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Communications of the Association for Information Systems

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The Contribution of Top IS Publications to Subsequent Research: A Citation Analysis

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Abstract:

Information Systems (IS) research is undertaken to advance the body of knowledge on IS-related phenomena at the individual, group, and organizational levels of analysis. The goals of conducting IS research range from individual learning—e.g., the intellectual development of individual scholars over community learning; e.g., the enhancement of research in the broader IS academic community to the improvement of practice in organizations. Whereas IS research has been criticized for having limited practical relevance, many scholars have assumed that IS research is succeeding in having a major impact on the IS academic community itself. This article challenges the assumption. Using citations as a proxy for contributions to subsequent research—or research importance—this study presents average citation figures for 1,992 papers published in six peer-reviewed IS journals between 1996 and 2010. It finds that citation figures are strongly skewed, with a vast majority of works published in top IS outlets being cited rather rarely. The article offers a discussion of the factors that may account for this finding and closes with a brief summary and outlook.

Keywords: IS research, citation analysis, research importance, practical relevance

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I. INTRODUCTION

Citations to academic papers are largely regarded as an important indicator of the impact of research [Karuga et al., 2007]. Citation analyses have been widely used to assess the impact of individual researchers [Clark and Warren, 2006; Gallivan and Benbunan-Fich, 2007; Truex et al., 2008; Truex et al., 2009], to value the quality of doctoral programs and institutions [Dennis et al., 2006], and to rank journals [Lewis et al., 2007; Lowry et al., 2004]. Organizations such as Academic Analytics and Thompson SCI, for instance, gather and synthesize detailed citation counts in virtually every discipline.

However, few have sought to use citation analyses to understand the impact of IS research on the discipline itself [Gill and Bhattacharjee, 2009]. Accordingly, we ponder whether IS research does an effective job of informing scholarship. More specifically, we investigate whether or not published IS research efficiently contributes to the production of further knowledge [Cooper et al., 1993; Cote et al., 1991]. That is, we are concerned about the contribution of research to subsequent research in contrast to contributions to practice or to individual career building. We term such contribution to subsequent research as *research importance*.

To address the issue of research importance, i.e., how existing published research contributes to subsequent research, we use citations of IS research to analyze the application of IS knowledge to scholarship. Following Starbuck [2007], we conduct a quantitative citation analysis covering citation data of IS papers published between 1996 and 2010 in six peer-reviewed IS journals.

II. OPERATIONALIZING RESEARCH IMPORTANCE: CITATION ANALYSIS

Typically the intent of researchers is to publish the results of their completed research in peer-reviewed journals, thereby enabling others to draw on their research [Ben-David, 1991]. However, publishing does not, per se, imply that the research is important to others or influences their work. In fact, published research might not even be read. In the era of information overload and omnipresent digital content, even peer-reviewed journal publications do not necessarily have any traceable importance to future works [Hassan and Loebbecke, 2010].

Research may be considered contributing to future research when the ideas expressed in the research are 'used' by other researchers. How would researchers 'use' research papers? They would read them, which is practically impossible to measure, and—subsequently—potentially cite them as reference in their own work. The bibliometrics concept of citation serves as available, even if only imperfect [MacRoberts and MacRoberts, 1996], proxy to research importance. Therefore, assuming that the most important contributions would be cited most frequently, citation analyses can be applied for assessing the research importance of a journal or an entire (sub)field [Cooper et al., 1993; Cote et al., 1991; Katerattanakul and Hong, 2003; Salancik, 1986; Zinkhan and Leigh, 1999].

Citation analyses can be conducted quantitatively and qualitatively.¹ Quantitative analyses focus on the number of times a paper has impacted other work, regardless of the context of the impact. Taking citations as quantitative tools for evaluating the progress of science [Price, 1978], such quantitative studies typically focus on citation counts as proxy measures of research importance and suggest the impact of publications on the research of future generations [Garfield, 1979]. By contrast, qualitative citation analyses, also called *content analyses* [Chubin and Moitra, 1975], are more interested in understanding the reasons behind a citation and a paper's impact than in determining an overall assessment of impact [Garfield, 1979]. Because our intent is to uncover the impact IS research, rather than the reasons for the impact, we rely on a quantitative citation analysis.

Quantitative, positivistic citation analyses have primarily been used in two different ways to evaluate research importance: First, they have been applied to *develop major research profiles and their intra- and inter-disciplinary impacts* [Banker and Kauffman, 2004; Culnan, 1986; Culnan, 1987; Davis, 1980; Gillenson and Stutz, 1991; Grover et al., 2006; Hamilton and Ives, 1982; Jackson and Nath, 1989; Nord and Nord, 1995; Nunamaker, 1980; Vogel and Wetherbe, 1984; Walstrom et al., 1995; Walstrom and Leonard, 2000]. Second, they have been used to *measure absolute and relative citation figures for papers, journals, and overall disciplines* [Brown and Gardener, 1985; Cote et

¹ Hassan and Loebbecke [2010] offer details of various approaches and interpretations to citation analyses and other scientometric approaches.

al., 1991; Dyckman and Zeff, 1984; Galliers and Whitley, 2002; Galliers and Whitley, 2007; Katerattanakul and Han, 2003; Liebowitz and Palmer, 1984].

We follow the quantitative positivistic path of citation analyses. However, we do not aim at ranking research, programs, or publications outlets, but rather seek to look at the productivity of (published) IS research as a whole. To that end, and despite reported weaknesses [MacRoberts and MacRoberts, 1989; Cameron, 2005], we offer a citation analysis investigating average citation figures [Moed, 2005]. As we do not know which publications are read or taught, we see average citations as the best available proxy and as the most suitable standardized, positivistic measure for research productivity and impact of a field [Ball, 2005].

