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Analyzing IS research productivity: an inclusive approach to global IS scholarship

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Abstract
An increasing number of studies have appeared that evaluate and rank journal quality and the productivity of IS scholars and their institutions. In this paper, we describe the results of one recent study identifying the 'Top 30' IS Researchers, revealing many unexamined assumptions about which IS publication outlets should be included in any definition of high-quality, scholarly IS journals. Drawing from the argument that all categories and classification schemes are grounded in politics, we critique the process by which the recent study in question (and several earlier studies) have derived the set of journals from which they count researcher publications. Based on a critical examination of the widespread inclusion of practitioner outlets, and the consistent exclusion of European scholarly IS journals, we develop our own arguments for which journals should be included in such evaluations of researcher productivity. We conduct our own analysis of IS researcher productivity for the period 1999–2003, based on articles published in a geographically balanced set of 12 IS journals, and then we compare our results with those from the recent study in question and their predecessors. Our results feature a more diverse set of scholars – both in terms of location (specifically, the country and continent in which the researchers are employed) and gender. We urge future studies of IS research productivity to follow our practice of including high-quality European journals, while eschewing practitioner-oriented publications (such as *Harvard Business Review* and *Communications of the ACM*). We also advocate that such studies count only research contributions (e.g., research articles), and that other genres of non-research articles – such as book reviews, 'issues and opinions' pieces and editorial introductions – not be conflated with counts of research contributions.
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Introduction

With the proliferation of many outlets for publishing IS research in recent years, there appears to be an increasing trend to conducting research on research. This phenomenon is longstanding in the IS literature – indeed many of the seminal papers in the IS discipline could be classified as 'research on research' (e.g., Culnan, 1986, 1987; Markus & Robey, 1988; Orlikowski & Baroudi, 1991; Orlikowski & Iacono, 2001). Over the past two decades, there have been 35 published studies that have addressed topics such as the rankings of IS journal outlets (Doke & Luke, 1987; Koong & Westrofer, 1989; Gillenson & Stutz, 1991; Holsapple *et al.*, 1993, 1994a, b; Jackson and Nath, 1989; Nord & Nord, 1995; Walstrom *et al.*, 1995; Hardgrave & Walstrom, 1997; Walczak, 1999; Mylonopoulos & Theoharakis, 2001; Katerattanakul & Han, 2003; Lowry *et al.*, 2004), the 'most prolific'

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IS scholars (Trower, 1995; Im *et al.*, 1998; Athey & Plotnicki, 2000; Claver *et al.*, 2000; Huang & Hsu, 2005), the most 'productive' IS research institutions (e.g., Vogel & Wetherbe, 1984; Lending & Wetherbe, 1992; Eom, 1994), the most widely cited IS papers (Walstrom & Leonard, 2000; Whitman & Woszczynski, 2003) or the most prolific researchers in specialty areas within the IS discipline, such as decision support systems (DSS) (Holsapple *et al.*, 1995; Forgionne & Kohli, 2001), group support systems (GSS) (Holsapple & Luo, 2003), ecommerce (Bharati & Tarasewich, 2002), expert systems (Cheng *et al.*, 1994), accounting IS (Daigle & Arnold, 2000), or reviews of the top researchers or journals in fields such as library and information science (Meho & Spurgin, 2005), computer science (Katerattanakul *et al.*, 2003), and operations management (Goh *et al.*, 1996, 1997; Barman *et al.*, 2001). IS researchers have even identified IS scholars' views of the best IT practitioner journals (Hsieh *et al.*, 2001), and have developed sophisticated mathematical procedures for identifying the highest-quality IS journals (e.g., Cooper *et al.*, 1993; Kleijnen & van Groenendaal, 2000; Forgionne & Kohli, 2001), including a formula for consolidating the results of nine prior journal ranking studies (Rainer & Miller, 2005).

Studies assessing the most productive or 'prolific' researchers and institutions have existed in the IS literature since the dawn of our discipline (Vogel & Wetherbe, 1984). In recent years, such studies have proliferated – with one U.S. scholar alone (Clyde Holsapple) co-authoring eight such studies (Holsapple and Luo, 1993, 1994a, 1994b, 1995, 2003; Cheng *et al.*, 1994; Goh *et al.*, 1996, 1997). Given the questions that have been raised regarding the excessive emphasis on rankings of prestigious MBA programs or other professionals schools (Stake, 2004), one might question whether such an emphasis on identifying and ranking the most 'prolific' IS researchers and most productive institutions is truly valuable to faculty and students in the IS field, or whether this borders on 'form over substance' (Gioia & Corley, 2002). We were especially intrigued by the fact that the latest such installment in the genre of studies that rank IS researchers based on numbers of published articles (Huang & Hsu, 2005) yielded a list of the 'Top 30' most prolific IS scholars that features *no* Europeans and just two women scholars – both in North America. In this paper, we examine the research methodology of this recent study, comparing it to prior studies that constructed similar rankings of the most productive IS scholars and observing that, by choosing what to count (and what not to count), implicit assumptions pervade such studies – with these assumptions directly (but subtly) influencing the results that ensue. Specifically, we examine how ranking studies tend to exclude large segments of the IS researcher population – in this case, European scholars – who may be extremely productive (Galliers & Whitley, 2002), although they may be slighted by the specific outlets counted in such studies which have, to date, exclusively focused on North American journals.

Critique of studies of 'prolific' IS researchers

In her renowned essay titled 'Do Categories Have Politics?', Lucy Suchman (1994) draws on speech–act theory to develop the central argument that all categories are political. How we classify persons, objects, and events – including what is or is not counted – rests on a series of political decisions that both reflect and, in turn, influence the allocation of power. Referencing the work of sociologist Harvey Sacks on the politics of categories and labeling, Suchman (2002, pp. 96–97) argues that the process of categorizing objects and events serves as:

> *… a fundamental device by which all members of any society constitute their social order…. [T]he sociologist Harvey Sacks was concerned … with the role that categorization plays in contests over the control of [group members'] social identities…. Sacks' analysis identifies the relation of categorization devices to social identity, including assessments of persons' adherence to the moral and aesthetic sensibilities associated with a particular category. It points as well to the ways in which categorization can be … a resource in the development of more elaborated and formalised systems of social control.*

In this vein, it is important to consider the merits of constructing lists of most prolific scholars, as well as the types of categories that are used in constructing them – categories such as 'high-quality IS journals' or 'scholarly journals,' in general. In their recent ranking of the 'Top 30' most productive IS scholars (see Appendix A), Huang & Hsu (2005) counted IS articles published between 1999 and 2003 in a set of 12 journals which were largely consistent with those counted in prior studies that ranked the most productive IS scholars and/or institutions (e.g., Lending & Wetherbe, 1992; Im *et al.*, 1998; Athey & Plotnicki, 2000; Lowry *et al.*, 2004). The journals employed in Huang and Hsu's study are summarized in Table 1, along with cross-references to several prior studies that evaluated the quality of IS journals. In comparing the set of journals used by Huang and Hsu to a similar study by Athey & Plotnicki (2000) five years earlier, we see that they expanded the set of journals slightly: first by adding *Decision Support Systems*, a specialized journal focusing on DSS research, and second, by adding the *Journal of the AIS* to their list (an electronic journal published by the *Association of Information Systems,* first published in 2000). Other than these two additions, their list was consistent with that of Athey & Plotnicki (2000).

