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KNOWLEDGE CONTRIBUTION OF IS RESEARCH: WHERE IS IT CITED?

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Abstract

Results of several previous studies have shown that IS research has traditionally borrowed ideas from its foundational fields. Other disciplines have also contributed to IS research both directly and indirectly. In contrast, this present study employs a Citation analysis to examine knowledge contribution of IS research. Totally, 251 IS articles published in MIS Quarterly are the targets of this study and 3,497 citations made to these target articles were collected and analyzed. Results show that, although main proportion of the citations made to the target articles was made within IS discipline itself, more than 40% of these citations were attributed to other disciplines.

Keyword: Knowledge contribution, IS discipline, IS research, citation analysis, *MIS Quarterly*

Introduction

Disciplinary reviews in IS have addressed a variety of worthwhile issues. Faculty productivity, in terms of number of publications appearing in a set of top-tier IS journals by individual faculty member and institution, was examined by Athey and Plotnicki (2000). Faculty opinions of the quality rankings of IS and IS-related journals were also collected (e.g., Hardgrave and Walstrom 1997; Walstrom *et al.* 1995). Academic value of writing books was studied by Gillenson and Stutz (1991). The intellectual structure of IS and its points of work and reference were also examined (Culnan 1986; Culnan and Swanson 1986); similarly, Hamilton and Ives (1982) explored the principal sources of information used by IS researchers and the extent to which IS discipline relies on the accumulation of previously published knowledge.

A useful view of IS discipline is to conceive of its growth from its foundational fields in Computer Science, Management Science, and Organization Science (Culnan and Swanson 1986). Thus, IS research has traditionally borrowed ideas from these foundations. It is also recognized that other disciplines have contributed to IS research both directly and indirectly (Culnan 1986; Kling 1980). Whereas, the role that IS research has made to advancing the body of knowledge has never been studied. It is unclear whether other disciplines use our IS research – How often IS research is cited and by which disciplines?

To study knowledge contribution of IS discipline, this present research employs a *Citation analysis* and examines the citations that IS articles are used both within and across disciplines. The number of citations made to IS articles published in *MIS Quarterly* (*MISQ*) is analyzed. *MISQ* is selected since it publishes solely IS research and it is a globally-recognized IS journal that has been

consistently rated as the top-ranked IS journal in several studies (e.g., Hardgrave and Walstrom 1997; Mylonopoulos and Theoharakis 2001; Whitman *et al.* 1999).

Citation analysis is a well-established procedure for examining knowledge exchange (Garfield 1979) since it allows the contribution of disciplines, journals, articles, or scholars to be evaluated by giving substantive expression to the use and diffusion of knowledge (Jackson and Rushton 1987). The number of citations that an article receives has been considered an objective measure of its academic impact and contribution (Brown and Gardner 1985, Salancik 1986).

Research Methodology

A list of the articles published in *MISQ* during 1989-1998 was compiled. There were totally 251 target articles on this list. Another list of the citations made to each target article by the articles published during 1991-2000 was also compiled. The two-year lag time between the publication of a target article and the citations of that target article has been used to ensure a reasonable citation history for analysis since the modal elapsed time between IS article publication and IS article citation was found to be about two years (Hamilton and Ives 1982). All citation data were collected from *Social Science Citation Index (SSCI)* and *Science Citation Index (SCI)*, the primary sources of citation data that cover a broad range of publications. There were totally 3,497 citations made to those 251 target articles by the articles published in 240 different journals (i.e., the citing journals). Table 1 summarizes the collected citation data.

The journal categories provided in *SSCI* and *SCI* were used with some modifications to group the 240 citing journals into the following eight areas of study; then, the citations made to *MISQ* target articles by each of the 240 citing journals were recorded and were combined among the journals in each area of study.

