

2009

An event-driven approach to dynamic situation detection

David Avison

ESSEC Business School, avison@essec.edu

Shirley Gregor

Australian National University, shirley.gregor@anu.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/ecis2009>

Recommended Citation

Avison, David and Gregor, Shirley, "An event-driven approach to dynamic situation detection" (2009). *ECIS 2009 Proceedings*. 64.
<http://aisel.aisnet.org/ecis2009/64>

This material is brought to you by the European Conference on Information Systems (ECIS) at AIS Electronic Library (AISEL). It has been accepted for inclusion in ECIS 2009 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

AN EXPLORATION OF THE REAL OR IMAGINED CONSEQUENCES OF INFORMATION SYSTEMS RESEARCH FOR PRACTICE

Avison, David, ESSEC, Cergy-Pontoise, France, avison@essec.fr

Gregor, Shirley, Australian National University, Canberra ACT 0200, Australia,
Shirley.Gregor@anu.edu.u

Abstract

In this paper we attempt to assess the impact of IS research on practice. It is important to show a positive impact, if we can, so that academia, prospective students and the outside world more generally sees that the IS discipline has made a positive and major impact on organizations, people and society. Our research fills a gap as there has been little or no work to date that systematically assesses the effective relevance of IS research to practice. We find that the use of bibliometric indicators to trace the flow of ideas from research published in our top journals to practitioner journals does not detect any strong link between IS research and practice. We suggest several alternative means of assessing effective, rather than imagined, relevance and also consider how more effective diffusion of our IS research might be encouraged.

Keywords: Information systems, impact, research, practice, bibliometric indicators

1 INTRODUCTION

The positive impact of using information systems (IS) in practice is well demonstrated, with studies of the business value of information technology (IT) showing contributions to competitive advantage and productivity (see for example, Dedrick et al., 2003). However, the role that IS *academic research* plays in the adoption and effective use of IT is not clear. We would like to think that IS research has relevance and contributes to practice so as to be of benefit to individuals, organizations and society. Moreover, government research funding bodies are increasingly asking that external impact be implicated in research proposals (for example, European Union, 2008; National Science Foundation, 2008)

The impact of IS research on other research disciplines is evidenced by Baskerville and Myers (2002). and is extremely important, but this does not evidence impact on practice. Many research papers make claims that the work described is 'relevant to practice': for example, many of those describing action research, case studies and organization surveys. However, making this statement is not enough. In a discipline like IS, as in many applied disciplines, it is vital that we demonstrate that our research is actually being used by practitioners and so increase our claims to legitimacy.

In this paper, therefore, we address the question: *Does IS academic research have demonstrable consequences for practice concerned with the use and implementation of IT?* In answering this question, we found we also had to address a secondary question: *How can we show that ideas and knowledge flow between IS researchers and professional practice?*

The motivation for addressing these questions is strong. It is not enough to espouse relevance: it must be demonstrated. If we show that IS research has an impact on practice, then we achieve several useful ends. We can, for example:

1. Use the evidence as a weapon to show academia and the outside world that the IS discipline (not just technology) has made a positive and major impact on organizations, people and society.
2. Provide our students with a context which demonstrates the impact of IS research on organizations, people and society so that they appreciate its present and its potential impacts and thus see the study of IS as potentially worthwhile.
3. Demonstrate that we have means for assessing the flow of ideas from IS research to practice that can be used for benchmarking and for making arguments to funding bodies.

In contrast, if it appears that little of our research ideas flow through to practice, then we believe we are being alerted to a situation which our community should make considerable effort to address. If we cannot provide convincing evidence of how ideas flow between academia and practice, because there are no obvious means to do so, then we need to devise suitable indicators and measures.

We begin from an underlying position that IS academic research should have practical relevance, as IS is an applied discipline; a view recognized by our journals when they ask that articles indicate potential practical significance. Our work is significant because we could find no prior work that attempted to answer our questions for IS *academic research*, research that is published in our leading journals.

When we set out to address our primary question, we did not know the answer! Was our research being used by practitioners? However, even more interesting perhaps, we did not know how we could provide the answer. How could we demonstrate that our research was having such an impact (or not)? This paper discusses our exploration as we began to address these questions.

2 BEGINNING OUR EXPLORATION: SEARCHING FOR *EFFECTIVE RELEVANCE AND KNOWLEDGE TRANSLATION*

Benbasat and Zmud (1999, p 13) argued that ‘the IS field does not possess the evidence with which to illustrate the impact of its research This is an important question that academics should investigate’. Almost ten years later, we also could not find research that addressed this question. Rosemann and Vessey (2008) make suggestions on how the relevance of IS research can be improved, specifically through using what they call applicability checks when research projects originate. These authors argue that there is “limited demand on the part of practice for the outcomes of IS academic research” (p. 2). However, the only evidence they give for this view is that the numbers of practitioners who subscribe to IS journals or who attend academic conferences such as the International Conference in Information Systems (ICIS) are rather low.