III. DATA COLLECTION

In November 2006, we conducted the first round of data collection. We screened the list of 125 ranked journals with IS content published by the Association for Information Systems (see aisworld.org/csaunders/rankings.htm). We focused on IS journals continuously published between 1996 and 2005 with a Social Science Citation Index (SSCI) larger than 0.5 for the chosen reference year 2005. Those criteria gave us eight IS journals (see Table 1). However, we had to eliminate JMIS and IJEC from our study, as SSCI neither included data for JMIS between January 1996 and August 1999, nor for IJEC between January 1996 and March 2000. This left us with collecting citation data on six IS journals.

In November 2011, in order to update our data set, we extended the analysis to papers published in the same journals between 1996 and 2010. We kept the journal selection the same in order to allow for a comparable result structure. Therefore, instead of having investigated citations of 1,178 papers published between 1996 and 2005, in this article we offer citation data of 1,992 papers published between 1996 and 2010 (+70 percent). We base our data collection on the Web of Science listings of papers as 'article.'

In the analysis, we divide the six journals into two groups, with MISQ and ISR forming one group of premium IS journals, and EJIS, ISJ, JSIS, and JIT as a second group of top IS journals based on 2005 SSCI Impact Factor (see Table 1).

Table 1: IS Journals Selected for Citation Analysis

Journals	Code	∑ SSCI Impact Factor '05	∑ SSCI Citations '96-'05	∑ SSCI Citations '96-'10	Comment
<i>MIS Quarterly</i>	MISQ	4.98	4,118	13,729	
<i>Information Systems Research</i>	ISR	2.05	3,217	9,372	
<i>Journal of Information Technology</i>	JIT	1.54	687	1,837	
<i>Journal of Mgmt. Information Systems</i>	JMIS	1.41	1,394	6,022	No SSCI data 01/'96-08/'99
<i>European Journal of Information Systems</i>	EJIS	1.20	992	3,090	
<i>International Journal of Electr. Commerce</i>	IJEC	1.14	617	2,284	No SSCI data 01/'96-03/'00
<i>Information Systems Journal</i>	ISJ	0.56	615	2,175	
<i>Journal of Strategic Information Systems</i>	JSIS	0.51	562	2,181	

We notice that the number of citations roughly triples from 10,191 to 32,384 citations across the six journals when comparing 1996–2005 to 1996–2010 publications. This increase is largely to be explained by rising citation figures of the "older" papers, which have been available and sufficiently diffused over time so that the citations to those papers get published and can be counted. (This explanation confirms our reasoning for excluding JMIS and IJEC papers from our analysis, for which the first SSCI data was available for 2000 and 2001 respectively.)

We collected raw citation data from SSCI and Web of Science (see Table 2 for a description of those measures). For the analysis, we restricted ourselves to SSCI for two reasons. First, the well-defined SSCI measure excludes citations in working papers, conference proceedings, books, Ph.D. theses, and master theses and thereby avoids redundant counts of work published in multiple outlets. Second, SSCI monitors only peer-reviewed journals and thus offers only material pre-selected by academics.

To collect citation data points, for each paper published in the six journals between 1996 and 2010, we accessed the Thomson Reuters Web of Knowledge between November 1 and November 8, 2011, to extract the paper titles, author names, and publication dates. In total, we retrieved data for 1,992 individual papers (up from 1,178 papers published between 1996 and 2005). Table 3 shows the distribution of papers across journals.

Table 2: Citation Measures Overview

Direct Measure	Explanation
Social Science Citation Index (SSCI) per paper	Number of citations for papers published in 2,176 journals (by Nov. 2011) from 1946 to present [science.thomsonreuters.com]
Web of Science citation count per paper	Number of citations for paper based on a variety of indices, incl. Science Citation Index Expanded, Social Science Citation Index, Arts & Humanities Citation Index, Conference Proceedings Citation Index Science and Social Science & Humanities, Book Citation Index Science and Social Sciences & Humanities [images.webofknowledge.com]

Table 3: Total Number of Papers Published in Six Selected Journals (1996–2010)

Journal	First Published	Impact Factor '05*	Impact Factor '10**	∑ SSCI Citations '96–'10	Papers '96–'10	Average Citation p. Paper
MISQ	1977	4.98	5.04	13,729	344	39.91
ISR	1990	2.05	3.36	9,372	346	27.09
JIT	1986	1.54	2.91	1,837	355	5.17
EJIS	1991	1.20	1.77	3,090	465	6.65
ISJ	1991	0.56	2.18	2,175	249	8.73
JSIS	1991	0.51	2.90	2,181	233	9.36
Total				32,384	1,992	16.26

* Generated in Nov. 2006 via portal.isiknowledge.com

** Generated in Nov. 2011 via admin-apps.webofknowledge.com/JCR/JCR

To put the citation numbers for the IS field into perspective, we also collected data for other disciplines via the Thomson Reuters Web of Knowledge Journal Citation Reports [www.webofknowledge.com]. Again, we extend our data collection in order to now cover 1996 to 2010 papers. The Appendix shows representative journals and their respective key publication and citation data for five disciplines (categories) as defined by the Thomson Reuters Web of Knowledge Journal Citation Reports. Journals may be represented in more than one category.

IV. DATA ANALYSIS

Comparing IS publications in the six IS journals published between 1996 and 2010 to the ones published between 1996 and 2005 [Loebbecke et al., 2007b], the total number of papers published increased from 1,178 papers published between 1996 and 2005 to 1,992 papers published between 1996 and 2010 (+70 percent). The number of SSCI-counted citations to those papers almost tripled (32,384 vs. 10,191). Table 4 shows the SSCI-counted citation numbers. The disproportionately strong increase in citations is likely to be explained with the increasing time distance to the publication year (see Figures 1 and 2).