Although Huang and Hsu's journal list is generally consistent with the prior study of IS researcher productivity by Athey & Plotnicki (2000), as well as with earlier studies that ranked IS journal quality (summarized in Table 1), what is overlooked in Table 1 is the fact that the most recent journal ranking study in Table 1 (Mylonopoulos & Theoharakis, 2001) ranked *European Journal of Information Systems* (*EJIS*) as a high-quality journal, but neither *EJIS* or any other European journal were counted

Table 1 Journals employed by Huang and Hsu (2005) and comparative rankings in prior studies of IS journal quality

Journal Name	Mylonopoulos & Theoharakis (2001)	Hardgrave & Walstrom (1997)	Walstrom *et al.* (1995)	Holsapple *et al.* (1994a)	Gillenson & Stutz (1991)
MIS Quarterly	1	1	1	1	2
Communications of the ACM	2	4	2	2	3
Information Systems Research	3	2	3	Not ranked	Not ranked
Journal of MIS	4	5	7	3	5
Management Science	5	3	4	4	1
IEEE Transactions on Software Engineering	6	7	5	6	8
Harvard Business Review	7	9	9	7	10
Decision Sciences	8	6	8	17	4
Decision Support Systems	9	10	11	5	Not ranked
Information & Management	10	20	12	8	12
Sloan Management Review	12	13	13	10	13
Journal of the AIS	Not ranked	Not ranked	Not ranked	Not ranked	Not ranked

in any of these studies ranking the most productive IS scholars. In the recent global survey conducted by Mylonopoulos & Theoharakis (2001), *EJIS* was ranked 11th by respondents worldwide; *Information Systems Journal* (*ISJ*), *Journal of Strategic Information Systems* (*JSIS*), and *Information Technology & People* (*ITP*) were ranked number 16, 20, and 27, respectively. We summarize the results of many prior studies that ranked IS journals, scholars, and institutions in Appendix B.

Not only do we consider it problematic that *EJIS* and these other leading European scholarly journals were excluded from researchers' publication counts, but a cursory review of the journal titles that *were* included in Huang and Hsu's study reveals a host of other problems. In our opinion, *all* such studies of the 'most productive scholar' genre mask several unexamined assumptions about the choice of 'high-quality' IS journals. These include assumptions about which journals are 'high-quality,' but, more fundamentally, assumptions about what counts as a scholarly IS journal in the first place – as opposed to journals in other disciplines that publish *some* IS research. As we discuss below, many of the journals included in Huang and Hsu's study are popular and widely read by practitioners, but they are not scholarly IS journals. Some others represent journals that primarily serve academic researchers in disciplines *other* than IS, although they sometimes publish IS research. Moreover, if the list of top journals used in such studies is simply expanded incrementally based on the lists used in prior studies, then the problem of 'path dependence' emerges (Whitley & Galliers, 2005). By this we refer to the fact that the authors' choice of journals to examine in any given study of high-quality IS journals will be influenced by whatever journals were in the study before that, and so forth, going back in time to the earliest studies of this genre (e.g., Vogel & Wetherbe, 1984). The problem of path dependence is reflected by the fact that authors who examine publications in high-quality journals often just incrementally update the list of 'top' journals from the prior study. If all authors simply update such lists incrementally – going back to the first studies that identified the most-prolific IS researchers (e.g., Remus, 1989, 1991) or the institutions with most productive researchers (e.g., Lending & Wetherbe, 1992; Vogel & Wetherbe, 1984) – most of which were published before the emergence of journals such as *Information Systems Research* (in 1990), *European Journal of IS*, *JSIS* (both in 1991), *ISJ* (in 1995), and *Journal of the AIS* (in 2000), then they will necessarily overlook these newer but possibly higher-quality outlets – in favor of journals whose primary attribute may be their longevity. We consider it surprising and problematic that the authors of the most recent studies identifying the most prolific IS researchers neglected to include the leading European IS journals (such as *EJIS, ISJ*, *JSIS*, and *ITP*), despite the fact that all of these high-quality European journals were founded prior to 1995, and the studies in question counted publications from the mid-to-late 1990s (in the case of Athey & Plotnicki (2000)) or well into the beginning of the new millennium (for Huang & Hsu (2005)). Indeed, given the fact that several of these European IS journals frequently rank among the 'Top 10' scholarly IS journals worldwide, according to Galliers & Meadows (2003), it is problematic that they have been either intentionally or unwittingly overlooked in these most recent studies of IS researcher productivity.

The other problem with studies that employ lists of high-quality journals, which are expanded incrementally from prior studies (as do Huang and Hsu, by adding *Decision Support Systems and Journal of AIS* to their list, but not seriously challenging the journals that already comprise the list of so-called top journals), is that these authors never consider the question of whether a given journal may have 'slipped' in the rankings – perhaps due to the emergence of other, higher quality journals, or due to other editorial policy changes. As is well known in the case of *Communications of the ACM* (*CACM*) (see Dennis *et al.*, 2006, p. 9), this journal transformed its editorial policies and target readership during the mid-1990s to serve a practitioner audience, rather than a scholarly one.

As noted by Nord & Nord (1995, pp. 38, 40) in their study, 'Journal Status Assessment and Analysis,' *CACM* 'restructured its format to include shorter articles with fewer references [in the early 1990s, but] … Perhaps the *CACM* change with the most significant impact is the increase to about 90 percent its articles published [by] practitioners. This may affect its rankings in future studies.' The fact that by 1997, all articles in *CACM* were held to very terse word limits (3,000 words) along with severe constraints on the total number of citations (maximum of 12 citations), seems to have been overlooked by many who have classified high-quality IS journals over the past five years, and who still continue to rank *CACM* as a 'Top 5' IS journal (Mylonopoulos & Theoharakis, 2001; Lowry *et al*., 2004; Rainer & Miller, 2005). In general, since these studies are based on researchers' perceptions of journal quality, there may be a delay in the adjustment of such perceptions to reflect the realities of such editorial policy changes. It is perhaps also noteworthy that nearly all of the studies that have evaluated and provided rankings of IS journals over the past decade were themselves published in *CACM* (Walstrom *et al*., 1995; Mylonopoulos & Theoharakis, 2001; Katerattanakul *et al*., 2003; Schwartz & Russo, 2004; Barnes, 2005; Rainer & Miller, 2005). ISWorld provides a comparison of MIS journal rankings in different studies at: http://www.isworld.org/csaunders/rankings.htm.

We believe there are several unexamined assumptions related to the politics of how IS journals are categorized as 'high-quality scholarly journals' *vs* 'low-quality scholarly journals,' or as 'niche-area scholarly journals' *vs* 'popular practitioner outlets.' We believe that many of the journal ranking studies have conflated the notion of journal name recognition (which tends favor practitioner outlets and scholarly journals with broad coverage) with the level of journal quality – at the expense of some very high-quality journals that serve niche areas, for example, database management, design research, or interpretive research. We believe that it is important for researchers who are conducting studies of IS journal quality – or even those of us simply *reading* such studies – to ask the questions: 'What are scholarly IS journals?', 'What are popular, high-impact practitioner journals, which have different review criteria for publishing their contents?' and 'Can we distinguish scholarly IS journals from scholarly publication outlets in other disciplines?' We state these questions explicitly because, in the analyses that led to the creation of recent lists of 'highly prolific' IS researchers (Im *et al*., 1998; Athey & Plotnicki, 2000; Huang & Hsu, 2005), these authors counted publications in journals that might best be regarded as high-impact practitioner magazines (e.g., *Harvard Business Review (HBR), Sloan Management Review*, and *CACM*), as well as scholarly journals that focus on other disciplines, such as operations research or operations management (e.g., *Management Science* and *Decision Sciences*), or computer science (*IEEE Transactions on Software Engineering*) and which consequently, publish few papers by IS researchers. We question the inclusion of these practitioner magazines and non-IS, academic outlets in counting publications of IS researchers, at the expense of more focused scholarly IS journals, including several leading European journals (*EJIS, ISJ, JSIS and ITP*). We are especially strong in our critique of the set of journals selected in the two most recent studies (Athey & Plotnicki, 2000; Huang & Hsu, 2005) – particularly given the fact that the first set of authors featured data indicating that some of these journal outlets publish under 20% of their studies by IS scholars. For example, Athey & Plotnicki (2000) presented data showing that the fraction of articles having one or more IS scholars as authors was as follows: *Harvard Business Review* (0.5%), *Sloan Management Review* (18%), *CACM* (15%), *Management Science* (12%), and *IEEE Transactions on Software Engineering* (14%). The only one of these journals where the proportion of papers with at least one IS scholar as authors exceeded the 20% threshold was *Decision Sciences* (for which Athey and Plotnicki reported that 36% of its papers contained at least one IS academic author). We thus challenge the inclusion of high-impact, but non-scholarly magazines that primarily serve the general management community (*HBR* and *Sloan Management Review*) or IT practitioner community (*CACM*), as well as academic outlets written by and for scholars in fields other than IS (e.g., *Management Science* and *IEEE Transactions on Software Engineering*). In contrast, based on the data provided by Athey & Plotnicki (2000), we consider *Decision Sciences* to be a journal that routinely publishes articles by and for IS researchers, as well as for scholars from related disciplines, such as operations research and operations management.