To address our primary question, we turned to a familiar debate in IS to continue our exploration, that of rigor versus relevance (for example, see Agarwal & Lucas 2005, Benbasat & Zmud, 1999). We did not do so to join in this debate ourselves, but to see if there was evidence of what we call *effective relevance* in this body of work. We use the term effective relevance as embodying some demonstrable evidence of practitioner take-up as against the mere suggestion that the research ‘should be’ or ‘might be’ relevant (as often claimed in the conclusion sections of papers). Despite the lengthy debate of rigor versus relevance there has been little demonstration of effective relevance in this body of literature nor has there been debate about how it can be demonstrated.

The research impact of IS papers has been assessed through bibliometric methods both with regards to the impact of IS researchers within the discipline and also to researchers in other disciplines (Baskerville & Myers, 2002, Lowry et al. 2007). But we are addressing a different question when we ask about the impact on practice, that is, the flow and reception of ideas or knowledge between IS academic and practitioner communities. This issue is one of *knowledge translation or transfer* which “assumes that practical knowledge (knowledge of how to do things) in many professional domains derives at least in part from scientific knowledge” (Van de Ven 2007, p. 3).

In some related areas where a more distinct artifact is produced, measures of impact such as patentable ideas or start-up companies can be used. In IS, however, the products of research are likely to be less tangible outputs such as methods for IS development or the evaluation of applications, the translation of which from research to practice are more difficult to track.

The problem of the gap between practitioner and academic communities in terms of knowledge creation and transfer was addressed in a special issue of the *Academy of Management Review* (2001, 14, 2). In introducing this issue, Rynes et al. (2001, p. 340) note that “a substantial body of evidence suggests that executives typically do not turn to academics or academic research findings in developing management strategies and practice”. Some observers have suggested that academics and practitioners inhabit basically different communities, with different frames of reference and different ways of sense-making (Shrivasta & Mitroff, 1984). Further, Rynes et al. (2001) note the paucity of empirical work on the topic of knowledge transfer between academics and practitioners, particularly in the organizational sciences.

There are many ways in which knowledge transfer from research to practice can occur, through textbooks, practitioner-oriented books and publications, teaching, consulting, executive education, and personal links. In this exploratory study, however, we have chosen to study knowledge transfer by investigating how academic research results flow to trade journals and practitioner magazines. We recognize that this is only one of the approaches that could be employed. In defence of our choice, ideas in practitioner journals have been shown to be an important means for the diffusion of knowledge (Rogers, 1995, Van Steijn & Rip 1988) and there is a substantial literature that points to the flow of ideas and knowledge through communication channels as crucial for innovations and innovative behavior (see Rogers, 1995). To give one example, Nederhof and Meijer (1995) argue that

trade journals are the most single important source of knowledge for farmers and horticulturists. Further, Spencer (2001), in looking at the extent to which corporate and academic researchers in the flat panel display industry exchanged knowledge, noted the importance of publishing in practitioner journals if knowledge transfer is to occur.

To sum up, in our study we chose to explore whether the impact of IS research on practice could be demonstrated by looking at the use of IS academic research in outlets with a professional readership. We explain our approach to achieve this goal in the next section.

3 EXTENDING OUR EXPLORATION: SEARCHING FOR IMPACT OF IS ACADEMIC RESEARCH IN PRACTITIONER JOURNALS

We chose to explore the impact of IS research in practitioner journals by extending traditional bibliometric analyses, as these methods can be applied in a systematic fashion. The method that we adopted was to examine the extent to which a selection of high-profile ‘practitioner’ journals referenced IS research in 2006. This method involved four inter-related steps, none of which were carried out without difficulty, and all these required some degree of iterative exploration and judgment. The four steps were as follows:

1. Choice of the sources of IS research that were to be included.
2. Choice of the high-profile practitioner journals that were to be examined for evidence of references to IS research; that is, referencing the sources selected in (1).
3. Choice of a database that could provide evidence of the linkages between the IS research in (1) to the practitioner journals in (2)
4. Analysis of the linkages between IS research and the practitioner journals in 2006, using the database from (3).

