

The Journal[Cybermetrics News](#)[Editorial Board](#)[Guide for Authors](#)[Issues Contents](#) ➤**The Seminars** ➤**The Source**[Scientometrics](#) ➤[Tools](#) ➤[R&D Policy & Resources](#) ➤[World Situation Report](#) ➤**VOLUME 4 (2000): ISSUE 1. PAPER 3****A Profile in Statistics of Journal Articles: Fifty Years of American Documentation and the Journal of the American Society for****Information Science****Wallace Koehler, Abby D. Anderson, Beverly A. Dowdy, Daniel E. Fields, Michael Golden, Dawn Hall, Amy C. Johnson, Carey Kipp, Lina L. Ortega, Erika B. Ripley, Robert L. Roddy, Karla Burt Shaffer, Shane Shelburn, and Carol D. Wasteneys[1]**School of Library and Information Studies. The University of Oklahoma
401 West Brooks, Room 120. Norman, OK 73019 USAwkoehler@ou.edu**Abstract**

JASIS has consistently been identified as one the major information science and library journals both in the United States as well as for the rest of the world (Kohl & Davis, 1985; Rice 1990; Siddiqui, 1997; Wormell, 1998; Nisonger, 1999). The Journal has also long been regarded as one of the discipline's chief archival documents. And archival documents retain their influence over their disciplines far longer than do other quality publications (Griffith et al, 1979). Based on our analysis of articles published in AD and JASIS from 1950 to 1999, we find that there has been a slow but perhaps inevitable shift based first on the single non-funded researcher and author to a much wider research and publishing participation among authors, regions, corporate authors, and countries. This suggests not only cross-fertilization of ideas, but also more complex research questions. A small trend toward greater external funding further reinforces this finding. We also chose to close our data collection with the last number of volume 50. This is less by design than by serendipity, since the data collection and initial analyses were conceived as a class project for the Elements of Research course of the School of Library and Information Studies at the University of Oklahoma for fall semester 1999.

Keywords

Scientometrics journal characteristics; authors; gender; transnationalism; statistical profile

Introduction

Articles published in library and information sciences journals reflect changes in the interests and concerns of their author constituencies and these changes can be documented through bibliometric analyses of journal content (e.g.

Jarvelin & Vakkari, 1990; Jarvelin & Vakkari, 1993; or Cano, 1999). Because of its prominence in the American and international librarianship and information science literature, an exploration of changes and trends manifested by the content and format of the *Journal* may well mirror social, professional, and intellectual change within the information professions the *Journal* embraces. Because this research includes each number of each volume of the *Journal* since 1950 and since the *Journal* is generally accepted as one of, if not *the* definitive archival serial for American librarianship and the information sciences; we can trace the careers of its leading practitioners through a count of their articles and by marking their first and last or most recent contributions to the *Journal*.

This bibliometric analysis of the *Journal*, like similar analyses of the *Journal* (Harter & Hooten, 1992; Al-Ghamdi et al, 1998; Lipetz, 1999; Smith, 1999) and other publications like *College & Research Libraries* (Cline, 1982; Metz, 1988), *Cataloging & Classification Quarterly* (Carter & Kascus, 1991), *Library Resources & Technical Services* (Smiraglia & Leazer, 1995), or the *Canadian Library Journal* (Stephenson, 1993), addresses a range of variables and changes to those variables over time. These include changes in patterns of authorship: (1) a tendency toward more multi-authored pieces, (2) an increase in the number of female authors and in the number of female first-authors, and (3) a redistribution of authors from corporate and more service oriented institutions (libraries) toward university faculties.

Like many others before it, this article is an example of bibliometric exploration of important journals in librarianship and information science (e.g., Saracevic & Perk, 1973; Olsgaard, & Olsgaard, 1980; Cline, 1982; Carter & Kascus, 1991; Stephenson, 1993; Smiraglia & Leazer, 1995; Terry, 1996; or Cano, 1999) and many other fields of inquiry (e.g., Magyar, 1974; Worthen, 1978; Salton & Bergmark, 1979; Houston, 1983; Hurt, 1984; Maheswarappa, & Nagappa 1984; or Kaneiwa et al, 1988; Sin, 1998; Glanzel et al, 1999; or Reed, 1999).

Ours, like others before us (Harter & Hooten, 1992; Al-Ghamdi et al, 1998; Lipetz, 1999; or Smith, 1999), focuses on the *Journal of the American Society for Information Science (JASIS)*. We concern ourselves with trends that can be documented from the pages of the *Journal*. These changes include, as discussed above, name changes, article characteristics (length, number of footnotes, types of footnotes), and author characteristics (number of authors, gender, corporate authorship, co-authorship, transnational authorship).