The authors of these recent North American rankings of most prolific IS scholars note that the choice of journals will affect which authors and academic institutions are ranked most highly. For instance, Athey & Plotnicki (2000, p. 11) assert that 'the importance of the decisions as to which journals to include … cannot be overemphasized.' Given this statement and the fact that several leading European journals began publication in the early-to-mid 1990s, it is surprising that Athey and Plotnicki neglected to include European scholarly journals in their study. Perhaps not surprising, was the fact that there were *no* European scholars listed among the 30 most productive scholars in any of these studies of most productive IS researchers. In the interest of full disclosure, we acknowledge that several scholars from outside of North America have appeared in these results, but they were from countries such as Hong Kong (Patrick Chau), and Singapore (K.K. Wei, Bernard Tan, and Kar-yan Tam). There were, however, no Europeans appearing among the list of top-ranked IS researchers in these studies. Given evidence that European IS scholars publish much more frequently in European IS journals than in North American journals – and vice-versa for North Americans (Galliers & Meadows, 2003), this neglect of European IS journals would seem to ensure the absence of European scholars from the set of results.

A comparable gender analysis of Huang and Hsu's 'Top 30' most prolific researchers raises similar questions, especially given the fact that women comprise a large proportion of the authors of scholarly IS research today. We note that, in Huang and Hsu's study, covering 1999–2003, only two women from North American universities were featured among the 'Top 30' scholars (Ritu Agarwal and Anne Massey), whereas in Athey and Plotnicki's study (covering publications from 1992 to 1997), five women appeared in the list of the 24 most productive scholars (Sirkka Jarvenpaa, Iris Vessey, Bernadette Szajna, Maryam Alavi, and Wanda Orlikowski). We believe that the choice of journals to include (and which others to exclude) may also influence the balance of male and female scholars appearing in the set of results, since some scholarly journals have a higher proportion of women authors than other journals.

With regard to the politics of the category 'scholarly IS journal,' Athey and Plotnicki note that the creation of such lists of prestigious journals tends to favor well-known, generalist publications, even if they are directed to a practitioner audience (such as *HBR* or *CACM*) over high-quality academic journals that *specialize* in a particular niche area of scholarly research:

> *The standard methodology of all these studies [that identified the top IS journals] was a survey instrument. The very nature of a survey eliminates any specialized journal as a top tier publication. For example, a researcher specializing in database would consider the ACM Transactions on Database Systems a premier journal, [but] due to the general survey audience in the above studies, only journals of general interest [to IS scholars] would receive the necessary votes to be classified as top-tier.* – Athey & Plotnicki (2000, p. 6).

Thus, high-quality specialized outlets, such as the '*IEEE Transactions* …' or 'ACM Transactions …' journals, tend to score much lower in surveys of journal quality, as rated by IS scholars, compared to generalist, practitioner journals (e.g., *HBR, CACM*), and below other general, scholarly IS journals that may have less rigorous criteria for review and acceptance (e.g., *Information & Management* or *Journal of Computer Information Systems*). There is also the question of whether some leading North American journals are biased toward positivist, empirical research. Several recent studies have shown that North American IS journals publish relatively little qualitative and/or interpretive studies, relative to their European counterparts (Walsham, 1995; Chen & Hirschheim, 2004), and that papers published in European IS journals (Galliers & Meadows, 2003) and European Ph.D. dissertations (Evaristo & Karahanna, 1997) are more likely to be conceptual or qualitative in nature, rather than positivist, theory-testing studies. One conclusion is that if North American journals are not amenable to qualitative, interpretive, or critical theory studies – or if they have only recently become more open to publishing such studies (see Markus & Lee, 1999), then European authors will be underrepresented in counts of articles published in North American journals during the mid-to-late 1990s. Some scholars have even suggested that certain leading North American journals are still not wholly receptive to alternative research methods (Chen & Hirschheim, 2004). Introna & Whittaker (2004) invoke Foucault's (1977) notion of 'regimes of truth' in alluding to *MIS Quarterly*'s publication practices which, they argue, have historically been biased against interpretive and critical research. Based on their keynote address at the 2002 ECIS conference analyzing who publishes where and what they cite, Galliers and Whitley report 'interesting patterns that strongly suggest that European researchers have a different research profile to those reported elsewhere' (2002, pp. 11–12). This is supported by evidence that European Ph.D. dissertations tend to employ different research methods and leverage distinct reference disciplines, compared to their U.S. counterparts (Evaristo & Karahanna, 1997). In fact, Galliers and Meadows, in analyzing patterns of cross-citations between European and North American scholars refer to the IS community as 'a discipline divided …. marked by a distinct parochialism along national, or at least, regional lines' (Galliers & Meadows, 2003, p. 108). Their conclusion echoes a comment 10 years earlier by Suomi (1993), who – even then – noted a pattern where European IS scholars often cite their North American counterparts who, in turn, almost completely ignore them.

This leads to the key objective of our study: to identify the most productive IS researchers from a recent five-year interval, but based on a geographically balanced set of quality journals serving the global IS academic community. We examine whether the set of IS researchers yielded by our analysis differs from the lists generated solely from the previous studies that were limited to North American journals (Im *et al.*, 1998; Athey & Plotnicki, 2000; Huang & Hsu, 2005). We pose the question that, if scholars who conduct these types of studies acknowledge that 'the importance of the decisions as to which journals to include … cannot be overemphasized' (Athey & Plotnicki, 2000, p. 11), then shouldn't a more balanced set of journals yield different results, in terms of the geographic distribution and possibly the gender distribution of scholars who appear in the results?

Research methods

To answer these questions, we employed the bibliographic repository that was recently created and made available to the IS community by a team of faculty and Ph.D. students at Georgia State University in the U.S.A. (Chua *et al.*, 2002). The GSU bibliographic repository (GSU/BR) consists of a comprehensive database of all publications in IS, information science, computer science, and related journals. With regular updates every six months since its original release in 2003, we consider the GSU/BR to be a valuable resource for research. In order to essentially replicate Huang and Hsu's study, in terms of the time period covered, but with a more balanced set of international, scholarly IS journals, we

limit ourselves to the same *number* of journals employed by Huang and Hsu (12 journals), yet we substituted scholarly IS journals (primarily European journals) for the six journals that we omitted (Table 2).

In modifying the list of journals employed by Huang & Hsu (2005), we chose to exclude the high-impact practitioner publications that Huang and Hsu included in their study: *HBR, Sloan Management Review,* and *CACM*. Moreover, we agree with Claver *et al*. (2000, p. 182) who characterize publications such as *Management Science*, *Academy of Management Journal,* and *IEEE Transactions on Software Engineering* as being outlets 'which, though not specialising in IS, regularly publish articles regarding this area.' We also agree with their logic that it makes sense to exclude these non-IS journals when evaluating scholarly IS productivity:

> *… we decided not to study the second group of journals (non-IS), although some of the landmark papers were published there … there may be complete issues (or even volumes) of these journals containing no IS articles, which would distort a chronologically exhaustive study of research on IS* (Claver *et al*., 2000, p. 182).

In addition to excluding these practitioner journals, we also excluded two scholarly journals that mainly publish research in other disciplines, such as operations research/operations management (*Management Science*) and computer science (*IEEE Transactions on Software Engineering*). We also omitted *Journal of the AIS*, a relatively new electronic journal that did not publish many articles before 2001. After excluding these six journals, we added six other, internationally recognized scholarly journals that focus on IS research. This includes *EJIS*, *ISJ*, *ITP* and *JSIS*. In order to have the same total number of journals as Huang and Hsu, we added two additional journals that publish high-quality IS research of a general nature – despite having misleading titles which suggest that they are niche journals (*Database for Advances in Information Systems* and *IEEE Transactions on Engineering Management*). The latter two journals are both scholarly IS journals focusing on general topics of IT deployment, use, and management (although *IEEE TEM* also contains articles about R&D management and technology commercialization, in addition to IS research).