Each of these steps in described in more detail below:

3.1 Choice of sources representing high-quality IS research

We decided to use the ‘basket’ of journals selected by the Association for Information Systems (AIS) as being representative of high-quality research devoted specifically to the information systems field. This basket comprises (in alphabetical order) *European Journal of Information Systems (EJIS)*, *Information Systems Journal (ISJ)*, *Information Systems Research (ISR)*, *Journal of the Association for Information Systems (JAIS)*, *Journal of Management Information Systems (JMIS)* and *Management Information Systems Quarterly (MISQ)*. Unfortunately, *JAIS* had to be omitted because it is a relatively recent addition to the Web of Science/ISI database and citation data for it could not be obtained. Although data was difficult to obtain, our understanding is that only *MISQ* (with around 3000 subscribers) and *ISR* (with around 2000 subscribers) have substantial subscriptions for their paper editions (of the basket of six, only *JAIS* is electronic only). Table 1 shows details of the five journals included in the analysis.

Journal Title	Abbreviated Title	ISSN	Impact Factor
European Journal of Information Systems	<i>EJIS</i>	0960-085X	0.862
Information Systems Journal	<i>ISJ</i>	1350-1917	1.543
Information Systems Research	<i>ISR</i>	1047-7047	2.537
Journal of Management Information Systems	<i>JMIS</i>	0742-1222	1.818
MIS Quarterly	<i>MISQ</i>	0276-7783	4.731

Table 1: Selected High Quality IS Research Journals

3.2 Choice of high-profile practitioner journals and magazines

Table 2 shows the practitioner journals and magazines selected for inclusion in our analysis. These are hereafter referred to as practitioner journals for the sake of convenience. The sample is a judgment sample from journals of interest to IS that met the following criteria:

- They appear in the chosen database (the Web of Science/ISI);
- They are mainly aimed at practitioners;
- They have relatively high circulation counts, and thus a potentially large readership (figures taken from Ulrich's Periodicals Directory 2008).

Some judgment was required to identify journals that are aimed at least in part at practitioners. Ulrich's Periodicals Directory makes a distinction between 'scholarly/academic' journals and trade journals, but it was found not to be useful for our purposes, as its categorization appeared to be problematic. For example, *Communications of the ACM (CACM)* is shown as an 'academic/scholarly' journal in Ulrich's Periodicals Directory, but the Association for Computing Machinery (ACM) itself refers to this publication as a 'magazine'. Rather than using Ulrich's, therefore, we examined the home pages of journals that could be expected to reference IS research. We made a decision as to whether a journal could be classed as having a practitioner audience by considering its stated aims on its web site. The circulation count was also taken into account, as this is evidence of reaching an audience beyond academia.

Only journals with a circulation count of 5000 or above were included. The result of this process was the journals shown in Table 2.

Journal Title	Abbreviated Title	ISSN	Impact Factor	Circulation
Communications of the ACM	<i>CACM</i>	0001-0782	1.509	85,000
California Management Review	<i>CMR</i>	0008-1256	1.429	6,500
Harvard Business Review	<i>HBR</i>	0017-8012	1.505	250,000
IBM Systems Journal	<i>IBM</i>	0018-8670	0.747	30,000
Journal of the American Medical Informatics Association	<i>JAMIA</i>	1067-5027	3.979	5,000
MIT Sloan Management Review	<i>Sloan</i>	1532-9194	0.888	25,000

Table 2: Selected High-Profile Practitioner Journals/Magazines

3.3 Choice of Citation Database

The two primary databases utilized in our analyses were the *Web of Science* (2008) and *Scopus*. (2008). The Web of Science refers to services offered by Thomson Scientific and was previously known under the label of the Institute for Scientific Information (ISI). This database was used as the primary source as it is well-known and used frequently for bibliometric and citation analyses. It was supplemented by data from the Scopus database for some analysis where Scopus provided the data in a more convenient or complete form.

The Thomson/ISI database has some drawbacks. Clarke (2008) has pointed out some deficiencies with respect to IS, including the omission of about 60% of the core body of IS publications, patchiness of data and some serious anomalies. The database also requires some expertise to use and has some peculiarities. Specific journals can be hard to find, even using the international standard serial number (ISSN), which was found to be the most reliable search criterion. Some journals are only in the Social Science Edition (e.g. *ISJ* and *ISR*), some only in the Science Edition (e.g. *EJIS*) but some are in both (e.g. *MISQ*).

In a final step we used Google Scholar (2008) for some further tentative analysis. Google Scholar is an experimental service, still in ‘beta’ release in 2008, but has a more extensive collection and the powerful Google search engine (Clarke, 2008). Unless otherwise noted, however, the data used is from the Web of Science.

