December 2007

Research Importance in the Information Systems Field: A Citations Analysis

Claudia Loebbecke
University of Cologne

Claudio Huyskens
University of Cologne

Olivier Berthod
University of Cologne

RESEARCH IMPORTANCE IN THE INFORMATION SYSTEMS FIELD: A CITATION ANALYSIS

Claudia Loebbecke*
Department of Business Administration and Media Management
University of Cologne, Cologne, Germany
claudia.loebbecke@uni-koeln.de
*Visiting Professor (Fall 2007): Bentley College

Olivier Berthod
Department of Business Administration and Media Management
University of Cologne, Cologne, Germany
olivier.berthod@uni-koeln.de

Claudio Huyskens
Department of Business Administration and Media Management
University of Cologne, Cologne, Germany
claudio.huyskens@uni-koeln

Abstract

IS research can serve two goals: improve practice or make a research contribution. Since the early days of the Information Systems (IS) discipline, researchers have criticized the limited practical relevance of their work. In the case of research contributions, new research typically builds on important prior research. This study investigates the phenomenon of research importance in IS, using citations as proxy for research importance. The paper analyzes citations to 1,178 papers published in six peer-reviewed IS journals between 1996 and 2005. The study finds that, based on citations, only few papers show measurable research importance. The paper concludes with a discussion of the factors that may account for this finding and closes with a proposed solution to address the issue.

Keywords: IS Research, Citation Analysis, Research Importance, Practical Relevance

Introduction

The Information Systems (IS) discipline has been widely criticized for delivering results with only minor practical relevance (Benbasat and Zmud 1999; Baskerville and Myers 2004; Davenport and Markus 1999; Lyytinen and King 2004). In light of this, an alternative contribution is required to legitimize the tremendous research efforts undertaken by the academic IS community.

Such alternative contribution could be the importance that research and its published results have to the production of further knowledge (Cooper et al. 1993; Cote et al. 1991). The importance of research to research – or, in brief, the *research importance* – marks an equally rewarding research contribution (Agarwal and Lucas 2005; Karuga et al. 2007; Shrivastava 1987; van de Ven and Johnson 2006), which indirectly also appears in the 'rigor versus relevance' debate (e.g., Applegate 1999; Davenport and Markus 1999; Orlikowski and Iacono 2001; Watson et al. 1999; Weber 2003).

Following up on the concept of *research importance* to research, in this paper we aim at investigating whether and to what degree IS research *is* important to further research and thereby influences the production of IS knowledge and the development of the IS discipline. To start, such an investigation requires operationalizing the concept of research importance.

Typically, researchers – upon completion of their work – publish in peer-reviewed journals and thereby enable others to draw on research (Ben-David 1991). However, publishing does not per se imply that the research is important to others and influences their work. In the era of information overflow and omni-present digital content, even peer-reviewed journal publications do not necessarily have any traceable importance. Hence, neither publication numbers nor content quality assessments can serve as appropriate measure for research importance in IS.

Instead, research may be considered important when the expressed ideas are 'used' by other researchers. How would researchers 'use' research papers? They would read them, which is practically impossible to measure, and – in a second step – potentially cite them as reference in their own work.

Therefore, the bibliometrics concept of citation serves as best available, even if only imperfect (MacRoberts and MacRoberts 1996) proxy to research importance. Measuring the citations various publications receive, citation analyses can be applied for assessing the research importance of a journal or an entire field, assuming that the most important contributions would be cited most frequently (Cooper et al. 1993; Cote et al. 1991; Katerattanakul and Hong 2003; Salancik 1986; Zinkhan and Leigh 1999).

Citation analyses can be conducted as quantitative and qualitative. Qualitative citation analyses also appear under the term Content Analysis (Chubin and Moitra 1975); they allow a more in-depth investigation into the reasons for the impact of a paper (Garfield 1979).

Regarding quantitative citation analyses, two major streams have emerged to evaluate research importance: Firstly, quantitative citation analyses have been applied for characterizing 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).

Secondly, quantitative citation analyses have been used to measure absolute and relative citation figures for papers, journals, and overall disciplines (Brown and Gardener 1985; Cote et al. 1991; Dyckman and Zeff 1984; Galliers and Whitley 2002; Galliers and Whitley 2007; Katerattanakul and Han 2003; Liebowitz and Palmer 1984). Such studies offer indications for the importance that publications have on the research of following generations (Garfield 1979).

To pursue our research question, whether and to what degree IS research is important to further research and thereby influences the production of IS knowledge and the development of the IS discipline, we follow Starbuck (2007) and conduct a quantitative citation analysis. In particular, we analyze citation data of IS papers published between 1996 and 2005 in six peer-reviewed journals.

Data Collection

For our exploratory study, 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) impact factor 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 the analysis, we divide the six journals in two groups with MISQ and ISR forming one group and EJIS, ISJ, JSIS, and JIT a second one.

Table 1. IS Journals Selected for Citation Analysis

Journals	Code	SSCI Impact Factor '05	∑ SSCI Citations '96-'05	Comment
MIS Quarterly	MISQ	4.98*	4,885	
Information Systems Research	ISR	2.05*	3,593	
Journal of Information Technology	JIT	1.54*	720	
Journal of Mgmt. Information Systems	JMIS	1.41*	1,630	No SSCI data 01/'96-08/'99
European Journal of Information Systems	EJIS	1.20*	901	
International Journal of E. Commerce	IJEC	1.14*	722	No SSCI data 01/'96-08/'99
Information Systems Journal	ISJ	0.56*	692	
Journal of Strategic Information Systems	JSIS	0.51*	558	

* As Thompson Scientific does not calculate Impact Factors for EJIS and JSIS, we calculated the respective value based on ISI Impact Factor guidelines and SSCI citation data

We collected raw citation data from SSCI and Google Scholar (see Table 2 for a description of those measures). For the analysis, we restricted ourselves to SSCI for two reasons. (1) The well-defined SSCI measure excludes citations in working papers, conference proceedings, books, PhD theses, and master theses and thereby avoids redundant counts of work published in multiple outlets. (2) SSCI only monitors peer-reviewed journals and thus offers only material pre-selected by academics.