Perhaps even more critical than the question of what *journals* to count is the question what types of *publications* to count. Recent studies of 'most prolific researchers' rely on online databases that typically count every possible article (whether it is a research paper or not) as a publication. While some authors have explicitly stated that they excluded non-research articles, such as book reviews (Athey & Plotnicki, 2000), other researchers do not always specify whether they excluded non-research articles. While it is fairly easy to perform online searches by author names in databases such as *ABI/Inform* or *Science Direct*, the results obtained from these searches often included other types of publications, in addition to research articles. For example, the GSU/BR (which we use for our study) does not distinguish between research articles and other genres of articles, such as book reviews, letters to the editor (often called 'issues & opinions' pieces), editors' introductory comments, or guest editors' introductions to special issues.

One by-product of this failure to distinguish among different genres of research papers *vs* non-research papers, is that journals that feature many special issues (e.g., *Journal of MIS (JMIS)*), special sections (*MIS Quarterly*), or those featuring a regular 'introduction from the editor' column (e.g., *Database for Advances in IS, EJIS,* and *MIS Quarterly*), or book reviews (e.g., *EJIS, ITP*) will tend to overstate the publication counts by their editors, guest editors, and book reviewers. While all scholarly journals have occasional special issues – which often begin with the guest editors' introductory comments – some journals begin every issue with brief introductory comments from the Editor, and sometimes feature as many as three special issues or special sections per year. Although these editorial introductions are valuable for journal readers, counts of authors' publications that fail to distinguish between editorial introductions and peer-reviewed research articles do a disservice to the practice of counting scholars' research contributions. For example, one highly regarded journal routinely uses the same researchers as guest editors for periodic special issues, while another seeks to incite controversy by asking noted scholars to write short research commentaries. In both cases, we consider that such practices unnecessarily inflate the publication counts of specific guest editors and/or senior scholars who have the honor of serving in these roles.

Any analysis of researchers' productivity should seek to 'filter' the lists of publications carefully, so as not to conflate scholarly research articles with these other types of articles. Although this pattern is certainly not typical of all journals, some journals featured as many as eight 'special issues' or 'special sections' during the five-year period covered in our study. At a rate of two or three guest editors per special issue, on average, we estimate that over 20 article 'counts' result from these very short introductory comments in one journal alone (*JMIS*) – which may have a noticeable effect on our results. We consider it

Table 2 Journals used in our study

Data Base for Advances in Information Systems
Decision Sciences
Decision Support Systems
European Journal of Information Systems
IEEE Transactions on Engineering Management
Information & Management
Information Systems Journal
Information Systems Research
Information Technology & People
Journal of Management Information Systems
Journal of Strategic Information Systems
MIS Quarterly

important to treat such non-research articles differently than peer-reviewed research articles. Unfortunately, the GSU/BR treats all types of articles alike and hence, we had to add a special 'article type' field to the database containing the GSU/BR to identify such short, non-peer-reviewed articles. After we conducted queries using terms such as 'Editor's Comments,' 'Introduction to Special Issue,' or 'Book Review' in the paper titles – or searched on page length to identify articles below five pages – we found that some authors appearing in our result list indeed had their publication counts substantially inflated due to such non-research articles. Many of these authors were highly respected senior scholars – those who had risen to the role of Editor-in-Chief or regular guest editor for various journals. Even after adjusting their totals counts to omit these non-research articles, some of these authors still appeared at the top of our result set (e.g., Mark Keil, Dorothy Leidner, and Jay Nunamaker). In some other cases, however, most of the author's publications were deleted after adjusting for these non-research articles, with the result that some scholars no longer appeared in our result set of authors with three or more publications.

After eliminating non-research articles, we ran several queries on the GSU/BR to identify researchers with at least two articles in the set of 12 journals during 1999–2003. There were 560 authors with two or more publications. We then manually coded data about each author's gender (based on personal knowledge, and by viewing website photographs) and the continent/country in which they were employed during most of the 1999–2003 time period. We chose country/continent of employment (rather than the author's nationality or country of origin) for several reasons: while the vast majority of IS faculty are employed in the same continent in which they were born, in those cases where nationality and country of employment differ, the latter can easily be verified by examining biographical details within the publications themselves. In contrast, nationality cannot be verified in any source. We know of a few cases where authors moved between continents during the period under examination; we dealt with these exceptions by coding the authors as belonging to the continent/country where they spent the majority of time during the interval from 1999 to 2003.

For authors for whom we were uncertain about their gender, we were able to resolve this uncertainty by viewing photographs on their websites or, for some journals, articles containing photographs. Since this process of gathering and coding data for each author's gender and continent of employment was labor intensive, we were unable to do so for every researcher who had published one or more papers in this set of journals (a list that amounts to more than 3000 researchers). Since this coding process was so time-consuming (requiring that we consult several additional databases containing IS researcher information such as the ISWorld Faculty Directory and the AIS membership database), we restrict our analysis below to authors who published *three* or more papers in the set of journals during 1999–2003. This limited our results to 240 IS researchers. In a related study, where we analyze whether gender differences exist in terms of IS researchers' productivity (Gallivan & Benbunan-Fich, 2006), we focus on a larger result set of 560 authors with *two* or more publications in the same journals during this interval.

One additional methodological consideration is how to measure the productivity of the researchers (Chua *et al.*, 2003). Previous studies in the field of scientometrics typically feature at least two different methods for counting numbers of publications – either *normal counts* (with each publication counted as 1 for all authors, regardless of number of co-authors) or *adjusted counts* (with each publication counted as a fraction of a paper, depending on the number of authors – for example, 1/3 of a publication, for a paper with three authors). Prior studies found that their results were rather sensitive to different counting methods – especially for authors with many co-authored publications and few solo-authored publications, or vice-versa.

Based on a set of queries that we ran with the GSU/BR, we generated a list of researchers with three or more research publications in these 12 journals during 1999–2003, using normal counts and then we computed the adjusted counts by crediting each author with a fractional count for any jointly authored papers. As mentioned above, we coded the demographic characteristics of the resulting authors in terms of gender and the continent/country where they were employed. Finally, we analyzed the geographic and gender distribution of authors in our results – both for the overall set of 240 authors with three or more publications, and also for the 'Top 30' authors in our result set. We compared our list of 'Top 30' researchers to the two prior studies (Athey & Plotnicki, 2000; Huang & Hsu, 2005), allowing us to analyze the effects of substituting the four European journals and two other scholarly journals that we added for the practitioner journals and other, non-IS journals that we deleted.

Results

We examined the demographic attributes of all 240 authors who published three or more articles in any of the 12 journals. Unfortunately, due to space limitations, we are unable to include the full list of author names (however, the list is available upon request from the authors). Our full set of 240 researchers includes 42 women (17.5% of all authors), 67 authors employed outside of North America (27.6%), and specifically 32 authors from Europe (13.3%). We note that the ratio of authors from Asia and Australia-New Zealand (combined) was 14.6%, just slightly larger than the ratio of authors from Europe (13.3%). Table 3 provides a summary of demographic data for the set of 240 authors with three or more journal publications from 1999 to 2003.

Table 3 Results for authors with three or more publications

	Men	*Women*	*Overall*	*North America*	*Europe*	*Asia*	*Aus-NZ*	*Overall*
No. of authors	198	42	240	173	32	29	6	240
Percent of authors	82.5	17.5	100.0	72.1	13.3	12.1	2.5	100.0
Normal count results								
Mean no. of pubs	4.55	4.17	4.48	4.51	4.25	4.59	4.33	4.48
Standard deviation	2.75	1.51	2.58	2.84	1.83	1.76	1.21	2.58
Median no. of pubs	3	3	3	3.00	3.00	4.00	4.50	3.00
% of total no. of pubs	83.7	16.3	100.0	72.6	12.7	12.4	2.4	100.0
Adjusted count results								
Mean no. of pubs	2.07	1.81	2.02	1.99	2.06	2.17	1.94	2.02
Standard deviation	1.19	0.71	1.12	1.19	0.94	0.98	0.41	1.12
Median no. of pubs	1.75	1.67	1.73	1.67	2.00	2.00	1.88	1.73
% of total no. of pubs	84.3	15.7	100.0	71.0	13.6	13.0	2.4	100.0

We also analyzed the average productivity of authors from each continent, and also the average productivity of the men and women appearing in the full set of 240 authors. When analyzed by continent of employment, North American authors dominate the list with 72% of total authors on the list, and 72.6% of total papers published. The figures for the ratio of authors from other continents appear in Table 3. Note that the fraction of total *papers* published by authors from various geographic regions is very close to the proportion of *authors* from these regions – which means that, for authors who appear on this list of 240 researchers, there were no geographic differences in average researcher productivity. For example, if we had found that researchers from Asian countries represented 12% of authors, but had published 15% of total papers, this would indicate that authors from Asian countries were more prolific, on average, than other authors. (In fact, the Asian authors represented 12.1% of authors on the list and they were responsible for 12.4% of the total papers in the sample.) The fact that we did not observe any differences between the ratio of authors from each continent *vs* their proportion of papers published is due to the fact that, on a continent-by-continent basis, the authors from the four different continents represented in our results were equally productive.