3.4 Analysis

Each of the five leading IS journals were examined in turn and the number of citations by the selected practitioner journals in 2006 were noted, using the Journal Citations Report facility in the Web of Science database. Note that all ‘articles’ shown in the database were included, even though these will include some editorials, reviews and similar material. Table 3 shows the results of this analysis.

It can be seen that there are relatively few citations of IS research in the practitioner journals, both in absolute terms and as a percentage of the total number of citations of the IS research articles. As an example, for *MISQ*, the table shows that there were a total of 49 citations of *MISQ* articles in the selected practitioner journals in 2006. However, in 2006 the total number of times that *MISQ* articles were cited by all journals in the Web of Science database was 3186. The last line in Table 3 shows the percentage of citations for the journal that were in the selected practitioner journals compared with the total citations for that journal. So, for *MISQ*, just 0.02% of its citations were in the selected practitioner outlets. In total, there were only 80 citations in the practitioner journals in 2006 that formally referenced any work in the leading IS research journals. These 80 citations represented, on average, less than 0.01% of the total 9183 citations to the IS research journals.

An alternate way at looking at the data is to study the two right-hand columns. Many of the practitioner journals do not contain a large number of formal references, so these columns give an indication of how often IS journals are cited by the practitioner outlets relative to their overall citations. Thus, we can see that in 2006, *CACM* made 1658 citations of other work, with 38 (2.29%) being to the basket of IS journals.

Cited by	Source					Citations of IS journals	All citations	% IS journals
	EJIS	ISJ	ISR	JMIS	MISQ			
CACM	2	2	8	7	19	38	1658	2.29
CMR	-	-	2	2	3	7	1054	0.66
HBR	-	-	-	-	-	-	50	0.00
IBM	-	-	3	2	9	14	1206	1.16
JAMIA	-	-	-	3	16	19	3224	0.59
Sloan	-	-	-	-	2	2	474	0.42
Practitioner journal citations	2	2	13	14	49	80	7666	0.01
All citations	439	290	1508	1523	3186	9183		
% Practitioner	0.00	0.01	0.01	0.01	0.02	0.01		

Table 3 Number of citations of leading IS journals (all years) by selected practitioner journals in 2006

Our analysis is not complete as it does not include all IS research articles or all practitioner journals. However, we have selected leading research outlets and practitioner journals where IS work could be expected to appear, so, if anything, this result may overstate the proportion of IS research being cited in practitioner journals, as against citations in other research outlets.

As the number of cited papers is rather small, we provide an example of which papers are cited in practitioner journals in Appendix A. This appendix shows the articles from *MISQ* cited in *CACM* in 2006 (18 articles using the *Scopus* database). Of these 18 articles only 4 were published after the year 2000, so they are hardly ‘cutting edge’. What is happening? It may be that the articles in *CACM* are

using the IS journals to provide evidence of scholarly merit rather than reporting on new and exciting work.

As we have minimal existing data to use as a benchmark, it is difficult to say if this result for IS is markedly different from that of other academic disciplines. However, Nederhof and Meijer (1995) report that in the humanities, a large part (sometimes more than 50%) of the research products is directed at external knowledge transfer, while in some science fields, such as experimental psychology, a more 'modest' percentage (12%) of the output is directed to a non-scientific public (Nederhof et al., 1989). Obtaining extensive data for more directly comparable analysis was beyond the scope of our study. We did, however, look further at one of the practitioner journals, *CMR*, which publishes across a range of disciplines. In 2007, *CMR* had in total 1277 citations to works in other journals. Analysis classified 242 of the citations as being to research journals, with a breakdown by journal discipline of: 162 Management; 30 Marketing; 23 Psychology, 11 Sociology; 10 Economics, 6 Information Systems, 5 Planning; 3 Law and 2 International Business. IS does not show up well in this comparison.

Given these rather disappointing results, we continued the exploration along some other lines, as shown in the next section.

4 EXTENDING OUR EXPLORATION FURTHER: SEARCHING FOR LOOSER LINKS

The analysis above indicates a rather small proportion of our research flowing directly through to practitioner outlets from our leading journals. However, we explored further, looking for looser links such as what we refer to as additional flow-on effects and non-obvious connections. By additional flow-on effects, we refer to the dispersal effects that occur when articles that appear in practitioner outlets which make reference to IS research journal output are themselves referenced by other practitioner journals. Of course, the latter may not reference those aspects of the intermediary article that discuss the original IS research, so the effect might be very limited. By non-obvious connections we refer to influential IS research that may appear in practitioner outlets without the connection to the underlying IS research being obvious: that is, it may not appear in formal citations.

