combined all of the journals found in the last six IS journal-ranking articles (Hardgrave and Walstrom 1997; Lowry et al. 2004; Mylonopolous and Theoharakis 2001; Peffers and Ya 2003; Walstrom and Hardgrave 2001; Whitman et al. 1999). These six journal articles ranked journal outlets based on surveys of IS faculty between 1997 and 2004. After combining the outlets ranked in these articles, we developed three lists—one each for IS, business, and CE. All journals on the business list were included in the combination of the top-20 business journals list from Dennis et al. (2006) and the 2006 London *Financial Times* list of journals (LFTL). The LFTL is a particularly useful journal ranking because it represents the 38 top business journals as determined by leading business schools throughout the world. However, a couple of these journals had low or no ISI impact factors. Others were practitioner-oriented journals (e.g., *Harvard Business Review*, *Sloan Management Review*, *California Management Review*). Thus, not every LFTL journal was automatically considered a T1 journal.

To differentiate among T1, T2, and T3 journals, and to develop criteria to assign journals to tiers that were not on these top journal lists, we derived criteria based on the 2006 LFTL. We applied the following decision rules:

1. We calculated four years of ISI citation factors for all LFTL journals (2004–2007). Over this period, the average impact factor was 1.97, and the standard deviation was 0.930. We then applied the decision rule that if the four-year impact average of any journal is greater than or equal to one-half the standard deviation (0.465) below the LFTL average (1.97 minus 0.465 = 1.505), then the journal is considered a T1 journal. If the four-year impact average is between that 1.505 and 1.5 SD below the LFTL average (1.97 minus (1.5 × 0.930) = 0.575), then the journal qualifies as a T2 journal. Any journal with a four-year impact average of less than 0.575 is a T3 journal.

2. Any journal on the LFTL is at a minimum a T2 journal. For categorization within treatment analysis Scenarios 3 through 6, some of the LFTL journals are promoted to T1 because of their higher impact factors according to the impact-factor-based rules described in Step 1.

3. Any IS journal not listed in Table 9 was assigned as T2 or T3 using the citation impact factors categorization approach discussed in Step 1.

4. All *ACM* and *IEEE Transactions* journals are a minimum of T2. High impact factor averages promote some of these to T1 according to the impact-factor-based rules described in Step 1.

5. No practitioner-oriented "hybrid" journals, regardless of their impact factors, can be categorized higher than a T2. Notably, this includes high-impact journals such as *Communications of the ACM*, *IEEE Computer*, *IEEE Software*, *IEEE Intelligent Systems*, *Harvard Business Review*, *Sloan Management Review*, and *California Management Review*. This places a premium on research journals over practitioner-oriented journals.

Using the above rules, we assigned all journals on each of the three lists to tiers. However, not all the journals used to assess faculty productivity are shown in this appendix. Because our intent is to show journal outlets that IS faculty consider important for tenure and promotion, in this appendix we show only journals on the three lists that qualify as T1 and T2 according to our tier-assignment rules. T3 journals are not shown.

Based on these rules, Table B1 lists the top business journals, Table B2 lists the top IS journals, and Table B3 lists the top computer science, engineering, information science, and other technical (CE) journals. For additional face validity, we checked this list against the last several major IS journal ranking studies. All of the tier assignments fit well with these rankings, with the exception of *Communications of the AIS* and *DATA BASE*, both of which are highly ranked on journal rankings. Thus, in deference to the collective wisdom of the IS community represented in these rankings, both were elevated from T3 to T2. These heuristics appeared to provide strong face validity and provided the advantage of being able to fairly and systematically compare journals across different disciplines. In addition to the journals drawn from the six IS journal ranking articles, we show T1 and T2 journals that have at least three authorships. Our sample included 2,432 authorships in 594 peer-reviewed journals.