Women represented 17.5% of the researchers on the list and accounted for 16.3% of the total articles published (based on *normal counts*) and 15.7% of total articles published (based on *adjusted* counts). The mean number of articles per author is slightly lower for the 42 women (4.17 articles per woman) than for the 198 men (4.55 articles per man), and the standard deviation is much smaller for the women (SD = 1.51) than for the men (SD = 2.75). This lower standard deviation for women reflects the fact that women tend to be clustered more densely in the middle of the set of 240 authors (rather than in the very top or very bottom of the list). We obtained similar results for our analysis of adjusted counts, where the average publication statistics are again somewhat lower for the 42 women (1.81 papers) appearing in the result set than for the 198 men (2.07 papers), a difference of 13%. So, the women who appear on our list of 240 most productive IS researchers have, on average, 8% (based on normal counts) or 13% (based on adjusted counts) fewer publications than the men on our list. We consider the issue of research productivity by gender in more depth in a related study (Gallivan & Benbunan-Fich, 2006).

In terms of examining both continent of employment and gender simultaneously, we found relatively few women from outside North America among the 240 most productive scholars. One notable exception is Dorothy Leidner, who was the most prolific female author (with eight publications using normal counts and 4.75 using adjusted counts). Nearly all the remaining 41 women were either employed in the U.S.A. or Canada (the latter including Yolande Chan and Blaize H. Reich), with eight women from outside of North America, including five from the U.K. (Chrisanthi Avgerou, Margi Levi, Shirin Madon, Sue Newell, Jacky Swan), two from Asia (Lai Lai Tung and Christina Soh), and one from Australia/New Zealand (Shirley Gregor).

Table 4 shows the 'Top 32' most prolific IS researchers (those with seven or more publications based on *normal* counts). The first column lists the total number of normal count articles appearing in the 12 IS journals for the same time period as Huang &Hsu's study, while the second column shows the adjusted counts. The list is sorted by normal counts (i.e., total number of papers), followed by adjusted counts, then by the authors' surnames. In all cases where two or more authors have identical numbers of total counts and adjusted count papers, these are shown as ties. (Note that the rank order of authors would be different if we sorted first by adjusted counts, and then by normal counts.) This set of the 32 most productive researchers features four authors from Europe (Phillip Powell, Dorothy Leidner, Zahir Irani, and Kalle Lyytinen)

Table 4 List of 'Top 32' most productive authors (with seven or more publications) (sorted by normal count, then adjusted count, then authors' surnames)

Rank	*Normal count*	*Adjusted count*	*Last name*	*First name*	*Gender*	*Continent/country*
1	21	7.67	Klein	Gary	Male	North America
2	21	7.50	Jiang	James J.	Male	North America
3	15	6.42	Grover	Varun	Male	North America
4	13	5.50	Benbasat	Izak	Male	North America
5	12	5.08	Rai	Arun	Male	North America
6	12	4.42	Keil	Mark	Male	North America
7	11	4.50	Sambamurthy	V.	Male	North America
8	11	3.67	Whinston	Andrew B.	Male	North America
9	11	3.09	Chen	Hsinchun	Male	North America
10	10	3.58	Straub Jr.	Detmar W.	Male	North America
11	10	2.70	Nunamaker Jr.	Jay F.	Male	North America
12	9	3.83	Zmud	Robert W.	Male	North America
13	9	3.50	Powell	Philip L.	Male	Europe (UK)
14	8	4.75	Leidner	Dorothy E.	Female	Europe (France)
15	8	4.50	Irani	Zahir	Male	Europe (UK)
16	8	4.33	Gefen	David	Male	North America
17	8	4.08	Chau	Patrick Y. K.	Male	Asia (Hong Kong)
18	8	3.83	Kauffman	Robert J.	Male	North America
19	8	3.58	Teo	Thompson Sian Hin	Male	Asia (Singapore)
20	8	3.33	Agarwal	Ritu	Female	North America
21	8	3.25	Lyytinen	Kalle J.	Male	Europe
22	8	3.00	Tam	Kar Yan	Male	Asia (Hong Kong)
23 (tie)	8	2.92	Lederer	Albert L.	Male	North America
23 (tie)	8	2.92	Hu	Paul Jen-Hwa	Male	North America
25	8	2.83	Dennis	Alan R.	Male	North America
26	8	2.33	Tan	Bernard C. Y.	Male	Asia (Singapore)
27	7	5.83	Aladwani	Adel M.	Male	North America
28	7	4.33	Davison	Robert M.	Male	Asia (Hong Kong)
29	7	4.08	Venkatesh	Viswanath	Male	North America
30	7	3.50	Baskerville	Richard L.	Male	North America
31 (tie)	7	2.25	Massey	Anne P.	Female	North America
31 (tie)	7	2.25	Montoya-Weiss	Mitzi M.	Female	North America

and five authors from Asia (Patrick Chau, Bernard Tan, Kar-Yan Tam, Thompson Teo, and Robert Davison). This 'Top 32' list includes four women (Dorothy Leidner, Ritu Agarwal, Anne Massey, and Mitzi Montoya-Weiss) and 28 men. In demographic terms, our results differ from those published by Huang & Hsu (2005), which had no Europeans scholars, three men from Asia, and just two women (both from North America).

We conducted additional analyses to see whether continent of employment or gender was statistically significant in explaining the total number of publications for the authors in our list of 'Top 240' authors with three or more publications. The results for our loglinear regression analysis (based on Poisson distributional assumptions) found no significant results. In our analyses, we used dummy variables to represent the authors' location (with separate variables for North America, Europe, Asia, and Australia/ New Zealand) as well as for gender. We found no statistically significant effect for continent. We interpreted this to mean that, although non-North American authors represent just 28% of the authors in this dataset, for those authors that *do* appear in the dataset, they are just as likely to have published a large number of articles as the North Americans – as shown, for instance, by Philip Powell (nine papers), Zahir Irani (eight papers), and several other authors with seven or eight papers. While non-North American authors represent 28% of the authors who published three or more papers in our overall result set (as shown in Table 4), and nine of the 32 authors (28.2%) in our 'Top 32' authors, the non-North Amercians are a much larger proportion of the authors in our result set, compared to the 13% reported by Huang & Hsu (2005).

Similarly, our analysis of gender revealed no statistical difference between the number of publications by men and women. Although women represent a minority of the authors in the overall result set of 240 researchers (17.5%), for those women who *do* appear in the result set, they are just as likely as the men to have published many articles. In order to truly know whether continent of employment or gender have an effect on the likelihood of publishing in the set of journals we counted, we would

need to have data about *all* IS researchers worldwide who have published 0, 1 or 2 papers in these journals during the period in question. Unfortunately, we are unable to perform this type of analysis because we lack a comprehensive database that lists all IS researchers, along with gender and the continent where they are employed. We estimate that coding this information for authors who have published just one or more papers in these journals would require hundreds of hours. Moreover, coding this information for IS researchers who have not published *any* papers in these journals would be nearly impossible, as the IS discipline lacks a comprehensive listing of all Ph.D. graduates and/or university faculty. Although the GSU/BR contains information about publications, the demographic data regarding authors' gender and continent/country of employment must be manually gathered and coded from other sources, such as the ISWorld Faculty Directory, the AIS membership database, and other sources.