Examining the share of papers per publication year with n or less citations, Figure 1 aggregates the citations over all six journals. Figure 2 summarizes the respective citation numbers separately for MISQ and ISR in one graph and the other four journals EJIS, ISJ, JSIS, and JIT in the other one. In Figure 2, pretty much across the six journals, less papers published in the years 2000 and 2001 are cited rarely compared to those stemming from earlier or later publication years. This is even more notable as the number of total citations is similar to the previous and the following years, with only MISQ and ISR showing some opposite citation figures (see Table 4). An explanation for this phenomenon seems difficult.

In order to investigate the general citation situation, we calculate the average number of citations in SSCI-covered journal publications per paper per journal over the fifteen-year time span (calculating total citations received between 1996 and 2010 over total papers published between 1996 and 2010). For instance, MISQ published 344 papers between 1996 and 2010, which, by November 2011, together receive 13,729 citations. This leads to an average citation number for MISQ of 39.91. The respective average citation numbers for the other journals are 27.09 for ISR, 6.65 for EJIS, 8.73 for ISJ, 9.36 for JSIS, and 5.17 for JIT (Figure 3).



Table 4: Citations per Publication Outlet						
Year	SSCI Citations					
	MISQ	ISR	ISJ	EJIS	JIT	JSIS
2010	63	31	32	23	21	12
2009	170	103	62	40	33	18
2008	279	154	93	113	47	72
2007	361	158	94	250	101	99
2006	818	339	132	271	69	97
2005	1,107	494	241	294	62	205
2004	687	743	194	160	113	155
2003	1,854	836	188	323	158	109
2002	794	1,688	218	291	170	428
2001	886	1,002	175	249	168	151
2000	1,176	573	163	213	307	387
1999	1,839	705	172	208	159	191
1998	1,089	751	144	206	141	69
1997	1,280	904	110	165	99	64
1996	1,326	891	157	284	189	124
Σ	13,729	9,372	2,175	3,090	1,837	2,181
Web of Science Citations						
Σ	17,325	12,452	3,487	4,914	2,918	3,350

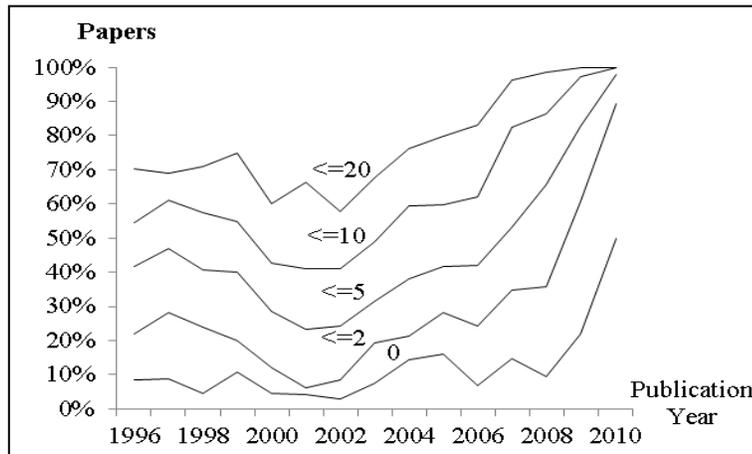


Figure 1. Share of Papers per Publication Year with n or Less Citations Aggregated over Six Journals (MISQ, ISR, EJIS, ISJ, JSIS, and JIT)

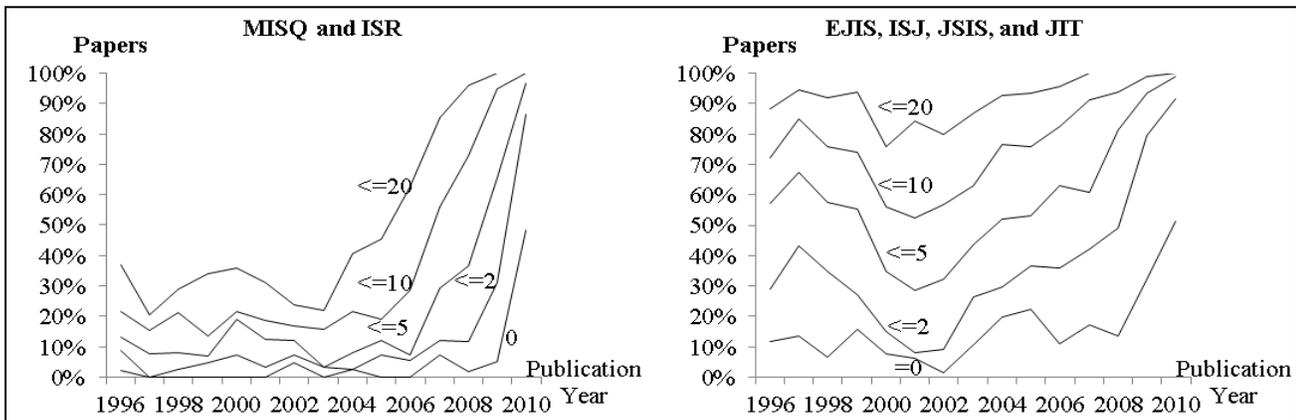


Figure 2. Share of Papers per Publication Year with n or Less Citations Aggregated over Journal Groups