Table 2. Citation Measures Overview

Direct Measure	Explanation
Social Science Citation Index (SSCI) per paper	Number of citations for papers published in more than 3,300 journals from 1946 to present; see portal.isiknowledge.com
Google Scholar per paper	Number of citations across outlets including books, working paper, conference proceedings, etc., all indexed by Google (not disclosing details of searching and counting algorithms)

To collect citation data points, for each paper published in the six journals between 1996 and 2005, we accessed the ISI Web of Knowledge between November 6 and November 17, 2006, to extract the paper titles, author names, and publication dates. In total, we retrieved data for 1,178 individual papers. Table 3 shows the distribution of papers across journals.

Table 3. Total Number of Papers Published in Six Selected Journals (1996 – 2005)

Journal	First Published	SSCI Impact Factor '05	∑ SSCI Citations '96-'05	Papers '96-'05	∅ Citation p. Paper	Time
MISQ	1977	4.98	4,418	189	23.38	'96-'05
ISR	1990	2.05	3,217	222	14.49	'96-'05
JIT	1986	1.54	687	229	3.00	'96-'05
EJIS	1991	1.20	992	222	4.47	'96-'05
ISJ	1991	0.56	615	163	3.77	'96-'05
JSIS	1991	0.51	562	153	3.67	'96-'05
Total			10,491	1,178	8.91	'96-'05

To enable us to put the citation numbers for the IS field into perspective, we also collected data for other disciplines via the ISI Web of Knowledge Journal Citation Reports (portal.isiknowledge.com). Table A in the Appendix shows representative journals and their respective key publication and citation data for five disciplines (categories) as defined by the ISI Web of Knowledge Journal Citation Reports. Journals may be represented in more than one category.

Data Analysis

Together the six journals account for 10,491 SSCI-counted citations and 27,713 in Google Scholar (see Table 4).

Figure 1 depicts the average number of citations per paper per journal over the ten year time span (calculating total citations received between '96 and '05 over total papers published between '96 and '05). The respective figures are 21.78 for MISQ, 14.49 for ISR, 4.47 for EJIS, 3.77 for ISJ, 3.67 for JSIS, and 3.00 for JIT.

The last two years of publication are not yet cited often as papers that could cite them may still be in the reviewing and printing process. Hence, for some analyses we eliminate the last two years of publication and investigate the number of papers receiving fewer than a certain pre-defined number of citations (for both periods, '96-'05 and '96-'03).

To us, the overall most striking results are shown in Figure 2. By November 2006, aggregated over the six journals, more than 30% of all papers published between 1996 and 2003 have been cited two times or fewer. Figure 3 shows the respective numbers for each of the six journals.

As shown in Figure 4, about 66% of the papers published in MISQ and ISR receive 20 citations or fewer and about 35% of papers in those two journals have five citations or fewer. Considering only papers published between 1996 and 2003, the results are similar to the ones above. Still about 59% of those papers receive 20 citations or fewer and about 21% of those papers receive five citations or fewer.

The numbers drop further when looking at the other four journals (EJIS, ISJ, JSIS, and JIT). More than 98% of papers published between 1996 and 2005 receive equal to or fewer than 20 citations. About 77% have even equal to or fewer than five citations. Excluding the last two years of publication improves the numbers only slightly. Of all papers published in EJIS, ISJ, JSIS, and JIT between 1996 and 2003, about 97% show equal to or fewer than 20 citations and about 72% equal to or fewer than five citations.

Next, we investigate the number of citations per journal and year of publication (see Table B in the Appendix) . Figure 5 depicts the respective curves aggregated over all six journals. Figure 6 aggregates the respective citation numbers, once for MISQ and ISR and once for EJIS, ISJ, JSIS, and JIT. To dig deeper into the skewed distribution, for MISQ and ISR we repeat the above analysis *without* the 10 best-cited papers (Figure 7). While an average paper published between 1996 and 2003 in those two journals receives 21.4 citations, when eliminating the ten best-cited papers, the number of average citations drops by 13% from 21.4 to 18.6.

For MISQ and ISR, Figure 8 exemplifies in a different way how skewed the citation distribution is within the 10% best-cited papers. The 10% best-cited MISQ papers receive on average 89 citations, ranging from 130 citations to 55. The 10% best-cited ISR papers receive on average 58 citations ranging from 122 to 34 citations.

Table 4. Citations per Publication Outlet

Year	SSCI Citations					
	MISQ	**ISR**	**ISJ**	**EJIS**	**JIT**	**JSIS**
2005	44	11	15	16	3	5
2004	41	55	19	38	2	16
2003	300	138	40	66	37	23
2002	122	472	44	95	33	91
2001	221	332	56	121	49	51
2000	656	348	69	115	147	127
1999	736	398	88	138	103	106
1998	641	453	64	158	109	35
1997	641	405	101	105	65	35
1996	716	605	119	140	139	73
∑	4,118	3,217	615	992	687	562
	Google Scholar Citations[1]					
	10,979	7,572	2,370	2,628	2,270	2,894