Table B1. List of Top Business and Other Behavioral Journals

Journal Impact Rank	Journal Name	2004-2007 ISI Average	Tier	On LFTL?	On Dennis et al. List?	Number of Authorships in Our Sample
1	*MIS Quarterly*	4.604	T1	Yes	Yes	65
2	*Academy of Management Review*	4.215	T1	Yes	Yes	1
3	*J of Marketing*	3.953	T1	Yes	Yes	2
4	*Marketing Science*	3.767	T1	Yes	No	5
5	*Academy of Management Journal*	3.304	T1	Yes	Yes	5
6	*J of Finance*	3.067	T1	Yes	Yes	0
7	*J of Political Economy*	3.063	T1	Yes	No	1
8	*Administrative Science Quarterly*	2.874	T1	Yes	Yes	2
9	*J of Applied Psychology*	2.845	T1	Yes	No	5
10	*J of Financial Economics*	2.605	T1	Yes	Yes	0
11	*Information Systems Research*	2.696	T1	Yes	Yes	61
12	*Organization Science*	2.557	T1	Yes	No	5
13	*J of Accounting and Economics*	2.541	T1	Yes	Yes	1
14	*Econometrica*	2.541	T1	Yes	No	0
15	*Strategic Management Journal*	2.335	T1	Yes	Yes	6
16	*J of Marketing Research*	2.240	T1	Yes	Yes	1
17	*J of Consumer Research*	2.101	T1	Yes	Yes	0
18	*J of Accounting Research*	2.010	T1	Yes	Yes	1
19	*J of the American Statistical Association*	1.986	T1	Yes	No	1
20	*Review of Financial Studies*	1.845	T1	Yes	No	0
21	*Entrepreneurship Theory and Practice*	1.822	T1	Yes	No	0
22	*Management Science*	1.805	T1	Yes	Yes	49
23	*J of Operations Management*	1.771	T1	Yes	Yes	8
24	*J of International Business Studies*	1.769	T1	Yes	Yes	1
25	*Accounting Review*	1.757	T1	Yes	Yes	4
26	*Human Resources Management*	1.729	T1	Yes	No	4
27	*J of Business Venturing*	1.640	T1	Yes	No	0
28	*Organizational Behavior and Human Decisions Processes*	1.527	T1	Yes	No	9
29	*Harvard Business Review*	1.346	T2	Yes	No	10
30	*Decision Sciences*	1.218	T2	No	No	31
31	*J of Financial and Quantitative Analysis*	1.200	T2	Yes	No	0
32	*California Management Review*	1.186	T2	Yes	No	4
33	*Operations Research*	1.181	T2	Yes	Yes	7
34	*Academy of Management Perspectives* (formerly *Academy of Management Executive*)	1.147	T2	Yes	No	1
35	*Accounting, Organizations and Society*	1.072	T2	Yes	No	1
36	*MIT Sloan Management Review*	0.867	T2	Yes	No	12
37	*International Journal of Human Resource Management*	0.580	T2	Yes	No	1
38	*Real Estate Economics*	0.574	T2	No	Yes	0
39	*J of Business Ethics*	0.557	T2	Yes	No	4
40	*J of Risk and Insurance*	0.449	T2	No	Yes	0
41	*Management International Review*	n/a	T2	Yes	No	0

Table B2. List of Top Information Systems Journals

Journal Name	2004–2007 ISI Average[†]	Number of authorships in our sample
MIS Quarterly	4.604	65
Information Systems Research	2.696	61
J of Management Information System	1.590	81
J of the AIS	n/a	12
Information Systems Journal	1.090	10
European Journal of Information Systems	0.917	11
J of Information Technology	1.309	4
J of Strategic Information Systems	0.750	11
Information & Management	1.772	71
J of Database Management	1.690	8
J of Global Information Management	1.241	8
International Journal of Electronic Commerce	1.200	5
Decision Support Systems	1.171	94
Behavior and Information Technology	0.701	5
J of Computer Information Systems	0.673	58
Electronic Commerce Research and Applications	0.600	4
Communications of the AIS	n/a	19
Data Base for Advances in Information Systems	n/a	38

[†]Impact factors for top IS journals, except *ISR*, greatly increased in 2008, further validating these categorizations: *MISQ* (5.183), *JMIS* (2.358), *JAIS* (1.836), *ISJ* (2.375), *EJIS* (1.202), *JIT* (1.966), and *JSIS* (1.484).