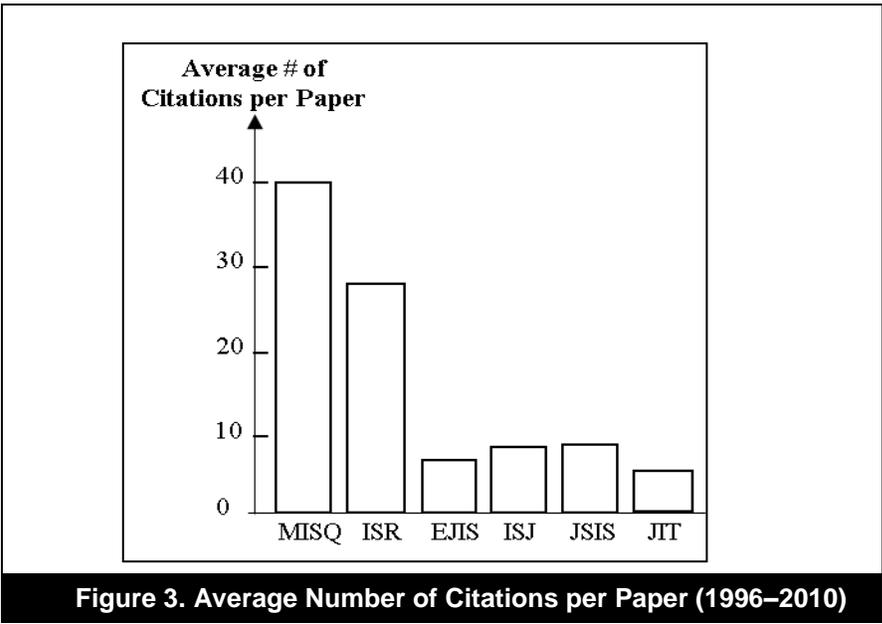


Figure 3. Average Number of Citations per Paper (1996–2010)

Comparing such average citation numbers for the two groups of journals, MISQ and ISR in one group and EJIS, ISJ, JSIS, and JIT in the other group, also shows that the generally assumed ranking difference is reflected in average citation numbers. The 690 papers published between 1996 and 2010 in the two top journals, MISQ and ISR, have 33.5 citations on average. The 1,302 papers published in EJIS, ISJ, JSIS, and JIT account for 9,283 (SSCI) citations.

Further analyzing our main citation counts shows that across all six selected journals more than two-thirds of all papers published between 1996 and 2005 are cited twenty times or less in November 2011, i.e., at least five years after the publication date (Figure 4). Looking at all the papers published between 1996 and 2010, even more than 80 percent are cited a maximum of twenty times. Similarly, minimum five years after publication in top IS journals, about 20 percent of the papers published until 2005 are cited two times or less.

Grouping MISQ and ISR, by November 2011 more than 20 percent of all papers published between 1996 and 2005 have five or less citations, and more than 50 percent are cited less than twenty times. About 30 percent of ISR papers are cited ten times at the most, even at least five years after publication (see Figure 5).

With regard to the other four journals, EJIS, ISJ, JSIS, and JIT, almost 90 percent of papers published between 1996 and 2005 receive twenty or less citations; more than 50 percent of those papers are cited ten times at best and more than 20 percent receive only two or less citations. Adding the last five years of publication deteriorates the numbers for EJIS, ISJ, JSIS, and JIT only slightly: More than 90 percent of papers published between 1996 and 2010 receive twenty or less citations. About 61 percent of the papers have five or less citations (see Figure 5). For the respective number for each of the six journals see Figure 6.

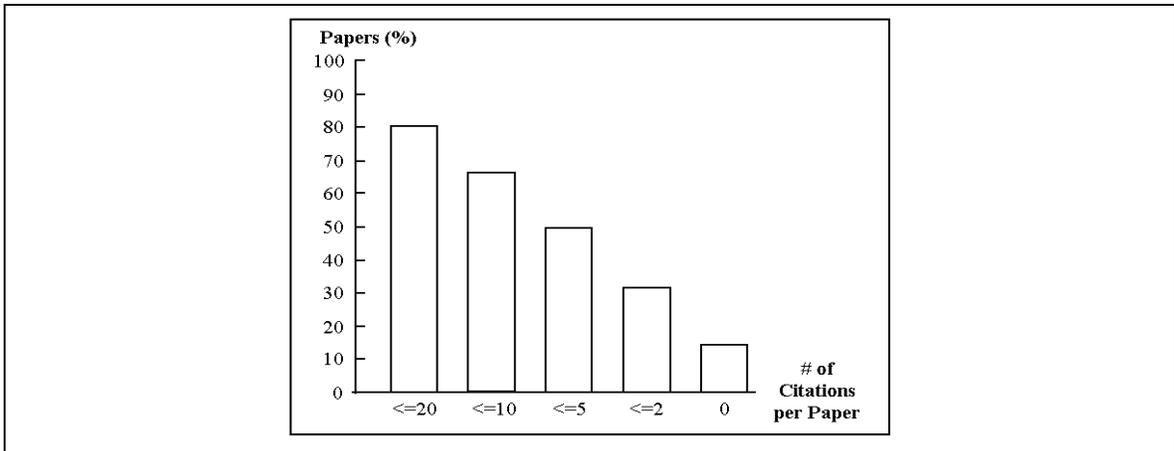


Figure 4. Share of Papers Published 1996–2010 with n or Less Citations by Nov. 2011 Aggregated over the Six Leading IS Journals (MISQ, ISR, EJIS, ISJ, JSIS, and JIT)

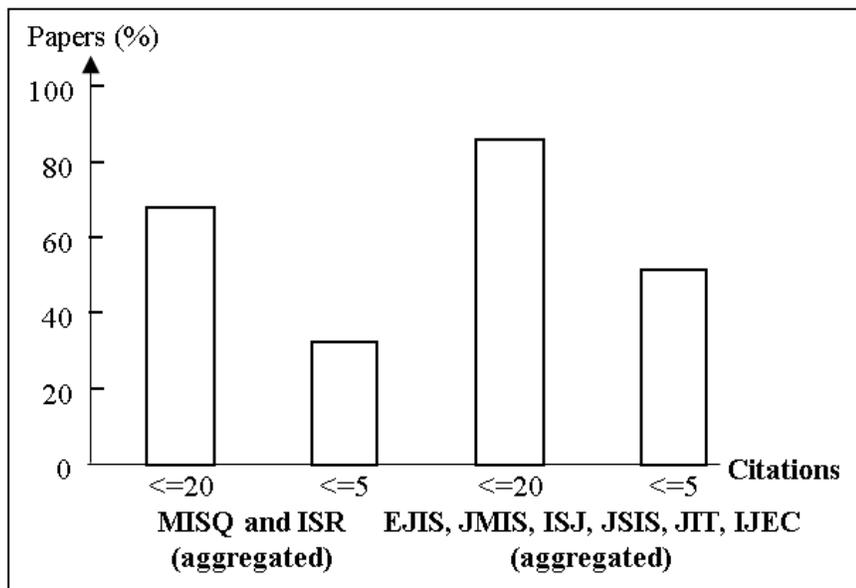


Figure 5. Share of Papers Published 1996–2010 with n or Less Citations by Nov. 2011 Aggregated over Journal Groups