1 Added due to popularity among researchers (Kousha and Thelwall 2007)

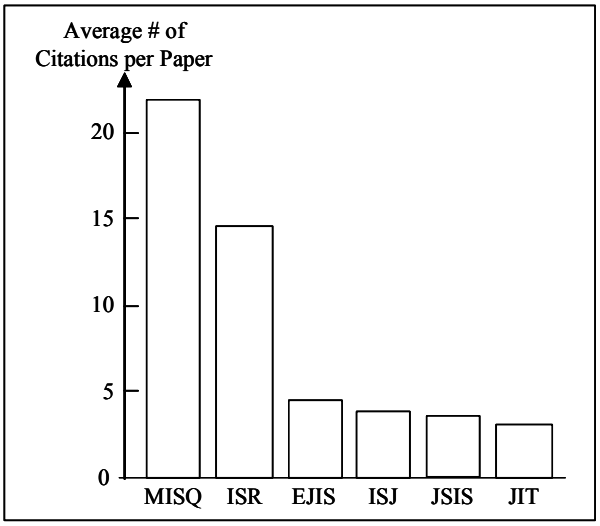

Figure 1. Average Number of Citations per Paper (1996-2005)

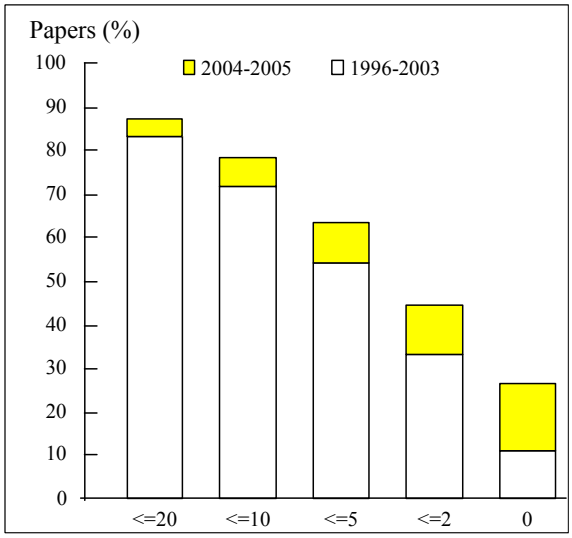

Figure 2. Share of Papers with Equal to or Fewer than n Citations
- Aggregated over the Six Leading IS Journals (MISQ ISR, EJIS, ISJ, JSIS, and JIT) –