Each of these aspects is explored in turn, using the same practitioner journals as included in the analysis above. *CACM* and *Harvard Business Review (HBR)* are worthy of particular note when looking for flow-on effects. Both reach many readers, as evidenced by their high circulation counts. *CACM* is the practitioner outlet which cites the largest number of papers in our basket of IS research journals. Polites and Watson (2008) showed in a social network analysis of *CACM* citations using 2003 data that *CACM* was the top-ranked journal in a network of 120 IS-related journals in terms of both prominence and centrality. *CACM* was shown to occupy a central bridging position in the network between the more technical computer science journals and the more business-oriented IS journals. *HBR* has a very large practitioner base and the potential to reach a significant body of managers whom we wish to influence.

Table 4 shows the result of a similar analysis performed with the practitioner journals to what was performed with the selected IS journals. It indicates that there are indeed such flow-on effects. The practitioner journals are cited comparatively more often in other practitioner journals than are the IS research journals.

CACM is noteworthy. In 2006, *CACM* articles were cited 130 times, mostly in *CACM* itself, but there were another 33 citations in other practitioner journals. Further, *CACM* by itself is the practitioner journal most likely to cite IS research articles (almost half of the citations to them in 2006). As suggested earlier, *CACM* does appear important to the practitioner influence we wield.

Cited by	Sources						Total citations
	CACM	CMR	HBR	IBM	JAMIA	Sloan	
CACM	100	4	10	5	-	3	122
CMR	3	54	74	-	-	4	135
HBR	-	-	8	-	-	-	8
IBM	19	-	6	33	3	-	61
JAMIA	8	-	5	-	374	-	387
Sloan	-	5	35	-	-	23	63
Total practitioner journal citations	130	63	138	38	377	30	776
All journal citations	8090	1634	4913	819	2143	301	17900
% Practitioner journal citations	1.61	0.04	2.80	4.64	17.59	9.97	4.33

Table 4: Flow-on effects from practitioner journal (all years) to other practitioner journals in 2006

The effect with *HBR* is even more marked. It had a total of 4,913 citations in 2006, with 138 in practitioner journals. However, it does not itself cite other sources in its articles and we cannot, therefore, claim any obvious additional flow-on effects though there may be non-obvious connections. This might require an analysis of the content of *HBR* articles. We cannot assume, however, that any influence to practitioners is benign to IS, as the article by one of its editors (Carr, 2003) evidences.

It is beyond the scope of our paper to take our analysis very much further. However, this exploration excited us to see whether there is influential IS research underlying publications in large circulation practitioner journals, which may not have been identified in the analysis above. To do this analysis, we used *Google Scholar*, which has more extensive references, and more relaxed criteria for including reference material. For example, citations need not be to an *ISI* listed journal and therefore potentially include papers in the *International Conference of Information Systems* as well as *JAIS*.

Doing searches with *Google Scholar* and a combination of search terms including “Communications of the ACM”, “Harvard Business Review”, “information systems” and “information technology” yielded some interesting results. A number of the searches converged on the same few papers in *CACM*, *HBR* and *SMR*, all of which have very large citation counts. Table 5 shows these papers and their *Google Scholar* and *ISI* citation counts. In further research the efficacy of using *Google Scholar* to develop this work could be investigated. It is very likely to be most popular in the future among IS academics, if perhaps not librarians.

Table 5 shows four papers that have particularly high citation counts. Although appearing in practitioner journals, they score highly even compared with the most highly-cited IS research articles. Lowry et al. (2007) identify the Delone and McLean (1992) article on the “quest for the dependent variable” as the most highly cited article from leading IS journals, with 481 citations. Only this paper and that of Moore and Benbasat (1991), with 312 citations, are shown as having higher citation counts than the Davenport and Short (1990) article in the *Sloan Management Review*. This observation indicates that Davenport and Short not only achieved high research impact in our normal use of the term, but they are also likely to have had high effective relevance because of their reaching out to a large practitioner audience, both directly through *Sloan Management Review*’s readership, but also through flow-on effects to other practitioner outlets.

Interestingly, Davenport and Short (1990) did not cite any leading IS journals as a source of ideas. Rather they appropriated ideas from industrial engineering (citing *Industrial Engineering*) and reported directly on what had been observed in case studies in 19 companies. Earl (1994, p. 6) refers to the concept of business process redesign as belonging to the “managerial journalism domain” with Davenport and Short’s seminal article in *Sloan Management Review* as being in a journal that provides “an interface between business schools and practitioners”. In view of the impact on subsequent

streams of research on business process redesign, business process modeling and the like, and the applicability of these ideas in practice, this “managerial journalism” is perhaps not such a bad thing.