Table B3. Examples of Top Computer Science, Engineering, Information Science, and Other Technical Journals

Journal Impact Rank	Journal Name	2004–2007 ISI Average	Tier	Number of Authorships in Our Sample
1	*ACM Computing Surveys*	6.705	T1	4
2	*ACM Transactions on Information Systems*	3.914	T1	6
3	*Human Computer Interaction*	3.562	T1	3
4	*Artificial Intelligence*	2.872	T1	4
5	*Annual Review of Information Science and Technology*	2.573	T1	9
6	*ACM Transactions on Database Systems*	1.975	T1	6
7	*IEEE Transactions on Software Engineering*	1.927	T1	14
8	*IEEE Transactions on Knowledge and Data Engineering*	1.739	T1	21
9	*J of the American Society for Infomation Science and Technology (JASIST)*	1.665	T1	40
10	*IEEE Intelligent Systems*	2.318	T2	10
11	*Communications of the ACM*	1.691	T2	86
12	*IEEE Software*	1.382	T2	6
13	*Information Processing and Management*	1.381	T2	13
14	*Information Systems*	1.373	T2	8
15	*IEEE Computer*	1.343	T2	12
16	*INFORMS Journal on Computing*	1.264	T2	9
17	*International Journal of Human Computer Studies*	1.234	T2	20
18	*Computational Complexity*	1.231	T2	3
19	*Expert Systems with Applications*	1.154	T2	18
20	*Data & Knowledge Engineering (D&KE)*	1.142	T2	4
21	*Computers in Human Behavior*	1.075	T2	6
22	*J of Algorithms*	1.034	T2	3
23	*Computers in Industry*	0.916	T2	4
24	*J of Intelligent Information Systems*	0.908	T2	4
25	*J of Information Science*	0.895	T2	7
26	*Interacting with Computers*	0.870	T2	4
27	*Computers and Operations Research*	0.837	T2	11
28	*Information Society*	0.802	T2	5
29	*Theoretical Computer science*	0.749	T2	5
30	*J of Systems and Software*	0.713	T2	9
31	*Computer Journal*	0.680	T2	5
32	*IIE Transactions*	0.603	T2	4
33	*Computers and Industrial Engineering*	0.546	T2	9
34	*J of Intelligent Manufacturing*	0.489	T2	5
	ACM Transactions (others not listed)	n/a	T2	10
	IEEE Transactions (others not listed)	n/a	T2	85

Table B4. Journals Considered T1 in Each Analysis Scenario (in Alphabetical Order)								
			Scenario					
	Journal	Type	1	2	3	4	5	6
1	*Information Systems Research*	IS	Y	Y	Y	Y	Y	Y
2	*MIS Quarterly*	IS	Y	Y	Y	Y	Y	Y
3	*Academy of Management Journal*	B		Y	Y	Y	Y	Y
4	*Academy of Management Review*	B		Y	Y	Y	Y	Y
5	*Accounting Review*	B		Y	Y	Y	Y	Y
6	*Administrative Science Quarterly*	B		Y	Y	Y	Y	Y
7	*J of Accounting and Economics*	B		Y	Y	Y	Y	Y
8	*J of Accounting Research*	B		Y	Y	Y	Y	Y
9	*J of Consumer Research*	B		Y	Y	Y	Y	Y
10	*J of Finance*	B		Y	Y	Y	Y	Y
11	*J of Financial Economics*	B		Y	Y	Y	Y	Y
12	*J of International Business Studies*	B		Y	Y	Y	Y	Y
13	*J of Marketing*	B		Y	Y	Y	Y	Y
14	*J of Marketing Research*	B		Y	Y	Y	Y	Y
15	*J of Operations Management*	B		Y	Y	Y	Y	Y
16	*Management Science*	B		Y	Y	Y	Y	Y
17	*Strategic Management Journal*	B		Y	Y	Y	Y	Y
18	*American Economic Review*	B			Y	Y	Y	Y
19	*Econometrica*	B			Y	Y	Y	Y
20	*Entrepreneurship Theory and Practice*	B			Y	Y	Y	Y
21	*Human Resource Management*	B			Y	Y	Y	Y
22	*J of Applied Psychology*	B			Y	Y	Y	Y
23	*J of Business Venturing*	B			Y	Y	Y	Y
24	*J of Political Economy*	B			Y	Y	Y	Y
25	*J of the American Statistical Assoc.*	B			Y	Y	Y	Y
26	*Marketing Science*	B			Y	Y	Y	Y
27	*Organization Science*	B			Y	Y	Y	Y
28	*Organizational Behavior and Human Decision Processes*	B			Y	Y	Y	Y
29	*Review of Financial Studies*	B			Y	Y	Y	Y
30	*J of Management IS*	IS				Y	Y	Y
31	*J of the Association for IS*	IS				Y	Y	Y
32	*European Journal of IS*	IS					Y	Y
33	*Information Systems J*	IS					Y	Y
34	*J of Information Technology*	IS					Y	Y
35	*J of Strategic IS*	IS					Y	Y
CE and Other		Mix						Y

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