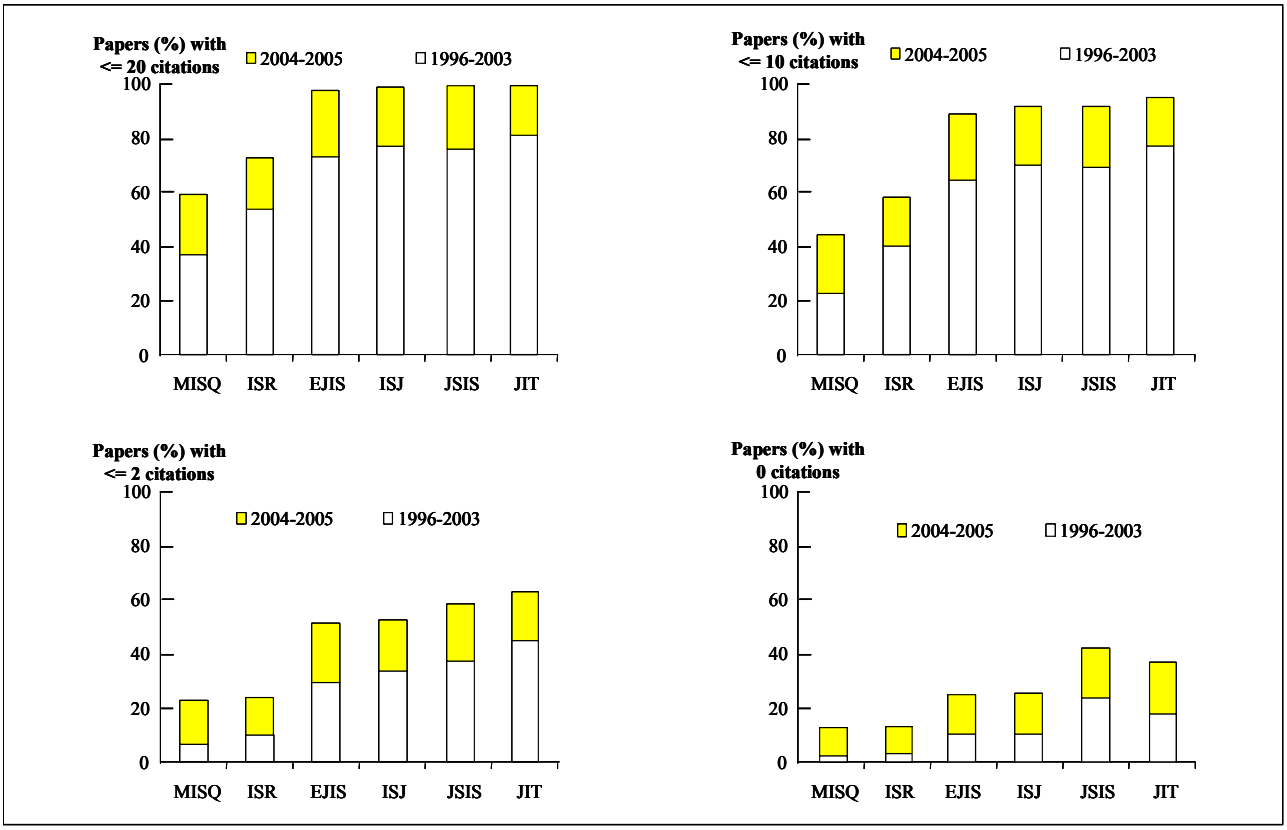

Figure 3. Share of Papers with Equal to or Fewer than n Citations

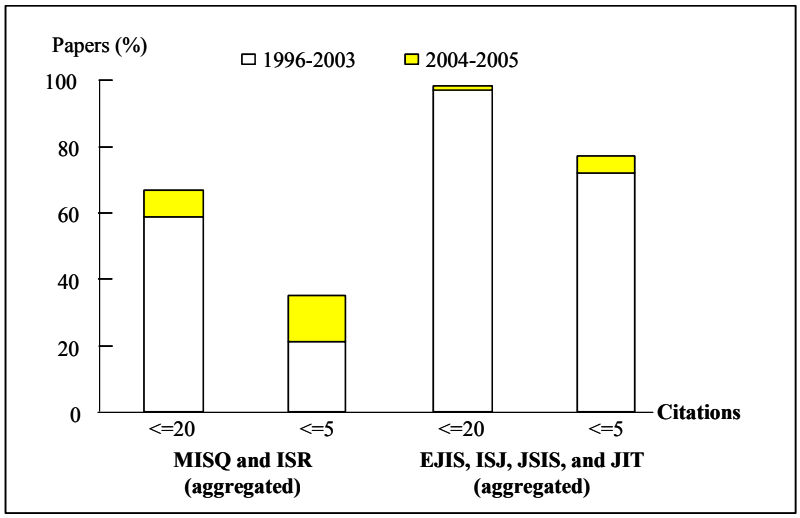

Figure 4. Share of Papers with Equal to or Fewer than n Citations (Aggregated over Journal Groups)

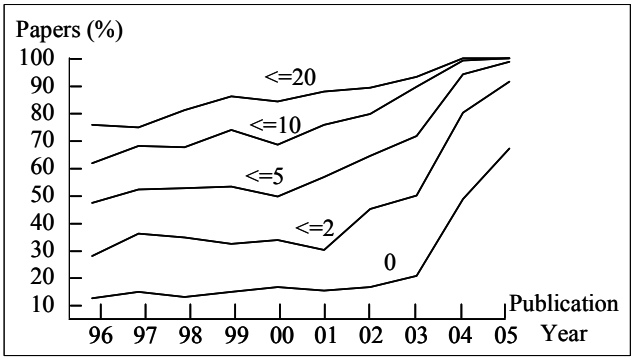

Figure 5. Share of Papers per Publication Year with Equal to or Fewer than n Citations – Aggregated over Six Journals (MISQ ISR, EJIS, ISJ, JSIS, and JIT) –

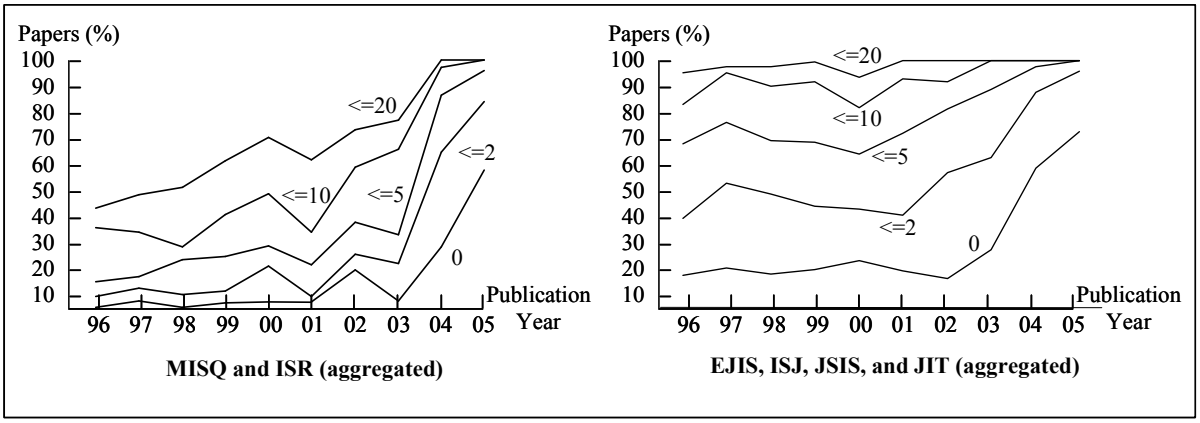

Figure 6. Share of Papers per Publication Year with Equal to or Fewer than n Citations – Aggregated over Journal Groups –

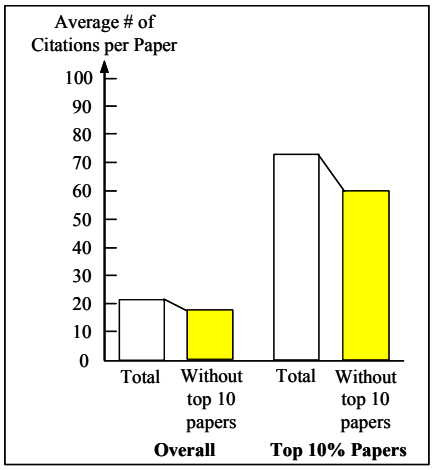

Figure 7. Aggregated MISQ and ISR Average Citations: Overall and 10% Best-Cited Papers (1996 - 2003)

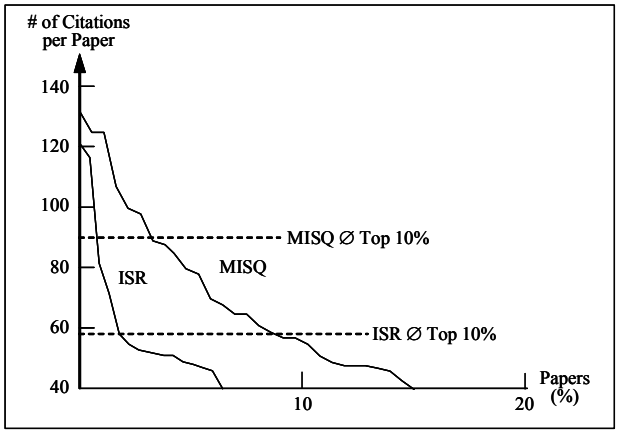

Figure 8. Number of Citations of the Best-Cited Papers in MISQ and ISR (1996 – 2003)