- **Business and Management**, including general business, organization science, and strategic management; examples of the journals in this area are *Organization Science*, *Sloan Management Review*, *Academy of Management Journal*, *Long Range Planning*, *Human Relations*, etc.
- **Other Businesses**, including accounting, economics, finance, and marketing; examples of the journals in this area are *Marketing Science*, *Accounting Organization and Society*, *Journal of Marketing*, *Journal of Economic Psychology*, *Futures*, *Journal of the Academy of Marketing Science*, etc.
- **Computer Science (CS)**, including cybernetics and ergonomics; examples of the journals in this area are *International Journal of Human-Computer Studies*, *Journal of Systems and Software*, *IEEE Transactions on Systems Man and Cybernetics*, *IEEE Transaction on Software Engineering*, *IBM Systems Journal*, *Australian Computer Journal*, *Interacting with Computer*, etc.
- **Information Systems (IS)**; examples of the journals in this area are *MIS Quarterly*, *Information Systems Research*, *Journal of Management Information Systems*, *European Journal of Information Systems*, *Decision Support Systems*, *Information Systems Journal*, *Journal of Strategic Information Systems*, etc.
- **Management Science / Production and Operation Management (MS / POM)**; examples of the journals in this area are *Decision Sciences*, *Management Science*, *Omega – International Journal of Management Science*, *Journal of Operational Research Society*, *European Journal of Operational Research*, etc.
- **Psychology / Sociology**; examples of the journals in this area are *Small Group Research*, *Journal of Applied Psychology*, *Administration & Society*, *Journal of Employment Counseling*, *American Review of Public Administration*, etc.
- **Engineering**; examples of the journals in this area are *IEEE Transactions on Engineering Management*, *Journal of Engineering and Technology Management*, *Computer & Industrial Engineering*, *Journal of Management in Engineering*, etc.
- **Other Disciplines**, including communications study, educations, health care, law, library, etc.; examples of the journals in this area are *Government Information Quarterly*, *International journal of Medical Informatics*, *Communication Research*, *Education*, *Education for Information*, *Journal of Forestry*, *Library Trends*, *Washington Law Review*, *Substance Use & Misuse*, etc.

Table 1. The Collected Citation Data

Citation Data	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	Total
Number of <i>MISQ</i> target articles published in each year	32	27	30	31	26	22	24	20	19	20	251
Citations made to <i>MISQ</i> target articles published in each year by the articles published during 1991-2000	646	333	615	483	441	314	338	198	92	37	3497

Study Results and Discussion

The highest proportion (58.4%) of the citations made to *MISQ* target articles is made within IS discipline itself (see Table 2). However, more than 40% of the citations are attributed to other areas of study. The three areas of study – Computer Science (13.5%), MS / POM (11.3%), and Business and Management (6.4%) – account for approximately 31% of the citations and nearly 9% of the citations are attributed to other external disciplines (e.g., economics, finance, marketing, psychology, engineering, health care, education). For each of the eight areas of study, a list of the citing journals, which accounted for 90% of the citations made to *MISQ* target articles by all of the citing journals in that particular area of study, is in Table 3. In addition, a list of the first 49 journals most frequently (more than 10 times) citing *MISQ* target articles is in Table 4.

Table 2. Citations Made to *MISQ* Target Articles by Discipline

Discipline	Citations made to <i>MISQ</i> target articles	% *
Business and Management	223	6.4
Other Businesses	30	0.9
Computer Science	472	13.5
Information Systems	2042	58.4
MS / POM	394	11.3
Psychology and Sociology	143	4.1
Engineering	84	2.4
Other Disciplines	109	3.1
Total	3497	100.0

*Based on totally 3,497 citations made to *MISQ* target articles

Since more than 40% of the citations made to *MISQ* target articles were attributed to non-IS journals, this result indicates that IS research does indeed influence or contribute to other disciplines. However, knowledge contribution of IS research are mainly to IS discipline and to closely related disciplines (i.e., Computer Science, Management Science, and Organization Science) as also shown on the list of the first 49 journals most frequently citing *MISQ* target articles (see Table 4).

Conclusion

Any discipline striving toward scientific maturity is justifiably concerned about the utility of its knowledge and the rate at which such knowledge is disseminated across scientific community (Cote *et al.* 1991). IS discipline is no exception. Results of the *Citation analysis* conducted in this study provide a strong argument for IS discipline that our IS research contributes to advancing the body of knowledge. IS research published in *MISQ* is frequently cited by other disciplines.

Nevertheless, the results of this study do not provide any relative comparison of knowledge contribution between IS discipline and others. Thus, further studies are warranted. Additionally, the investigation of the citation patterns for all major IS academic journals would reflect clearer role and knowledge contribution of IS research and its discipline. For this purpose, the investigation conducted in this study could serve as a starting point for these further studies.