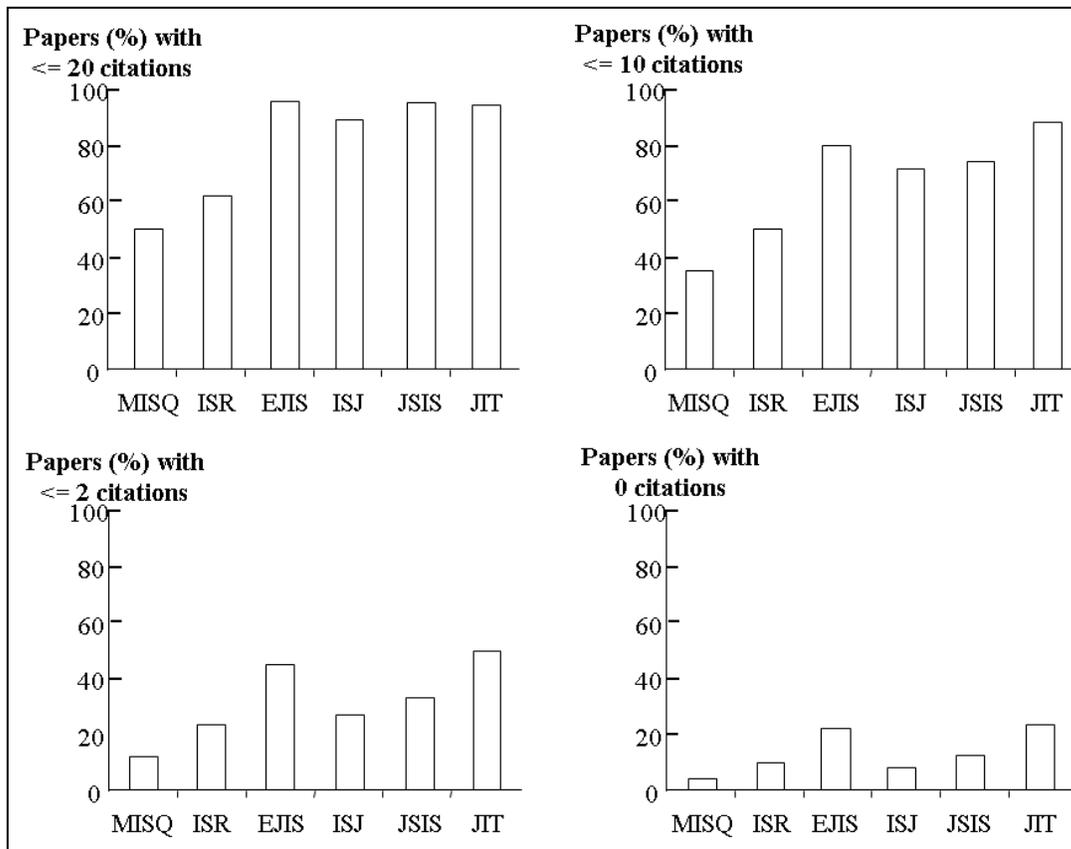


Figure 6. Share of Papers with n or Less Citations

Eliminating only ten papers from the analysis, namely the top ten most-cited papers, illustrates the skewed distribution of citations: Focusing on the 690 papers published in MISQ and ISR, for instance, the average number of citations drops from more than 35.5 to just above 28.8. The impact of eliminating the top most-cited papers from the analysis is even stronger, if one investigates only the top 10 percent most-cited papers (see Figure 7). For EJIS, ISJ, JSIS, and JIT the average number of citations per paper drops from 7.1 to 4.4 (1996–2010) when eliminating the ten most-cited papers.

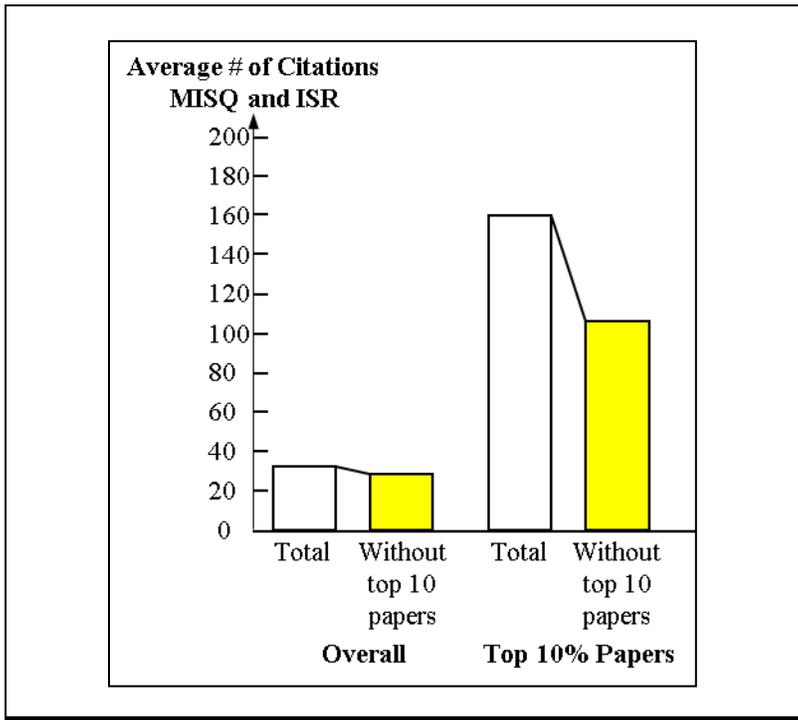


Figure 7. Aggregated MISQ and ISR Average Citations: Overall and 10% Most-cited Papers (1996–2010)

Looking at the 10 percent most-cited MISQ and ISR papers underlines again the skewed distribution (Figure 8). The 10 percent most-cited MISQ papers receive on average of almost 190 citations, ranging from 886 citations to 102. The 10 percent most-cited ISR papers receive on average 130 citations ranging from 331 to 66 citations. Across MISQ and ISR, the most-cited paper reaches 886 citations; the least-cited of the 10 percent most-cited ones receives only 87.