Main Findings and Discussion

Main Findings

Based on a ten-year period ('96-'05), the study indicates that a large share of research papers published in leading IS journals is cited rather rarely in (SSCI-covered) journal publications. Papers in MISQ and ISR have 21.3 citations on average. Almost 40% of the papers receive only five or fewer citations. Eliminating the 10 best-cited papers reduces the number of citations by almost 24% from 21.3 to 16.3. Excluding the 10% best-cited papers, further reduces the average number of citations by about 40% to 12.9 ('96-'05). Papers in EJIS, ISJ, JSIS, and JIT show on average 3.7 citations per paper. About 15% of those papers receive no citations and more than 40% receive only two or fewer. Eliminating the 10% best-cited papers leaves 2.4 average citations ('96-'05). Finally, our data point at the rather skewed distribution of citations among the 10% best-cited papers in MISQ and ISR. While the best-cited paper reaches 130 citations, the least-cited of the 10% best-cited ones receives only 44. Overall, based on this study – in which citations serve as proxy for research importance – the majority of IS publications seem to be of low research importance.

How does this compare to other disciplines – bearing in mind that different fields and different journals and disciplines follow distinct citation and reference policies and traditions?

Table 4 (above) – calculated from the ISI Web of Knowledge (portal.isiknowledge.com) taking into account a significantly longer publication period – points to significantly higher average citation per paper in other disciplines. The respective numbers are from 46.6 citations for the Journal of Financial Economics, 36.2 for the Journal of Strategic Management, 31.8 for the Quarterly Journal of Economics, and 31.1 for the Academy of Management Review. Similarly, Brown and Gardener (1985) refer to an average of 3.65 citations for papers published in the Journal of Accounting Research and 1.84 citations for those published in Accounting Research investigating the years 1963 to 1982.

However, Starbuck (2007) provides a different view. He investigates the citations of papers published between 1981 and 2004 in 509 journals and finds an average of 0.8 citations per paper in business and management and of 0.7 in business finance. Those strikingly low numbers may be explained by the large number of journals entering the calculation, though. While they make the results for IS look a bit more appealing, they also underline the general issue of 'low' citation numbers and hence presumably insufficient research importance. But how can we explain 'low' citation numbers?

Possible Explanations of 'Low' Citation Numbers

We propose seven possible explanations, which are mostly inherent to academia. We do *not* think that they legitimize the 'low' citation numbers. Nevertheless they need to be taken into account when looking for a potential solution to what we think is a serious dilemma for the research community.

The large number and diversity of journals and papers published. The multitude of available papers makes it increasingly difficult for researchers to be aware of published research, to read it, and finally to use and 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 to 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 and increase readership. 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 1985; Nissenbaum 2003). Hoping to increase the probability of acceptance, authors may cite to relate topics to core authors, 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.

Systematic biases due to the bibliographic practices of the respective field. 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. 2006; 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 would increase the average number of citations of major IS works.

Toward Better Legitimizing IS Research: A Proposal

If IS research offers neither sufficient practical relevance (Benbasat and Zmud 1999; Baskerville and Myers 2004; Davenport and Markus 1999; Lyytinen and King 2004) nor convincing importance to research (see this paper), one has to ask how to legitimize the tremendous IS research and publication efforts undertaken around the world by IS authors, reviewers, and editors.

Only two additional reasons – *beyond* practical relevance or research importance – *may* legitimize ongoing IS research efforts: (1) Efforts to 'grow the field' by giving more researchers the opportunity to contribute, and (2) very 'natural' P&T considerations. But, in the light of the enormous investments going into IS research, those two rather self-focused reasons – de facto driving so many of the community's research efforts – do not really ease the underlying issue.

We propose three suggestions aimed at addressing the current situation – with a strong emphasis for the third one.

Firstly, one could easily pick up again the long standing discussion on the IT artifact or other topical decisions, arguing that rather continuously developed foci may increase the research importance. But as only a sub-community pursues this line, obviously it is not everybody's idea of IS / IT research.

Secondly, one could aim at P&T decisions increasingly emphasizing citations in addition to publications. Presumably, such an incentive system would change many authors' approaches. However, citations come with a time lag of at least two years and only develop over a time span of five to ten years. While tenure decisions might take place at career stages beyond the horizon of ten years after the first publications, PhD candidates and hiring committees cannot afford to be that patient. Also, if citations became a factor in P&T, the practice of the community would possibly change calling for more citations and thus leading to citation-inflation (Liebowitz and Palmer 1984). Hence, changing P&T policies and the respective school structures not only reaches beyond the IS community; overall it seems to be unlikely to happen – to say the least.

Thirdly and finally, we suggest and put up for further discussion *limiting* the number of highly ranked, general IS journals and the number of papers per journal. This may appear as antagonizing traditional scientific norms and ongoing debates. But limiting the number of journals and papers per journal should naturally give weight to the then smaller number of more selected published contributions. It should consequently guide researchers to pursue 'research importance' from the beginning. During one's actual research process, work presented at conferences, published in proceedings, or published online as working paper would give interested colleagues the opportunity to draw on it and could thus contribute to 'grow the field'. We do, however, see three potential caveats to our suggestion:

(1) At first sight, limiting the number of publications may seem to reduce the diversity in IS research. Today, almost each school of thought has its own outlet, even though some outlets promote very similar research results just under different labels (Loebbecke et al. 2007). Nevertheless, diversity may still be maintained in the editorial selection process. With limited slots, journal editors would be asked to secure the diversity. This builds on the assumption that editors and reviewers are capable of selecting the important or even seminal papers in advance. While this assumption may be overoptimistic, it already plays a major role as long as editors and reviewers play any kind of gatekeeper role – regardless for how many papers on which journal 'rank'.