Table 3. Citing Journals Accounting for 90% of the Citations Made to MISQ Target Articles by Journals in Each Area of Study

Citing Journals	Citations	% *
<i>1. Business and Management:</i> totally 223 citations made to MISQ target articles		
Organization Science	39	17
Group Decision And Negotiation	31	14
Organizational Behavior And Human Decision Processes	18	8
Sloan Management Review	18	8
Academy of Management Journal	13	6
Journal of Management	13	6
Journal of Business Ethics	12	5
Canadian Journal Of Administrative Sciences	10	4
Academy of Management Review	8	4
Long Range Planning	8	4
California Management Review	6	3
Journal of Business Research	6	3
Journal of International Business Studies	6	3
Journal Of Organizational Change Management	5	2
New Technology Work And Employment	5	2
Human Relations	4	2
<i>2. Other Businesses:</i> totally 30 citations made to MISQ target articles		
Marketing Science	5	17
Accounting Organizations And Society	4	13
Journal of Marketing	4	13
Journal Of Product Innovation Management	3	10
Journal Of Public Policy & Marketing	3	10
Industrial Marketing Management	2	7
International Journal of Research in Marketing	2	7
Journal Of Economic Psychology	2	7
Futures	1	3
Journal of the Academy of Marketing Science	1	3
<i>3. Computer Science:</i> totally 472 citations made to MISQ target articles		
International Journal Of Human-Computer Studies	61	13
Behaviour & Information Technology	59	13
Communications of the ACM	57	12
Journal of Systems and Software	41	9
IFIP Transactions A – Computer Science And Technology	37	8
Computers In Human Behavior	32	7
IEEE Transactions On Systems Man And Cybernetics	23	5
Information and Software Technology	22	5
IEEE Transactions On Software Engineering	20	4
Wirtschaftsinformatik (German)	19	4
International Journal Of Computer Applications In Technology	13	3
Journal Of Software Maintenance-Research And Practice	12	3
Australian Computer Journal	9	2
IBM Systems Journal	7	1
Interacting With Computers	7	1
International Journal Of Man-Machine Studies	6	1

Citing Journals	Citations	% *
<i>4. MIS totally 2042 citations made to MISQ target articles</i>		
MIS Quarterly	413	20
Information & Management	367	18
Information Systems Research	171	8
Journal Of Information Technology	145	7
Journal of Computer Information Systems	131	6
Journal of Management Information Systems	115	6
European Journal of Information Systems	109	5
Decision Support Systems	99	5
Information Systems Journal	80	4
Data Base For Advances In Information Systems	77	4
International Journal Of Information Management	72	4
Journal Of Strategic Information Systems	69	3
<i>5. Management Science and Production and Operation Management: totally 394 citations made to MISQ target articles</i>		
Decision Sciences	160	41
Omega – International Journal of Management Science	89	23
Industrial Management & Data Systems	32	8
Management Science	31	8
European Journal of Operational Research	17	4
Journal Of Operational Research Society	12	3
Computers & Operations Research	8	2
International Journal Of Operations & Production Management	8	2
<i>6. Psychology and Sociology: totally 143 citations made to MISQ target articles</i>		
Small Group Research	20	14
Personnel Psychology	11	8
Systems Research And Behavioral Science	9	6
Evaluation And Program Planning	8	6
Public Administration Review	8	6
Journal Of Social Service Research	7	5
Administration In Social Work	6	4
Environment and Planning	5	3
Information Society	5	3
Journal of Applied Psychology	5	3
American Review Of Public Administration	4	3
Journal of Applied Social Psychology	4	3
Perceptual And Motor Skills	4	3
Social Science Computer Review	4	3
Annals Of Tourism Research	3	2
Behavior Research Methods Instruments & Computers	3	2
Psychological Reports	3	2
Work And Stress	3	2
Administration & Society	2	1
Creativity Research Journal	2	1
Journal Of Employment Counseling	2	1
Journal of Personality and Social Psychology	2	1
Sex Roles	2	1
Technological Forecasting And Social Change	2	1
Technology in Society	2	1