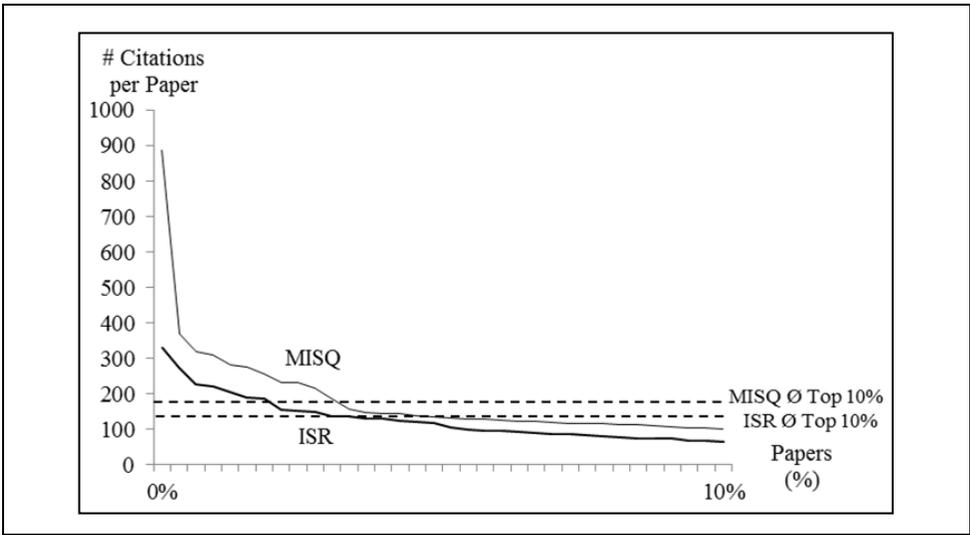


Figure 8. Number of Citations of the Most-cited Papers in MISQ and ISR (1996–2010)

Overall, considering papers in top IS journals, citation figures are strongly skewed with a vast majority of works published in those highly appreciated top IS outlets being cited rather rarely. Based on our analysis of the period between 1996 and 2010, we observe that about 80 percent of all publications in the six selected quality IS journals are cited twenty or fewer times and more than 50 percent less than five times. The distribution of citations is much skewed: for MISQ and ISR, when eliminating only the top-ten cited papers, the citation count drops by 14 percent to 28.8 on average for papers published between 1996 and 2010. Examining the respective numbers for the 10 percent most-cited papers, the citation average decreases by about 30 percent when taking the top ten papers away from the pool of the sixty-nine most highly cited papers. The same holds for EJIS, ISJ, JSIS, and JIT citation counts (7.1 vs. 4.4 citations on average across all papers published between 1996 and 2010).

How do our main findings compare to other disciplines—bearing in mind that different fields, journals, and disciplines follow distinct citation and reference policies and traditions? The Appendix—calculated from the Thomson Reuters Web of Knowledge [apps.webofknowledge.com] taking into account a significantly longer publication period—points to a significantly higher average citation number per paper in other disciplines. The respective numbers are on average 63.9 citations for the *Journal of Financial Economics*, 71.2 for the *Strategic Management Journal*, 51.7 for the *Quarterly Journal of Economics*, and 64.3 for the *Academy of Management Review*. Compared to the IS journal set investigated for this article, *internationally renowned academic journals in other disciplines seemingly show higher average citations per paper published*.

Starbuck [2007] provides an alternative picture when he investigates the citations of papers published between 1981 and 2004 in 509 business and management journals. He finds an average of 0.8 citations per paper in business and management and an average of 0.7 in business finance. The difference between the numbers of the premier journals provided in the previous paragraph and the ones offered by Starbuck may be explained by the large number of journals entering his calculation.

V. DISCUSSION

Whereas Starbuck's [2007] 0.8 average citations per paper across 509 business and management journals make the citation numbers for the top six IS journals look more appealing, it is, nevertheless, apparent that within our discipline, a small percent of papers receive a high number of citations and a large percent receive few citations. We provide several explanations for this phenomenon.

- *The large number and diversity of papers published.* The multitude of available papers makes it increasingly difficult for researchers to read the volume of academic contributions, to use and finally cite it. Indeed, senior scholars identifying very few seminal, 'classic' texts [de Solla Price, 1963] structure the reading for doctoral students and make the quantity of papers published more manageable. As a result, those seminal papers strongly influence average citation numbers.
- *The IS field still being young and growing.* In its early years, the field changed its focus several times, making it difficult to build on previous work. Especially the dynamic evolution of the technologies underlying much of the research, as, for instance, the advent of the Internet, has conceptually changed the approach to many topics. While the dynamic evolution of the field offers countless research opportunities, it means that research is unlikely to build on and cite prior research.
- *Tenured faculty also publishing in lower ranked journals with lower citation numbers.* After being awarded tenure, researchers may aim at promoting a new or underdeveloped journal in order to increase readership of that journal. Or they may appreciate the chance to publish an innovative idea more quickly, avoiding long review rounds and the rigor required for publishing in premier journals.
- *Authors deciding on citations based on political arguments.* Authors decide on citations not only based on the intellectual influence of the respective work, but also based on political arguments [Galliers and Meadows, 2003; Introna, 2003; Introna and Nissenbaum, 2000; Liebowitz and Palmer, 1984; Hassan and Loebbecke, 2010]. Hoping to increase the probability of acceptance, authors may refer to related topics or to core authors in order to cover the leading people in the field, and to give gratuitous citations to authors in editorial boards and to papers appearing in the journal of submission. Such 'core' referencing of seminal work is expected by many reviewers to show the proficiency to handle the conceptual core of the respective topic.
- *Citation policies and rules.* Some journals place limits on the number of references they allow. In rare cases, they even ask for references from specific journals [Salancik, 1986].
- *Books being excluded from the citation analysis.* Many core books are rather comprehensive 'classics.' Citing them often occurs "en passant" without using them as reference to a specific detail [Whitley and