(2) It must be recognized that a reduction of outlets would possibly lead to larger consortia of authors aggregating their research to accomplish publication. This would reduce the opportunity of single authored publications and make it difficult for doctoral students to distinguish themselves and get recognized by the community.

(3) The proposed limitation of journals and papers per journal argues against the recent trend towards electronic publications (Gray et al. 2006; Watson 2004). Although favoring electronic publications, we do not see how more publications, may they be on paper or electronic, access-controlled or easily accessible, would lead to any greater research importance. We do see, though, that electronic publications would facilitate the other reasons for doing

research, namely practical relevance by speeding up publications, growing the field by certainly growing the body of literature, and supporting P&T decisions – to the degree that electronic publications count.

Summary and Conclusion

From our results it is apparent that research conducted in the IS field over 10 years has been cited very selectively. Besides a handful of well-cited papers with strong research importance, a large proportion of IS papers published in leading peer-reviewed journals either receives 'low' single-digit or no citations. To us, the data presented here provides a strong message. Assuming that influential works would be cited, most of the published papers in IS do not serve to produce further knowledge as expected following a scientific tradition. If taken to its extreme, this suggests that much of current IS research is not important to other researchers.

One proposed solution to address this issue could involve limiting the number of journals and the number of papers published in those journals. To mitigate the criticism against the suggestion, we would like to reiterate the basis for our viewpoint: Conducting and publishing research requires enormous resources by various players in the community. But – according to the literature – much research lacks practical relevance, and – according to our analysis – much research lacks importance to fellow researchers.

Finally, with this study and our suggestion, we would like to open a discussion whether the IS research community should not be ambitious enough to aim 'for more' than serving its members in their career building activities. As a community we might want to strive for more than just mutual self-adulation among all contributing parties. We think that the IS community is too good for enjoying to 'stew in its own juice'.

References

Agarwal, R. and Lucas, H. "The Information Systems Identity Crisis: Focusing on High-Visibility and High-Impact Research," MIS Quarterly (29:3), September 2005, pp. 381-398.

Applegate, L. "Rigor and Relevance in MIS Research – Introduction," MIS Quarterly (23:1), March 1999, pp. 1-2.

Banker, R. and Kauffman, R. "50th Anniversary Article: the Evolution of Research on Information Systems: a Fiftieth-Year Survey of the Literature in Management Science," Management Science (50:3), March 2004, pp. 281-298.

Barrett, B. and Walsham, G. "Making Contributions from Interpretive Case Studies: Examining Processes of Construction and Use," in Information Systems Research: Relevant Theory and Informed Practice, Kaplan, B., Truex, D., Wastell, D., Wood-Harper, A., DeGross, J. (Eds.), Kluwer, Boston, 2004, pp. 293-312.

Baskerville, R. and Myers, M. "Special Issue on Action Research in Information Systems: Making IS Research Relevant to Practice – Foreword," MIS Quarterly (28:3), September 2004, pp. 329-335.

Benbasat, I. and Zmud, R. "Empirical Research in Information Systems: The Practice of Relevance," MIS Quarterly (23:1), March 1999, pp. 3-16.

Ben-David, J. "Scientific Growth: Essays in the Social Organization and Ethos of Science," University of California Press, Berkeley, CA, 1991.

Brown, L. and Gardener, J. "Using Citation Analysis to Assess the Impact of Journals and Articles on Contemporary Accounting Research (CAR)," Journal of Accounting Research (23:1), Spring 1985, pp. 84-109.

Chubin, D. and Moitra, S. "Content Analysis of References: Adjunct or Alternative to Citation Counting?," Social Studies of Science (5:4), November 1975, pp. 423-441.

Cooper, R., Blair, D. and Pao, M. "Communicating MIS Research: A Citation Study of Journal Influence," Information Processing & Management (29:1), January-February 1993, pp. 113-127.

Cote, J., Leong, S. and Cote, J. "Assessing the Influence of Journal of Consumer Research: A Citation Analysis," Journal of Consumer Research (18:3), December 1991, pp. 402-410.

Culnan, M. "Mapping the Intellectual Structure of MIS, 1980-1985: A Co-Citation Analysis," MIS Quarterly (11:3), September 1987, pp. 340-353.

Culnan, M. "The Intellectual Development of Management Information Systems, 1972-1982: A Co-Citation Analysis," Management Science (32:2), February 1986, pp. 156-172.

de Solla Price, D. "Little Science, Big Science," Columbia University Press, New York, 1963.

Davenport, T. and Markus, L. "Rigor vs. Relevance Revisited: Response to Benbasat and Zmud," MIS Quarterly (23:1), March 1999, pp. 19-23.