Table 5 compares our results with the results of earlier studies of most productive IS researchers. The prior study by Huang & Hsu (2005) identified two women, no European authors and three male Asian authors in their 'Top 30' researchers with at least eight normal count publications. While Huang and Hsu's study was conducted for the identical time period as our study, we note that two prior studies (Im *et al.*, 1998; Athey & Plotnicki, 2000) covered earlier time periods; therefore, we would not expect their results to exactly match our own. Among their 'Top 24' most productive IS researchers, Athey & Plotnicki (2000) identified just *one* researcher from outside of North America (Patrick Chau from Hong Kong) and five women (Sirkka Jarvenpaa, Iris Vesey, Bernadette Szajna, Maryam Alavi, and Wanda Orlikowski), of whom only Sirkka Jarvenpaa was ranked in their 'Top 10.' Likewise, Im *et al.* (1998) identified only two researchers from outside North America, and two women (Sirkka Jarvenpaa and Iris Vessey).

We first compare our list of the 'Top 32' researchers (those with at least seven normal count publications) to these earlier studies; then we compare the demographic attributes for our overall set of 240 authors with three or more publications to these prior studies. Our list of the 'Top 32' researchers features nine authors from outside North America (28%), and a total of four women (12.5%). The women include Dorothy Leidner (who we have coded as European, since she was on the faculty at INSEAD, in Paris, for most of the time period of our study) and three North American women – Ritu Agarwal, Anne Massey, and Mitzi Montoya-Weiss. Of the 28% of the sample that were employed outside of North America, there were two authors from the U.K. (Philip Powell and Zahir Irani), one from France (Dorothy Leidner), and one from Finland (Kalle Lyytinen). It also includes five authors from Asia, including Hong Kong (Patrick Chau, Kar Yan Tam, and Robert Davison), and Singapore (Thompson Teo and Bernard Tan). In comparing our 'Top 32' results to those of the prior studies, we see that

Table 5 Comparison of our results to prior studies of most productive IS scholars

Measures	*Our full results 'Top 240' (1999–2003)*	*Our results 'Top 32' only (1999–2003)*	*Huang & Hsu 'Top 30' (1999–2003)*	*Athey & Plotnicki 'Top 24' (1992–1997)*	*Im, Kim & Kim 'Top 28' (1991–1996)*
Minimum number of articles required to appear in ranked list	3 (normal count)	7 (normal count)	8 (normal count)	3.0 (adjusted count)	6 (normal count)
Results by continent					
No. from Europe	32	4	0	0	0
Percent from Europe	13.3	12.5	0	0	0
No. from Asia	29	5	4	1	2
Percent from Asia	12.1	15.6	13.3	4.2	7.1
No. from Aus-NZ	6	0	0	0	0
Percent from Aus-NZ	2.5	0	0	0	0
No. from N. America	173	23	26	23	26
Percent from N. America	72.1	71.8	86.7	95.8	92.9
Results by gender					
No. of women	42	4	2	5	2
Percent of women	17.5	12.5	6.7	20.8	7.1

28% of our highest-ranked authors are from outside North America, compared to just 4–13% in the prior studies. A total of 12.5% of the authors on our 'Top 32' list were employed in European universities, compared to 0% in the prior studies. Finally, our study featured 12.5% women, compared to values ranging from 6.7% (Huang & Hsu, 2005) to 20.8% (Athey & Plotnicki, 2000) in these prior studies.

To examine the influence of the four European journals separately in our list of researchers, we conducted a separate analysis based on counts of articles published in the four European journals alone (*EJIS, ISJ, ITP,* and *JSIS*). Table 6 shows the 34 scholars who published three or more papers in these European journals. Of these authors, 22 were from Europe, with just seven from North America, three from Asia (Thompson Teo, Robert Davison, and Shan Pan), and two from New Zealand (Paul Cragg and Michael Myers). Seven of the 34 authors who published three or more papers in the European journals are women (21%) – a somewhat higher ratio than we found for the set of 12 journals overall (where the ratio of women was 17.5%). The highest number of normal count publications in the European journals was six papers each by Thomas Kern and Philip Powell. In comparing this list of most productive authors in European journals alone (Table 6) to our list of authors with seven or more total publications in any of the 12 journals (in Table 4), there were eight authors who appeared in both lists: one woman (Dorothy Leidner) and seven men (Mark Keil, Zahir Irani, Philip Powell, Robert Davison, Al Lederer, Thompson Teo, and Richard Baskerville). In addition to their European publications, each of these authors also published several papers in the larger set of North American journals during the same period.

Discussion

We analyzed the most productive IS researchers for the same time period as a recent study published in

Table 6 Authors with three or more publications in European journals (sorted by normal count, then adjusted count, then authors' surnames)

Rank	*Normal count*	*Adjusted count*	*Last name*	*First name*	*Gender*	*Continent/country*
1	6	2.25	Kern	Thomas	Male	Europe (UK)
2	6	2.17	Powell	Philip L.	Male	Europe (UK)
3	5	2.53	Mathiassen	Lars	Male	Europe (Denmark)
4	5	2.17	Willcocks	Leslie P.	Male	Europe (UK)
5 (tie)	5	2.00	Lyytinen	Kalle J.	Male	Europe (Finland)
5 (tie)	5	2.00	Avison	David E.	Male	Europe (UK/France)
7 (tie)	5	1.53	Newell	Sue	Female	Europe (UK)
7 (tie)	5	1.53	Swan	Jacky A.	Female	Europe (UK)
9	4	4.00	Aladwani	Adel M.	Male	North America
10	4	2.83	Peppard	Joe	Male	Europe (UK)
11	4	2.33	Gallivan	Michael J.	Male	North America
12	4	1.83	Teo	Thompson Sian Hin	Male	Asia (Singapore)
13 (tie)	4	1.67	Irani	Zahir	Male	Europe (UK)
13 (tie)	4	1.67	Love	Peter E. D.	Male	Australia-NZ
15 (tie)	3	2.50	Butler	Thomas G.	Male	Europe (Ireland)
15 (tie)	3	2.50	Leidner	Dorothy E.	Female	France (UK)
15 (tie)	3	2.50	Gray	Peter H.	Male	North America
15 (tie)	3	2.50	Madon	Shirin	Female	Europe (UK)
19	3	2.33	Avgerou	Chrisanthi	Female	Europe (UK)
20 (tie)	3	2.00	Westrup	Christopher	Male	Europe (UK)
20 (tie)	3	2.00	Davison	Robert M.	Male	Asia (Hong Kong)
22 (tie)	3	1.83	Baskerville	Richard L.	Male	North America
22 (tie)	3	1.83	Ljungberg	Jan	Male	Europe (Sweden)
24 (tie)	3	1.67	Galliers	Robert D.	Male	Europe (UK)
24 (tie)	3	1.67	Cragg	Paul B.	Male	Australia-NZ
26 (tie)	3	1.50	Jarvenpaa	Sirkka L.	Female	North America
26 (tie)	3	1.50	Damsgaard	Jan	Male	Europe(Denmark)
28 (tie)	3	1.33	Pan	Shan L.	Male	Asia (Singapore)
28 (tie)	3	1.33	Myers	Michael D.	Male	Australia-NZ
28 (tie)	3	1.33	Keil	Mark	Male	North America
31 (tie)	3	1.17	Levy	Margi	Female	Europe (UK)
31 (tie)	3	1.17	King	Malcolm	Male	Europe (UK)
31 (tie)	3	1.17	Lederer	Albert L.	Male	North America
34	3	1.08	Beynon-Davies	Paul	Male	Europe (UK)

Communications of the AIS (Huang & Hsu, 2005), but with a different set of journals – which included four European IS journals, but omitting practitioner-oriented publications, and scholarly publications which primarily serve disciplines other than IS (e.g., *Management Science* and *IEEE Transactions on Software Engineering*). Our analysis, based on a set of 12 geographically balanced, scholarly IS journals produced a substantially different – and more diverse – set of 'most productive researchers' than that reported in earlier studies. Our result set is more diverse, both in terms of the continent in which the researchers were employed (27.6% of researchers in our 'Top 240' list of researchers were from outside North America *vs* 14.3% in Huang and Hsu's (2005) study, and in terms of gender (18% women in our study, compared to 6.7% in Huang and Hsu's study). We believe that the changes we made in terms of what to count (e.g., substituting four European IS journals and two other international, scholarly journals for the practitioner outlets and non-IS journals counted in Huang and Hsu's study, as well as our exclusion of non-research articles) has influenced our results, making the resulting set of authors more diverse.