Galliers, 2007]. As books are popular sources of the theoretical and conceptual core of IS, citing them allows researchers to cover a broader field with just one citation.

- *Journal distribution practices.* The number of citations per paper not only depends on the research importance of a particular contribution, but also strongly varies with the circulations, where a larger circulation tends to produce more citations [Galliers and Whitley, 2007; Starbuck, 2007].
- *Citations of papers in practitioner-oriented journals excluded.* Journals such as *Harvard Business Review*, *Sloan Management Review*, and *Communications of the ACM* are frequently cited in IS and other academic outlets (e.g., Loebbecke et al., 2007a; Loebbecke and Powell, 2009; Whitley and Galliers, 2007). They serve as justification of the real business importance of an issue [Barrett and Walsham, 2004] or as short reference to a comprehensive idea, otherwise stretched over several research papers. Including such outlets may increase the average number of citations of major IS works.

Certainly, those eight lines of arguments support the citation figures presented above. Perhaps, the efforts to 'grow the field' by giving more researchers the opportunity and the outlets to contribute justify the current publication wave. Or perhaps, regardless of the number of papers we publish per year, the 80–20 rule will almost always apply, that is, that less than 20 percent of the papers will be responsible for more than 80 percent of the impact. However, given that this impact comes at a high cost in terms of reviewer time and effort as well as author time and effort, it is worth thinking about whether there are not more efficient ways to identify the 20 percent with high impact and to facilitate the publication of the 80 percent in an efficient manner. To the extent that the goal of publishing is simply to publish for the sake of promotion and tenure, there is no problem. To the extent that the aim of publishing our research is to provide the groundwork for future research, then these figures might give us cause to reflect.

It is our contention that the citation figures point to a dilemma for the IS community when it comes to legitimizing the tremendous IS research and publication efforts undertaken around the world by IS authors, reviewers, and editors. Our field is not alone in this dilemma: for example, in his 2011 AoM Division Keynote, Baum [2011] raises a similar concern with regard to management publications. In light of the enormous investments going into IS research, we would like to ask whether the current trend to publish more papers per year is healthy for the community and sustainable.

We would like to see more focus in publications as a means to grow the field. Could we, as a community, encourage researchers to pursue 'research importance'—perhaps measured in citations—instead of just another line on the publication record? Could we as a community push for shorter, more focused papers with fuller versions available online for authors that found value in the focused version?

We do not think that a claim for more focus would risk research diversity. Today, almost each school of thought has its own outlet, even though some outlets promote very similar research results under different labels [Loebbecke et al., 2007b]. Those niche publications get cited, they are at the core of their sub-community, and thus they are exactly what we ask for. As publications they measurably contribute to further research—even if in the niche.

Generally speaking, our claim for research publications with a stronger focus on their contribution to future research use (measured in citations) would also strengthen the role of editors and reviewers. As experts in the respective area, they have been selected by community members to play a guiding role for one of the outlets. We would assume that—as experts in the field—they are capable of selecting important or even seminal papers in advance. Complementing selective publications (in paper or electronic), the community may also support the trend to open, mostly electronic platforms where any gatekeeper role may be seen as inappropriate [Gray et al., 2006; Watson, 2004], platforms that allow almost everybody to upload almost everything with demand 'to be seen.'

Finally, we do not neglect any discussion of whether the number of citations in top journals can serve as proxy for research importance.² Citations act like an expert referral. 'Discovery, priority and recognition are thus inextricably intertwined with publication, and citation links expose the socially validated structure of originality' [Small, 2004, p. 73]. However, Hassan and Loebbecke [2010] among others also provide many reasons and even underlying theories why authors cite works which they do not even consider core to their research (see also Leydesdorff and Amsterdamska, 1990).

² Within the IS field, Hansen et al. [2006] analyzed how papers cited the IS classic "Power, Politics and Implementation" [Markus 1983]. They found almost 80 percent of citations to Markus [1983] referenced haphazardly in relation to concepts that did not play an important role in the citing paper's main argument.

VI. SUMMARY AND OUTLOOK

Our analysis uncovers a puzzling picture of one of many academic disciplines with large quantities of research publications but relatively few citations per publication. The production of new knowledge well-exceeds the application of the knowledge by other researchers in the discipline.

However, while the citation numbers are fairly straightforward, we admit that their meaning is ambiguous. Are we publishing too much research so that the research is subjected to the law of diminishing returns, with only a handful of exemplary papers achieving apparent impact? Or are we producing research that is simply not read, either because it is not sufficiently readable or is not being noticed within and beyond our discipline? Or, yet still, is the discipline functioning as an inefficient R&D unit, producing ever more innovations but with little realization of the value of these innovations?

To us, the data presented here provides a loud wake-up call. The vast majority of published papers in top IS journals, amid highly selected by resource consuming reviewing and editing processes, is of only limited (measurable) value to subsequent research if one uses citations as standardized measure for research productivity [Ball, 2005].