Davis, G. "A Systematic Evaluation of Publications for Promotion of MIS Academics," in Proceedings of the First International Conference on Information Systems, McLean, E. (Ed.), December 1980, pp. 206-216.
Dyckman, T. and Zeff, S. "Two Decades of the Journal of Accounting Research: A Review Article," Journal of Accounting Research (22:1), Spring 1984, pp. 225-297.
Galliers, R. and Meadows, M. "A Discipline Divided: Globalization and Parochialism in Information Systems Research," Communications of the Association for Information Systems (11:5), January 2003, pp. 108-117.
Galliers, R. and Whitley, E. "An Anatomy of European Information Systems Research ECIS 1993-ECIS 2002: Some Initial Findings," in Proceedings of the 10th European Conference on Information Systems, Wrycza, S. (Ed.), Gdansk, Poland, 2002, pp. 3-15.
Galliers, R. and Whitley, E. "Vive les Differences? Developing a Profile of European Information Systems Research as a Basis for International Comparisons," European Journal of Information Systems (16:1), February 2007, pp. 20-35.
Garfield, E. "Citation Indexing: Its Theory and Application in Science, Technology and Humanities," Wiley, New York, 1979.
Gillenson, M. and Stutz, J. "Academic Issues in MIS Journals and Books," MIS Quarterly (15:4), December 1991, pp. 447-452.
Gray, P., Lyytinen, K., Saunders, C., Willcocks, L., Watson, R. and Zwass, V. "How Shall we Manage our Journals in the Future? A Discussion of Richard T. Watson's Proposals at ICIS 2004," Communications of the Association for Information Systems (18:14), September 2006, pp. 275-295.
Grover, V., Ayyagari, R., Gokhale, R., Lim, J. and Coffey, J. "A Citation Analysis of the Evolution and State of Information Systems within a Constellation of Reference Disciplines," Journal of the Association for Information Systems (7:5), May 2006, pp. 270-325.
Hamilton, S. and Ives, B. "Knowledge Utilization among MIS Researchers," MIS Quarterly (6:4), December 1982, pp. 61-74.
Introna, L. "Disciplining Information Systems: Truth and its Regimes," European Journal of Information Systems (12:3), September 2003, pp. 235-240.
Introna, L. and Nissenbaum, H. "Shaping the Web: Why the Politics of Search Engines Matters," The Information Society (16:3), July 2000, pp. 169-185.
Jackson, W. and Nath, R. "Publication Patterns of MIS Researchers," Interface (11:2), 1989, pp. 15-20.
Karuga, G., Lowry, P. and Richardson, V. "Assessing the Impact of Premier Information Systems Research over Time," Communications of the Association for Information Systems (19:7), March 2007, pp. 115-131.
Katerattanakul, P. and Hong, S. "Quality and Knowledge Contributions of MISQ: A Citation Analysis," Communication of the Association for Information Systems (11:15), October 2003, pp. 271-288.
Katerattanakul, P. and Han, B. "Are European IS Journals Under-Rated? An Answer Based on Citation Analysis," European Journal of Information Systems (12:1), March 2003, pp. 60-71.
Kousha, K. and Thelwall, M. "Google Scholar Citations and Google Web/URL Citations: A Multi-Discipline Exploratory Analysis," Journal of the American Society for Information Science & Technology (58:7), May 2007, pp. 1055-1065.
Liebowitz, S. and Palmer, J. "Assessing the Relative Impact of Economics Journals," Journal of Economic Literature (22:1), March 1984, pp. 77-88.
Loebbecke, C., Huyskens, C. and Berthod, O. "A Citation Analysis of the Information Systems Field: Towards Research Importance," Working Paper, University of Cologne, Cologne, Germany, 2006.
Loebbecke, C., Berthod, O. and Huyskens, C. "Diversity in Collaborative Information Systems (IS) Research Methods: Academic Breadth or 'Re-Inventing the Wheel'?," in Proceedings of the 12th Americas Conference on Information Systems, Romano, N. (Ed.), Keystone, Colorado, US, August 9-12, 2007.
Lyytinen, K. and King, J. "Nothing at the Center? Academic Legitimacy in the Information Systems Field," Journal of the Association for Information Systems (5:6), June 2004, pp. 220-246.
MacRoberts, M. and MacRoberts, B. "Problems of Citation Analysis," Scientometrics (36:3), July 1996, pp. 435-444.
Nord, J. and Nord, G. "MIS Research: Journal Status Assessment and Analysis," Information & Management (29:1), July 1995, pp. 29-42.
Nunamaker, J. "Publications and the Use of the Science Citation Index," in Proceedings of the First International Conference on Information Systems, McLean, E. (Ed.), December 1980, pp. 217-219.
Orlikowski, W. and Iacono, C. "Research Commentary: Desperately Seeking the 'IT' in IT Research – A Call to Theorizing the IT Artifact," Information Systems Research (12:2), June 2001, pp. 121-134.

Salancik, G. "An Index of Subgroup Influence in Dependency Networks," Administrative Science Quarterly (31:2), June 1986, pp. 194-211.

Shrivastava, P. "Rigor and Practical Usefulness of Research in Strategic Management," Strategic Management Journal (8:1), January-February 1987, pp. 77-92.

Starbuck, B. "What the Numbers Mean," pages.stern.nyu.edu/~wstarbuc/whatmean.html, 2007, accessed: 2007-09-04.

Van de Ven, A. and Johnson, P. "Knowledge for Theory and Practice," Academy of Management Review (31:4), October 2006, pp. 802-821.

Vogel, D. and Wetherbe, J. "MIS research: A Profile of Leading Journals and Universities," The DATABASE for Advances in Information Systems (15:4), Fall 1984, pp. 3-14.

Walstrom, K., Hardgrave, B. and Wilson, R. "Forums for Management Information Systems Scholars," Communications of the ACM (38:3), March 1995, pp. 93-107.

Walstrom, K. and Leonard, L. "Citation Classics from the Information Systems Literature," Information & Management (38:2), December 2000, pp. 59-72.

Watson, R. AIS President's Report, International Conference on Information Systems, Washington D.C., USA, December 12, 2004.

Watson, H., Taylor, K., Higgins, G., Kadlec, C. and Meeks, M. "Leaders Assess the Current State of the IS Academic Discipline," Communications of the Association for Information Systems (2:2), July 1999, pp. 1-28.