With respect to continent of employment, the addition of the four European journals seems to have enhanced the diversity of our sample by adding more researchers from Europe to our result set (which consists of 12.5% Europeans and a total of 28% non-North Americans in our 'Top 32' list, compared to no European authors in Huang and Hsu's 'Top 30'). However, despite the fact that four of the 12 journals we included are European scholarly journals, still less than 14% of the authors in our 'Top 32' and in our full result set of the leading 240 IS scholars are European. The results of the separate analysis of productivity in European journals alone suggest that the inclusion of these outlets in our basket helped to increase the list of European authors who appeared in our set of the 'Top 240' IS researchers worldwide. Below, we consider additional questions raised by our analysis.

Our results have important implications for any future productivity analysis of IS scholars. The first issue deals with how to determine productivity itself. The selection of journals and time period, the type of publications and the method of counting all play a role in the set of individuals who comprise the result set. By comparing our results with those of the prior 'most productive researcher' studies, we have shown that different methods for identifying scholarly IS journals – and for deciding what constitutes a research contribution – can generate a more-or-less diverse set of researchers, in terms of geographic location and gender. While most researcher productivity studies have paid a great deal of attention to which journals to include in their 'basket' of high-quality journals, most of these studies have ignored the issue of what types of publications to count. In our study, we have specifically focused on peer-reviewed research articles, discounting non-research articles, such as book reviews, editors' introductions, short articles that critique other published studies, etc.

Given the fact that ours is the first study of IS researcher productivity to include several high-quality European journals – leading to the result of a more diverse set of authors – it follows that careful consideration must be given to judging researchers' productivity according to criteria that are geographically neutral. This impartial process is made more critical in light of recent evidence suggesting the existence of a methodological and epistemological divide between U.S. and European journals and scholars (Walsham, 1995; Avgerou *et al.*, 1999; Galliers & Meadows, 2003; Katerattanakul & Han, 2003; Chen & Hirschheim, 2004). Evaristo & Karahanna (1997, p. 33) underscore this theme in their review of European *vs* U.S. dissertations when they conclude that:

> *Given the predominantly positivist research tradition in North America and interpretive research tradition in Europe, it seems reasonable to presume two different sociological paradigms. If indeed, North American and European researchers belong to two different sociological paradigms, this could pose problems in terms of reviewing and publishing in MIS journals and conferences as well as in sharing knowledge across research traditions.*

Despite the fact that only four European authors appeared on our list of the 'Top 32' researchers with seven or more publications (Table 5), European authors still constitute a minority of authors in our results. Two-thirds of the journals in our 'basket' are considered to be North American journals (eight out of 12), and apparently, European scholars publish much less frequently in North American journals than do North Americans – a phenomena that was explored at length in a recent essay by Galliers & Meadows (2003). Why might this be the case? One potential explanation suggested by Galliers and Meadows was that the IS community is a 'discipline divided' – that is, marked by considerable 'parochialism' at the country or regional level. By this, they meant that North American IS scholars tend to publish their research in North American journals and cite North American authors, while European authors tend to publish their work in European journals and cite works in those journals. While Galliers and Meadows were not the first to draw attention to differences between European and North American styles of research (Walsham, 1995; Evaristo & Karahanna, 1997), their arguments are consistent with other studies showing that North American scholars generally slight European IS publications by neglecting to cite them (Suomi, 1993; Katerattanakul & Han, 2003). Another observation is that, when European IS researchers publish scholarly articles, they tend to have a very different pattern of research citations than their North American peers. Along these lines, Galliers & Whitley (2002) found that Europeans cite other European authors much more than do North Americans (at least those who publish at ECIS conferences). In addition, Galliers & Whitley (2002) showed that the sources

European IS scholars cite most often are books – for instance, seven of the 11 most-cited sources at *ECIS* conferences were books (Checkland, 1981; Earl, 1989; Giddens, 1990; Davenport, 1992; Hammer & Champy, 1993; Walsham, 1993; Yin, 1994), with nearly all the other most frequently cited sources being practitioner articles in *Harvard Business Review* (Cash & Konsynski, 1985; Porter & Millar, 1985; Hammer, 1990). In contrast, Galliers and Whitley found that few scholarly articles were frequently cited in ECIS conference papers – just one scholarly article appeared among the top 11 most frequently cited sources (Malone *et al.*, 1987 in *CACM*). The most popular academic articles that *were* cited in ECIS conferences tended to be papers about how to conduct case studies or interpretive research (Benbasat *et al.*, 1987; Lee, 1989; Walsham, 1995), although none of the latter, scholarly articles were among the 10 most-frequently cited sources. These results demonstrate that European IS scholars do indeed employ different research methods and reference disciplines, compared to North American authors – at least, based on doctoral dissertations (Evaristo & Karahanna, 1997) and the sources cited most frequently in ECIS conference papers (Galliers & Whitley, 2002). Similar arguments have been made by other authors (e.g., Walsham, 1995; Chen & Hirschheim, 2004; Introna & Whittaker, 2004; Larsen & Levine, 2005), showing that European journals have traditionally been more open to interpretive, case study, and critical theory research, although some North American journals have, in recent years encouraged more submissions along these lines (Markus & Lee, 1999).

The separate analysis that we presented of articles in European journals alone (Table 6) shows that European researchers publish more frequently than North Americans do in European outlets (74% of the 34 authors publishing three or more papers in the four European journals are European or were employed by European universities). This result is consistent with the claim that European researchers are aware of the philosophical differences between the North American research paradigm (generally, quantitative and positivist) and their own (generally qualitative and interpretive or critical theory), and hence they mostly submit to outlets that have a record of publishing the style of research that they conduct (Galliers & Meadows, 2003). Unfortunately, since we lack data on the number of journal submissions by authors from various countries, we cannot critically test this explanation. (Publication data can be analyzed by the authors' country of employment, while actual submission data by country are not available anywhere, to our knowledge.) Whether this outcome is predominantly the result of self-selection (European authors eschewing North American outlets, in favor of European journals) or due to a reviewing bias (European manuscripts being rejected at higher rates by North American journals), our results attest to the aforementioned 'parochialism' (Galliers & Meadows, 2003) when it comes to the gap in research methods and epistemological beliefs between Europe and North America: 74% of the most prolific authors publishing in European journals are European and 72% of the most prolific authors publishing in a set of 12 (primarily North American) journals are North American or employed in North America.

Limitations

These results must be interpreted in light of out study's limitations. As we acknowledged above, the selection of journals and the timeframe being examined determine to a great extent the list of most productive researchers. Thus, any change in the 'basket' of journals or in the time period under investigation will produce a different set of results. Given this sensitivity of results to the timeframe and basket of journals selected, it would be interesting to conduct a study to see whether the proportion of papers published by Europeans in North American journals has increased over the past decade, or conversely, whether the proportion of papers published by non-Europeans in European journals has increased in recent years. While recent studies (e.g., Chen & Hirschheim, 2004; Larsen & Levine, 2005) have shown changes in the types of studies published in several IS journals over the past decade (specifically focusing on methods and epistemology), it would be interesting to build upon their work by conducting a trend analysis of authors' nationality in each journal to see if there have been changes over time.

A second limitation is that our method of determining the most productive researchers is based on normal counts and adjusted counts of number of papers published instead of other metrics for counting research impact, such as citation counts – as employed by Katerattanakul & Han (2003), and advocated by other authors (Mylonopoulos & Theoharakis, 2001; Galliers & Meadows, 2003). Obviously, a different process of identifying research contributions, such as weighting papers based on how often they are cited would alter the results to produce a set of IS researchers with the greatest impact (Walstrom & Leonard, 2000; Whitman & Woszczynski, 2003).