As in creative industries, we do not think that there is, could be, or should be a clear prescribed input–output relation that defines how many citations warrant publications or how many citations lead to a sufficiently valuable contribution. Neither do we think that our data should lead to comparing IS to other academic fields. Instead of using the presented data for any policy or action proposal, we would like to foster a discussion—in particular among those who are heavily cited and who have built their impressive careers: does the IS community and its respected leaders really believe that taxpayers and other funding authorities will continue to support many research works where the main ‘output’ are some citations and discussions around earlier versions of working drafts in workshops, conferences, and open source communities? If we think so, we find us too modest as a community. Maybe a newly fostered discussion would bring some reasoning onto the table beyond claiming that other academic disciplines do about the same. Maybe we could start a broader discussion about how to balance (1) our wish for the IS community as a whole help improving the world—either directly or at least indirectly by fostering further IS research with (2) the natural interest for personal career development and perhaps departmental reputation building.

We provide the data in this article in the hope that the debate will ultimately encourage action that will increase the contribution of IS research for future IS works and raise the profile and visibility of IS research.

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Editor’s Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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APPENDIX A. PUBLICATION AND CITATION DATA FOR JOURNALS IN FIVE CATEGORIES*

Table A1: Publication and Citation Data for Journals in Five Categories*

Category	Journal	JCR Social Sc. Impact Factor '10	Σ Web of Science Citations	Σ Papers	Average Citation p. Paper (11/'11)	Time
Business ¹	<i>Academy of Management Review</i>	6,720	12,4461	2,041	64.32	'83-'11
	<i>Journal of Marketing</i>	3,770	11,2152	4,278	27.09	'56-'11
	<i>Administrative Science Quarterly</i>	3,684	14,2160	3,450	42.59	'58-'11
	<i>Academy of Management J.</i>	5,250	15,3428	2,944	52.13	'80-'11
	<i>Strategic Management Journal</i>	3,583	13,3742	1,879	71.18	'56-'11
Economics ²	<i>Quarterly Journal of Economics</i>	5,940	140,618	2,718	51.74	'69-'11
	<i>Journal of Economic Literature</i>	7,432	55,459	7,336	7.76	'56-'11
	<i>Econometrica</i>	3,185	274,385	6,599	41.71	'56-'11
	<i>Journal of Political Economy</i>	4,065	216,843	4,863	44.95	'70-'11
	<i>Brookings Papers on Econ. Activity</i>	3,783	7152	715	10.00	'70-'11
Info Sci. & Library Sc. ³	<i>MIS Quarterly</i>	5,041	51,298	885	57.96	'66-'11
	<i>Ann. Rev. of Info. a. Science a. Tech.</i>	2,000	6,568	550	11.94	'94-'11
	<i>Information Systems Research</i>	3,358	18,407	486	37.87	'94-'11
	<i>Journal of Documentation</i>	1,447	18,236	3,663	5.10	'56-'11
	<i>Library Quarterly</i>	0,651	6,364	4,698	1.41	'83-'11
Management ⁴	<i>Academy of Management Review</i>	6,720	124,461	2,041	64.32	'56-'11
	<i>Administrative Science Quarterly</i>	3,684	142,160	3,450	42.59	'58-'11
	<i>Academy of Management Journal</i>	5,250	153,428	2,944	52.13	'92-'11
	<i>Organization Science</i>	3,800	54,647	1,026	53.26	'92-'11
	<i>Strategic Management Journal</i>	3,583	133,742	1,879	71.18	'56-'11
Business & Finance ⁵	<i>Journal of Finance</i>	4,151	171,826	7,060	24.49	'56-'11
	<i>Journal of Financial Economics</i>	3,810	118,590	1,857	63.86	'76-'11
	<i>Brookings Papers on Econ. Activity</i>	3,783	7,152	715	10.00	'70-'11
	<i>Journal of Accounting Research</i>	3,346	28,597	1,764	16.21	'63-'11
	<i>Auditing—J. of Practice & Theory</i>	1,021	4,589	709	6.47	'84-'11

* Source: ISI Web of Knowledge Journal Citation Reports (admin-apps.webofknowledge.com/JCR/JCR; current Nov. 12, 2011).

- 1 Covering marketing and advertising, forecasting, planning, administration, organizational studies, compensation, strategy, retailing, consumer research, management, and resources relating to business history, and business ethics.
- 2 Covering theoretical and applied works on the production, distribution, and consumption of goods and service including, political economy, agricultural economics, macroeconomics, microeconomics, econometrics, trade, and planning.
- 3 Covering bibliographic studies, cataloguing, categorization, database construction and maintenance, electronic libraries, information ethics, information processing and management, scientometrics, and libraries.
- 4 Covering management science, organization studies, strategic planning, decision-making methods, and leadership studies.
- 5 Covering financial and economic correlations, accounting, financial management, investment strategies, the international monetary system, insurance, taxation, and banking.

Most of the journals first appeared long before the six IS journals covered in this work. This is relevant for comparing the numbers among disciplines as the number of total citations and of average citations per paper often increase with the “age of the paper.”



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Claudia Loebbecke is a professor of Business, Media and Technology Management and Director of the Department of Media and Technology Management at the University of Cologne, Germany. 2005–2006 she was elected president of the Association for Information Systems (AIS). She serves as Senior Editor of the *Journal of Strategic Information Systems* (JSIS), as Advisory Board Member of *Information Systems Research* (ISR) and of the *Journal of Information Technology* (JIT), and on the Editorial Board of the *Information Systems Journal* (ISJ) and *Communications of the Association for Information Systems* (CAIS). Claudia received a Masters (1990) and a Ph.D. (1995) in Business Administration, both from the University of Cologne, Germany, and an MBA from Indiana University, Bloomington, Indiana, U.S. (1991). In 2011, she co-authored the study “Assessing Cloud Readiness,” which won the Research Competition of the Society for Information Management. She has published over fifty internationally peer-reviewed journal articles.

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