Weber, R. "Still Desperately Seeking the IT Artifact," MIS Quarterly (27:2), June 2003, pp. iii-xi.

Whitley, E. and Galliers, R. "An Alternative on Citation Classics: Evidence from the First 10 Years of the European Conference on Information Systems," Information & Management (44:5), July 2007, pp. 441-455.

Zinkhan, G. and Leigh, T. "Assessing the Quality Ranking of the 'Journal of Advertising', 1986-1997," Journal of Advertising (28:2), Summer 1999, pp. 51-70.

A P P E N DI X

Table A. Publication and 2005 Citation Data for Journals in Five Categories
(Source: ISI Web of Knowledge Journal Citation Reports, portal.isiknowledge.com; August 24, 2007)

Category	Journal	SSCI Impact Factor '05	∑ SSCI Citations	∑ Papers	∅ Citation p. Paper	Time
Business[1]	Academy of Management Review	4.254	56,224	1,805	31.15	'83-'07
	Journal of Marketing	4.132	57,398	4,008	14.32	'56-'07
	Administrative Science Quarterly	2.719	88,891	3,125	27.65	'58-'07
	Academy of Management Journal	2.200	79,535	2,639	30.14	'80-'07
	Strategic Management Journal	1.897	56,908	1,572	36.20	'56-'07
Econo-mics[2]	Quarterly Journal of Economics	4.775	80,109	2,523	31.75	'69-'07
	Journal of Economic Literature	4.054	32,959	6,919	4.76	'56-'07
	Econometrica	2.626	176,102	5,848	30.11	'56-'07
	Journal of Political Economy	2.245	147,049	4,729	31.10	'70-'07
	Brookings Papers on Econ. Activity	2.118	4,796	665	7.21	'84-'07
Info. Science and Library Science[3]	MIS Quarterly	4.978	19,857	712	27.89	'66-'07
	Ann. Rev. of Info. a. Science a. Tech.	2.652	4,128	500	8.26	'94-'07
	Information Systems Research	2.054	5,664	318	17.81	'94-'07
	Journal of Documentation	0.983	11,562	3,372	3.43	'56-'07
	Library Quarterly	0.688	4,441	4,498	0.99	'83-'07
Manage-ment[4]	Academy of Management Review	4.254	56,224	1,805	31.15	'56-'07
	Administrative Science Quarterly	2.719	88,891	3,215	27.65	'58-'07
	Academy of Management Journal	2.200	79,535	2,639	30.14	'92-'07
	Organization Science	1.989	18,198	690	26.37	'92-'07
	Strategic Management Journal	1.897	56,908	1,572	36.20	'80-'07
Business and Finance[5]	Journal of Finance	2.549	93,684	6,736	13.91	'56-'07
	Journal of Financial Economics	2.385	64,403	1,383	46.57	'76-'07
	Brookings Papers on Econ. Activity	2.118	4,796	665	7.21	'70-'07
	Journal of Accounting Research	1.635	15,194	1,598	9.51	'63-'07
	Auditing - Jou. of Practice & Theory	0.562	1,959	574	3.41	'84-'07

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 and decision-making methods, leadership studies, and total quality management.
5 Covering financial and economic correlations, accounting, financial management, investment strategies, the international monetary system, insurance, taxation, and banking.

It must be noted that most of the journals in Table A had their first appearances decades earlier than the six IS journals under consideration in this work. This is particularly relevant when comparing the numbers among disciplines as the number of total citations and the number of average citations per paper – especially for strongly cited papers – often increases with the 'age of the paper'.

Table B. Share of Papers per Publication Year with Equal to or Fewer than n Citations (in %)

Citations		'96	'97	'98	'99	'00	'01	'02	'03	'04	'05
MISQ	<=20	29	32	45	60	58	46	81	57	100	100
	<=10	24	21	25	30	25	9	64	50	94	100
	<=5	10	5	15	19	17	0	46	14	82	92
	<=2	5	5	10	4	13	0	27	7	71	72
	0	0	5	0	4	0	0	18	0	29	44
ISR	<=20	52	60	52	59	79	74	62	94	100	100
	<=10	41	40	24	46	67	52	50	78	100	100
	<=5	11	20	24	23	33	35	23	44	90	100
	<=2	4	10	0	9	21	9	15	28	55	95
	0	0	0	0	0	4	4	12	6	20	67
EJIS	<=20	95	96	91	96	95	100	100	100	100	100
	<=10	80	91	78	92	85	72	85	100	1ßß	100
	<=5	60	70	10	67	60	50	75	80	96	100
	<=2	25	52	48	33	20	28	50	45	73	100
	0	10	17	13	4	15	6	5	20	36	59
ISJ	<=20	88	94	100	100	100	100	100	100	100	100
	<=10	75	81	93	82	88	100	100	100	100	100
	<=5	56	63	80	65	75	87	88	94	94	100
	<=2	31	31	33	47	44	27	56	65	88	83
	0	6	13	7	18	13	0	19	12	47	67
JSIS	<=20	100	100	100	100	87	100	100	100	100	100
	<=10	75	100	100	91	73	100	77	100	100	100
	<=5	67	79	79	57	40	63	46	84	100	100
	<=2	33	64	64	33	40	50	15	84	88	94
	0	8	29	43	19	27	25	8	46	47	83
JIT	<=20	97	100	100	100	91	100	100	100	100	100
	<=10	90	100	91	97	77	100	100	100	100	100
	<=5	77	87	52	75	68	83	100	95	100	100
	<=2	50	52	44	50	55	44	81	58	100	100
	0	23	9	4	22	23	28	14	21	91	84