Article	Citations – Google Scholar	Citations - ISI
Davenport, T. and Short, J. (1990) The new industrial engineering: Information technology and business process redesign, <i>Sloan Management Review</i> , 31, 4, 11-27.	1501	287
Kaplan, R. and Norton, D. (1996). Using the balanced scorecard as a strategic management system, <i>Harvard Business Review</i> , 74, 1, 75-85.	1411	92
Davenport, T. (1998). Putting the enterprise into the enterprise system, <i>Harvard Business Review</i> , 76, 4, 121-131.	1275	160
Brynjolfsson, E. (1993). The productivity paradox of information technology, <i>Communications of the ACM</i> , 36, 12, 66-77.	729	138

Table 5: Influential IS ideas in practitioner journals

5 FURTHER REFLECTIONS

Our analysis, emphasizing the impact of IS research in terms of references to IS output reflected in our major research journals, has not shown clear links between IS research and practice, though some tentative strands have been suggested. We discuss the results in terms of our research questions, taking the second question first. We also provide suggestions for future work and action.

5.1 Can we demonstrate knowledge transfer between IS academic research and practice?

The approach in our study has **not** proved fruitful in showing knowledge transfer between IS academic research and practice. That is, analysis of citations of articles in leading IS journals in a sample of practitioner journals showed that a small number of IS articles were referred to the practitioner journals – less than 1% of total citations.

It is acknowledged that there are weaknesses in the approach we have used. Only a sample of practitioner journals was used and a number of the outlets we studied restrict the number of citations that authors can make. Further, by relying on citations alone we have not investigated the depth or extent to which the cited paper influences the ideas in the citing outlet. This latter weakness is one that is shared by other citation count methods that are used to assess impact, although our discipline frequently employs them as a base for assessing “research impact” and journal quality.

We suggest, however, that our study has considerable merit in that it provides a foundational step for an unexplored problem. When we began our study we could find no systematic studies of how knowledge transfer in IS could be assessed. Exploring the use of a citation count method is an obvious place to start, as this method can be applied consistently, the data is readily available and it is an approach we are familiar with for the assessment of research impact. Even the null result in our study is valuable as it means that future studies can build on it in unexplored directions.

We have made a tentative start on suggesting other avenues to explore in showing that there can be spreading effects from a publication in a practitioner journal to other practitioner journals. Further avenues to explore include more in-depth analysis of practitioner material to identify research work that has been used as a source of ideas. Further work could also widen the scope of the enquiry from practitioner publications to other transfer mechanisms such as textbooks and research monographs. Enid Mumford, for example, claimed that her work in companies could best be described in books and monographs rather than journal papers (see *ISJ*, 2006 for a full discussion of her work and Mumford and MacDonald, 1989, as an example). Further, articles on websites have potentially a high impact.

CIO Magazine (URL www.cio.com) is read by practitioners whom we wish to influence and so mention of our work in such sites does suggest impact. Practitioner-oriented IS publications are also crucial, such as *MIS Quarterly Executive*.

Other transfer mechanisms to be explored include student learning and development. Clearly IS academics influence practice through the employment of its graduates in relevant practice. However this is not evidence of our academic research making impact. Nevertheless many successful PhD students decide to continue their careers in practice rather than academia. This needs to be recognized as a positive outcome. Bjorn-Andersen (2008) argues that more than 50% of students at Copenhagen Business School not only take this route but this was their intention originally and these include some of the most talented researchers.

We now turn to our first research question.

5.2 Does IS academic research have consequences for practice?

We can give only tentative responses to this question because of our findings for the first question. We were unable to demonstrate, using the approach we adopted, that there were significant knowledge flows from IS academic research to practice. Because this result may be due to the limitations in our approach we do not want to speculate too far on the answers to the first question.

Our study did suggest, however, that ideas from IS may not be as readily passing on to a managerial audience to the same degree as in some other disciplines. A very preliminary analysis of *SMR* publications showed that academic works from Management, Marketing and even Psychology and Sociology were being cited to a greater degree than work from IS. This phenomena needs further study. Possible reasons include editorial policy or a lack of suitable contributions from IS researchers. A more worrying explanation would be that IS academic research **does not** have relevance to the *SMR* audience. We leave investigation of this phenomenon to further work. Concern over this issue continues in other fields and movements such as that towards “engaged scholarship” (Van de Ven 2007) and design science (Hevner et al., 2004) may go some way to addressing these concerns.