A third limitation is that our analysis focused on researchers who published at least three papers in the set of 12 journals that we analyzed, rather than the much larger set of authors who published just one or more papers in these journals. We made this decision to restrict our analysis to authors with three or more papers, since the effort involved in coding gender and continent of employment for authors with fewer papers would be enormously time-consuming. It is possible, however, that a slightly different pattern of results would emerge if we had set a lower threshold for inclusion in our study – such as just one publication, or just two publications in this set of journals – or in other journals.

Fourth, we focused on journal publications as our measure of scholarly productivity, and clearly, the results would differ greatly if we had focused on other scholarly outputs, such as authorship of research monographs or conference proceedings. It is obvious that, within

European universities, there is a much stronger tradition of researchers publishing books compared to North American universities – or, at least in North American *business schools*, specifically. A cursory analysis that we conducted regarding the number of books published by the European authors appearing in the list of 'Top 32' researchers, *vs* those from other continents, suggests that many of the European IS scholars publish books on a regular basis, in comparison to the North American authors, who publish few, if any books. Apparently, there is much greater recognition attached to academics publishing books in European business schools, compared to North America. While our study was limited to journal articles only, another interesting area for follow-up research would be to evaluate the numbers of books published by researchers from different geographical areas, and to assess their impact (based on citation counts). Galliers & Whitley, (2002) have conducted research along these lines, although it would be interesting to expand their analysis beyond ECIS conferences, to see how often scholarly books are cited in IS journals. Despite the limitations that we noted above, we believe that our study has shown that the details of what is counted in studies of IS researcher productivity has important implications for the set of authors who appear in the results. We hope that other researchers who conduct studies of scholarly productivity will carefully consider the issues that we raised above with regard to what journals (and what types of articles within them) should count as scholarly research contributions. As noted in Suchman's (1994) work on the politics of categorization, it is critical that we understand how the categories we use affect the outcomes that result from our efforts.

One final area of future research would be to investigate career development in academia. It may be the case that different reward systems and salary incentives per published refereed article (i.e., merit increases) exists between universities in North America, Europe, and other parts of the world. Likewise, future research should investigate whether these rewards for research – as opposed to teaching and service – are similar for men and women IS academics (Whitman *et al.*, 1999). Although studies have been conducted to examine whether gender is a factor in the productivity of IS researchers (Hu & Gill, 2000; Gallivan & Benbunan-Fich, 2006), and to estimate the increase in compensation associated with journal publications (Gill, 2001), analyses of compensation, based on gender and geographic location have not been published, to our knowledge. This area of future inquiry may hold the potential to explain the observed patterns of productivity among IS researchers.

Conclusions

Our analysis of the most productive IS researchers between 1999 and 2003 in a set of 12 geographically balanced, scholarly IS journals produced a substantially different – and more diverse – set of 'most productive researchers' than that reported in earlier studies. Our result set is more diverse in terms of the continent in which the researchers were employed with 28% of researchers from outside North America, and in terms of gender (17.5% women). In particular, 13.3% of the researchers in our full set of 240 researchers and four of the 'Top 32' (12.5%) are European authors with seven or more publications each (Philip Powell, Dorothy Leidner, Zahir Irani, and Kalle Lyytinen).

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Appendix A

Table A1 Most prolific researchers (from Huang and Hsu, 2005)

Rank	*Researcher*	*Current institution*	*Normal count*	*Adjusted count*
1	Jiang, James	University of Central Florida	21	7.50
1	Klein, Gary'	University of Colorado, Springs	21	7.50
3	Grover, Varun	Clemson University	19	7.75
4	Whinston, Andy	University of Texas, Austin	16	5.17
5	Benbasat, Izak	University of British Columbia	15	6.50
6	Kauffman, Rob	University of Minnesota	13	6.33
6	Nunamaker, Jay	University of Arizona	13	3.58
8	Chau, Patrick[a]	University of Hong Kong	12	5.62
8	Straub, Detmar	Georgia State University	12	4.83
8	Agarwal, Ritu[b]	University of Maryland	12	4.67
8	Chen, Hsinchun	University of Arizona	12	3.34
12	Venkatesh, Viswanath	University of Arkansas	10	5.42
12	Clemons, Eric	University of Pennsylvania	10	5.00
12	Sambamurthy, V.	Michigan State University	10	3.92
12	Krishnan, M.	University of Michigan	10	3.42
16	Rai, Arun	Georgia State University	9	4.00
16	Devaraj, Sarv	University of Notre Dame	9	3.67
16	Watson, Rick	University of Georgia	9	3.00
16	Briggs, Robert	University of Arizona; Delft University of Technology	9	2.75
20	Zmud, Robert	University of Oklahoma	8	3.50
20	Kohli, Rajiv	University of Notre Dame	8	3.33
20	Keil, Mark	Georgia State University	8	3.08
20	Dennis, Alan	Indiana University	8	3.00
20	Tam, Kar-Yan[a]	Hong Kong University of Science &Technology	8	2.83
20	Wei, K.K.[a]	City University of Hong Kong	8	2.58
20	Gupta, Alok	University of Minnesota.	8	2.50
20	Tan, Bernard[a]	National University of Singapore	8	2.50
20	Massey, Anne[b]	Indiana University	8	2.45
20	Mukhopadhyay, Tridas	Carnegie Mellon University	8	2.45
20	Rao, H. Raghav	SUNY, Buffalo	8	2.18

[a]These researchers are employed in universities located in Asia.
[b]These researchers are women in North American universities.

Appendix B

Table B1 Table of prior *general* studies of researcher productivity and journal quality

Authors	*Outlet*	*Time period*	*Scholarly IS journals*	*Other scholarly journals*	*Practitioner journals*
Studies that assess IS institutional productivity					
Lending & Wetherbe	DataBase 1992	1985–1990	CACM, I&M, ISR, MISQ, ACM/TDBS,	AMJ, DS, MS, ACM/CS, DB, Accounting Review	HBR, SMR
Eom	DataBase 1994	1986–1992	I&M, MISQ, JMIS, ISR, DSS	MS, DS, EJOR, IEEE SMC, Omega OR, AMJ, AMR	HBR, SMR, Interfaces, JSM
Studies that assess IS journal quality					
Mylonopoulos & Theoharakis	CACM 2001	1994–2000	MISQ, ISR, I&M JMIS, EJIS, DSS	MS, DS, IEEE Transactions (all)	HBR, SMR, CACM
Hardgrave & Walstrom	CACM 1997	1991–1996	MISQ, CACM, ISR, JMIS, DSS I&M	MS, DS, OrgSci, IEEE TSE, ACM TDBS	HBR, SMR
Walstrom, Hardgrave & Wilson	CACM 1995	1989–1994	MISQ, CACM, ISR, JMIS, DSS I&M	MS, DS, IEEE TSE, ACM CS, ACM TDBS	HBR, SMR,
Holsapple *et al*	I&M 1993	1987–1991	MISQ, JMIS, DSS, I&M, JCIS	ACM CS, ACM TDBS ACM TOS DS, IEEE TSE,	HBR, SMR, Data Management, JISM, Interfaces, JSM Datamation,
Gillenson & Stutz	MISQ 1991	1984–1990	MISQ, CACM, JMIS, I&M	MS, DS, JACM,	HBR, SMR, IEEE/Computer, JISM
Studies that assess researcher productivity					
Athey & Plotnicki (10 journals)	CAIS 2000	1992–1997	I&M, MISQ, ISR, JMIS, Decision Sciences	Management Science IEEE Trans. on Software Engineering	CACM, HBR, SMR
Huang & Hsu (12 journals)	CAIS 2005	1999–2003	MISQ, ISR, JMIS, Decision Sciences, DSS, I&M, JAIS	Management Science IEEE Trans. on Software Engineering	CACM, HBR, SMR
Claver, Gonzalez & Llopis	I&M	1981–1997	I&M, MISQ	(none)	(none)
Im, Kim & Kim (6 journals)	Decision Line 1998	1991–1996	ISR, JMIS, MISQ Decision Sciences	Management Science	CACM
Trower (2 journals)	AMCIS 1995	1990–1994	ISR, MISQ	(none)	(none)
Remus (4 journals)	MIS Interrupt 1989	1984–1988	MISQ	Management Science	CACM, HBR
Remus (4 journals)	MIS Interrupt 1991	1986–1990	MISQ	Management Science	CACM, HBR