Citing Journals	Citations	% *
Citing Journals	Citations	% *
7. Engineering: totally 84 citations made to MISQ target articles		
IEEE Transactions On Engineering Management	41	49
Journal Of Engineering And Technology Management	14	17
International Journal Of Technology Management	9	11
Technology Analysis & Strategic Management	6	7
Computers & Industrial Engineering	5	6
Journal Of Management In Engineering	1	1
8. Other Disciplines: totally 109 citations made to MISQ target articles		
Government Information Quarterly	12	11
Computers & Education	8	7
Computers in Nursing	6	6
International Journal Of Medical Informatics	6	6
Journal Of The American Medical Informatics Association	6	6
Computers And Electronics In Agriculture	5	5
Journal of Educational Computer Research	5	5
Journal of Healthcare Management	5	5
Communication Education	4	4
Health Care Management Review	3	3
British Journal of Radiology	2	2
Communication Research	2	2
Education for Information	2	2
Educational Technology Research And Development	2	2
Hospital & Health Services Administration	2	2
Human Communication Research	2	2
Journal Of Communication	2	2
Journal Of Medical Systems	2	2
Journal of Telemedicine and Telecare	2	2
Library & Information Science Research	2	2
Program-Electronic Library And Information Systems	2	2
Academic Medicine	1	1
Communication Theory	1	1
Education	1	1
Innovations In Education And Training International	1	1
International Forum On Information And Documentation	1	1
International Journal of Cancer	1	1
Journal Of Academic Librarianship	1	1
Journal of Experimental Education	1	1
Journal of Forestry	1	1
Journal Of Government Information	1	1
Journal Of Pragmatics	1	1
Library Trends	1	1
Modern Language Journal	1	1
Substance Use & Misuse	1	1
Vanderbilt Law Review	1	1
Washington Law Review	1	1

* based on the total citations that the citing journals in each area of study made to MISQ target articles

Table 4. Journals Most Frequently Citing *MISQ* Target Articles

Citing Journals	Citations	% *
MIS Quarterly	413	11.81%
Information & Management	367	10.49%
Information Systems Research	171	4.89%
Decision Sciences	160	4.58%
Journal Of Information Technology	145	4.15%
Journal of Computer Information Systems	131	3.75%
Journal of Management Information Systems	115	3.29%
European Journal of Information Systems	109	3.12%
Decision Support Systems	99	2.83%
Omega – International Journal of Management Science	89	2.55%
Information Systems Journal	80	2.29%
Data Base For Advances In Information Systems	77	2.20%
International Journal Of Information Management	72	2.06%
Journal Of Strategic Information Systems	69	1.97%
International Journal Of Human-Computer Studies	61	1.74%
Behaviour & Information Technology	59	1.69%
Communications of the ACM	57	1.63%
IEEE Transactions On Engineering Management	41	1.17%
Journal of Systems and Software	41	1.17%
Organization Science	39	1.12%
IFIP Transactions A – Computer Science And Technology	37	1.06%
Computers In Human Behavior	32	0.92%
Industrial Management & Data Systems	32	0.92%
Group Decision And Negotiation	31	0.89%
Management Science	31	0.89%
Information Processing & Management	30	0.86%
Expert Systems with Applications	24	0.69%
Data Base	23	0.66%
IEEE Transactions On Systems Man And Cybernetics	23	0.66%
Information and Software Technology	22	0.63%
Annual Review Of Information Science And Technology	21	0.60%
IEEE Transactions On Software Engineering	20	0.57%
Small Group Research	20	0.57%
Wirtschaftsinformatik (German)	19	0.54%
Organizational Behavior And Human Decision Processes	18	0.51%
Sloan Management Review	18	0.51%
European Journal of Operational Research	17	0.49%
Information Systems Management	15	0.43%
Journal Of Organizational Computing And Electronic Commerce	15	0.43%
Journal Of Engineering And Technology Management	14	0.40%
Academy of Management Journal	13	0.37%
International Journal Of Computer Applications In Technology	13	0.37%
Journal of Management	13	0.37%
Government Information Quarterly	12	0.34%
Journal of Business Ethics	12	0.34%
Journal Of Operational Research Society	12	0.34%
Journal Of Software Maintenance-Research And Practice	12	0.34%
International Journal Of Electronic Commerce	11	0.31%
Personnel Psychology	11	0.31%

* based on totally 3,497 citations made to *MISQ* target articles

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