5.3 Suggested action

The finding that is clear from our study is that there is relatively low proportion of academic IS work cited in the practitioner outlets we studied, although some work appearing in practitioner outlets has itself been very well cited in absolute terms. We therefore suggest:

- **Targeting the indicators:** Authors of papers in research journals might write more articles for trade magazines and similar and communicate the research in a more easily digested form whilst referencing the original research articles. Such trade magazine output should be recognized as worthwhile in the IS research community.
- **New Magazine:** *CACM* has signaled a change in focus (*ISWorld* listserv, 2 April 2008) that may well reduce IS publications and flow-on to practice. We therefore suggest a new magazine, similar in format to the present *CACM*, but solely IS and perhaps produced by the Association for Information Systems (AIS). Such an outlet could, for example, include interviews with practitioners illustrating the usefulness of our research as well as evidence of it in its articles.

In conclusion, it is somewhat surprising that prior work investigating whether the impact of IS research on practice is in fact real, rather than imaginary, appears to be non-existent. Our paper makes a contribution in again calling attention to this important topic, and indicating some means by which further investigation can proceed. Our initial study is limited to bibliometric analysis but provides a base for further research.

We need to show that our research has high impact on practice, and therefore we need to work on this problem as a community to affect those indicators that show academia and the outside world that the

IS discipline has made and continues to make a positive and major impact on organizations, people and society.

References

- Agarwal, R. and Lucas Jr. H.. (2005). The Information Systems Identity Crisis: Focusing on High-Visibility and High-Impact Research., *MIS Quarterly*, 29 (3), 381-398.
- Baskerville, R.L. and Myers, M.D. (2002). Information Systems as a Reference Discipline. *MIS Quarterly*, 26 (1), 1-14.
- Benbasat, I. and Zmud, R. (1999). Empirical Research in Information Systems: The Practice of Relevance. *MIS Quarterly*, 23 (1), 3-16.
- Bjorn-Andersen, N. (2008). Private email correspondence with authors, April.
- Brynjolfsson, E. (1993). The Productivity Paradox of Information Technology, *Communications of the ACM*, 36, 12, 66-77.
- Carr, N. (2003). IT Doesn't Matter. *Harvard Business Review*, 81 (5), 41-49.
- Clarke, R. (2008). An Exploratory Study of Information System Researcher Impact. *Communications of the AIS*, 22 (1), 1-32.
- Davenport, T. and Short, J. (1990). The New Industrial Engineering: Information Technology and Business Process Redesign, *Sloan Management Review*, 31, 4, 11-27.
- Dedrick, J., Gurbuxani, V., and Kraemer, K. (2003). Information Technology and Economic Performance: A Critical Review of the Empirical Evidence. *ACM Computing Surveys*, 35 (1), 1-27.
- DeLone, W. and McLean, E. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3 (1), 60-95.
- Earl, M. (1994). The New and the Old of Business Process Redesign. *Journal of Strategic Information Systems*, 3 (1), 5-22.
- European Union (2008). URL: http://ec.europa.eu/information_society/newsroom/cf/news.cfm?redirection=1&item_type=fo (Nov., 2008).
- Google Scholar (2008). (URL: <http://scholar.google.com> Accessed 4 May, 2008)
- Hevner, A., March, S., Park, J. and Ram, S. (2004). Design Science in Information Systems Research, *MIS Quarterly*, 28 (1), 75-105.
- ISJ (2006) Special Issue of the *Information Systems Journal*, 16 (4).
- Kaplan, R. and Norton, D. (1996). Using the Balanced Scorecard as a Strategic Management System, *Harvard Business Review*, 74, 1, 75-85.
- Lowry, P., Karuga, G., and Richardson, V. (2007). Assessing Leading Institutions, Faculty, and Articles in Premier Information Systems Research Journals. *Communications of the AIS*, 20, 142-203.
- Moore, G. and Benbasat, I. (1991). Development of an Instrument to Measure the Perception of Adopting to Adopt an Information Technology Innovation. *Information Systems Research*, 2 (3), 192-222.
- Mumford, E. and MacDonald, B. (1989). *XSel's Progress*. Wiley, New York.
- National Science Foundation (2008). URL: <http://www.nsf.gov/dir/index.jsp?org=CISE> (Nov. 2008)
- Nederhof, A. and Meijer, R. (1995). Development of Bibliometric Indicators for Utility of Research to Users in Society: Measurement of External Knowledge Transfer Via Publications in Trade Journals. *Scientometrics*, 32(1), 37-48.
- Nederhof, A., Zwann, R., De Bruin, R. and Dekker, P. (1989). Assessing the Usefulness of Bibliometric Indicators in the Humanities and the Social Sciences: A comparative Study. *Scientometrics*, 15, 423-437.
- Polites, G. and Watson, R. (2008). The Centrality and Prestige of CACM. *Communications of the ACM*, 51 (1) 95-100.
- Rogers, E. (1995). *Diffusion of Innovations* (5th edn). Free Press, New York.

- Rosemann, M., and Vessey, I. (2008). Towards Improving the Relevance of Information Systems Research to Practice: The Role of Applicability Checks. *MIS Quarterly*, 23 (1), 1-22.
- Rynes, S., Bartunek, J. and Daft, R. (2001). Across the Great Divide: Knowledge Creation and Transfer between Practitioners and Academics. *Academy of Management Journal*, 44 (2), 34-355.
- Scopus (2008). (URL: <http://www.scopus.com/scopus/home.url> accessed through library database, April, 2008).
- Shrivasta, P. and Mitroff, I. (1984). Enhancing organizational research utilization: The role of decision makers' assumptions. *Academy of Management Review*, 9, 18-26.
- Spencer, J. (2001). How relevant is university-based scientific research to private high-technology firms. *Academy of Management Review*, 44, 432-440.
- Ulrich's Periodicals Directory (2008). URL: <http://www.ulrichsweb.com/ulrichsweb/> (April, 2008)
- Van de Ven, A. (2007). *Engaged Scholarship A Guide for Organizational and Social Research*. New York: Oxford University Press.
- Van Steijn F. and Rip, A. (1998). The Role of Trade Literature in the Communication System. *Scientometrics*, 13, 81-91.
- Web of Science (2008). URL: <http://scientific.thomson.com/products/wos/> accessed through library April and Nov. 2008)

Appendix A: MISQ articles referenced in CACM articles in 2006

- (Articles were found using Scopus, which yielded 18 articles, compared with the 19 articles found by Web of Science for the same source and same year, see Table 3.)
- Alavi, M., Leidner, D.E., (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, 25 (1), 107-136.
- Baskerville, R.L., Myers, M.D. (2002). Information Systems as a Reference Discipline. *MIS Quarterly*, 26 (1), 1-14.
- Beath, C.M., (1991). Supporting the Information Technology Champion. *MIS Quarterly*, 15 (3), 355-372.
- Bharadwaj, A.S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly*, 24 (1), 169-193.
- Brancheau, J.C., Janz, B.D., and Wetherbe, J.C. (1996). Key Issues in Information Systems Management: 1994-95 SIM Delphi Results. *MIS Quarterly*, 20 (2), 225-235.
- Brancheau, J.C., Wetherbe, J.C.(1987). Key Issues in Information Systems Management. *MIS Quarterly*, 11 (1), 23-45.
- Cooper, B.L., Watson, H.J., Wixom, B.H., and Goodhue, D.L. (2000). Data Warehousing Supports Corporate Strategy at First American Corporation. *MIS Quarterly*, 24 (4), 547-567.
- Culnan, M.J., and Swanson, E.B, (1986). Research in Management Information Systems, 1980-1984: Points of Work and Reference. *MIS Quarterly*, 10 (3), 289-301.
- Daft, R.L., Lengel, R.H., and Trevino, L.K. (1987). Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems. *MIS Quarterly*, 11 (3), 355-366.
- Dickson, G.W., Leitheiser, R.L., Wetherbe, J.C., Nechis, M.(1984). Key Information Systems Issues for the 1980's. *MIS Quarterly*, 8 (3), 135-159.
- Goodhue, D.L., and Thompson, R.L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19 (2), 213-236.
- Hamilton, S., Ives, B. (1982). Knowledge Utilization Among MIS Researchers. *MIS Quarterly*, 6 (4), 61-77.
- Loch, K.D., Carr, H.H., and Warkentin, M.E. (1992). Threats to Information Systems: Today's Reality, Yesterday's Understanding. *MIS Quarterly*, 16 (2), 173-186.
- Montazemi, A.R. (1988). Factors Affecting Information Satisfaction in the Context of the Small Business Environment. *MIS Quarterly*, 12 (2), 239-256.
- Niederman, F., Brancheau, J.C., and Wetherbe, J.C. (1991). Information Systems Management Issues for the 1990s. *MIS Quarterly*, 15 (4), 475-500.

- Sambamurthy, V., Bharadwaj, A., and Grover, V. (2003). Shaping Agility Through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms. *MIS Quarterly*, 27 (2), 237-264.
- Te'eni, D. (2001). Review: A Cognitive-Affective Model of Organizational Communication for Designing IT. *MIS Quarterly*, 25 (2), 251-312.
- Todd, P.A., McKeen, J.D., and Gallupe, R.B. (1995). The Evolution of IS Job Skills: A Content Analysis of IS Job Advertisements from 1970 to 1990. *MIS Quarterly*, 19(1), 1-27.