The *Journal of the American Society for Information Science* and before it *American Documentation* represent the definitive archival journal in information science. The *Journal*, we must acknowledge, is not the only journal in information science. There are numerous other national and international journals that address both the general and specific disciplines within the genre. We make this statement not to deprecate the importance of the *Journal*, we accept *a priori* that it ranks in the top tier of scholarly and professional organization publications (Nisonger, 1999). Because it is one among many journals, the *Journal* cannot nor should it be expected to immediately reflect all changes within and vicissitudes of information science over half a century. In fact, general-purpose professional organizations and their journals are inherently conservative and will more slowly reflect changes and redefinitions of their disciplines than will journals and organizations emerging at the margins of the defined discipline. But these core organizations and their journals invariably recognize and adapt to new directions (Buckland, 1999; Bates, 1999b) or become moribund. The *Journal* is no different.

Journal articles offer many explicit and several implicit variables that point to the evolution of the *Journal* as well as the discipline it represents. These include editorial stability, frequency of publication, journal content type (book reviews, research articles, letters, etc), author based data (single- and co-

authorship, repeat authorship, order of authorship, gender), corporate authorship, articles based on funded research, and article characteristics (length, number and type of citations, title words). We argue that the *Journal* has undergone an inevitable evolution over its fifty years. It has become far more complex. Not only has it increased its publication frequency from four to fourteen numbers per volume, its content has shifted toward greater dedication of space to research articles, more research is funded by external agencies, the number of co-authored work has increased, the corporate author base has shifted from government and the corporate sector to the academic, the corporate author base has also shifted from almost solely a US base to a more international one, and there is greater participation by women as authors.

A Brief History

The first change of importance for the *Journal* is its change in provenance and name. *JASIS* was first appeared as the *Journal of Documentary Reproduction*, an American Library Association publication between 1938 and 1942. *American Documentation (AD)* succeeded the *Journal of Documentary Reproduction* and was published as *AD* from 1950 to 1969. *JASIS* has since been published under its present name (at least through volume 50). Because of the discontinuity, the change in association affiliation, and the order of volume numbering, we did not include the *Journal of Documentary Reproduction* in this fiftieth anniversary bibliometric survey of the *Journal*. For a discussion of the *Journal of Documentary Reproduction*, see Walker (1997) who addresses authorship and citation in *JDR*. We begin with *American Documentation* 1 (1) and end with the *Journal of the American Society for Information Science* 50 (14).

The change in 1970 brought the *Journal* in parallel with the 1968 name change of its parent organization from the American Documentation Institute to the American Society for Information Science (ASIS). ASIS explicitly recognizes the effect of change on its policies and organization, as is reflected by a statement on its Web site (ASIS, 2000). Much of the Society's early history is captured by Schultz and Garwig (1969) and re-echoed in the *JASIS* Special Topic Issue commemorating the fiftieth anniversary of the *Journal* edited by Marcia Bates (1999a). Each name change followed the recognition by the leading information scientists of the day for a need to reflect expanded interests and new realities (Bates 1999b). Consider the following quote from Vernon Tate, *AD* editor at its birth:

The late war ... [created many science and technology issues] ... at the same time it has provided techniques, equipment and processes that were formerly unknown or in rudimentary stages of development. It is the job of *American Documentation* to report these and other facets of the present day as phrased in the records of our life and times -- their creation, arrangement, use and reproduction. (Tate, 1950: 7)

And from Arthur Elias, *JASIS* editor at its rebirth:

It may not be commonly known, but this is actually the *second* name change for our journal. Its predecessor, *The Journal of Documentary Reproduction* was supplanted by *AD*, and there is a distinct parallel in the causes of that change and this one. *AD* represented, when *it* appeared, a shift in emphasis from an archival, microfilm centered organization of societies to a broad-scope institute of individuals. *JASIS* represents a growing and vital science, developing a theoretical base and applying these theories to practice for the general good. (Elias, 1970: 3)

Methodology

To document changes in authorship, citation patterns, funding and funding sources, and related bibliometric phenomena, the fall 1999 Elements of Research class at the University of Oklahoma collected data from each number of each volume of *American Documentation* and its successor the *Journal of the American Society for Information Science* from the first volume through the fiftieth. In general, each member of the class was responsible for two volumes of *AD* and two of *JASIS*. The names of all authors were collected in the published order together with each author's specific and general affiliation. For example, were we to record authorship for this article, we would record each of the fourteen authors and identify the School of Library and Information Studies as the specific corporate author and the University of Oklahoma as the general author. This allows us not only to follow authors as they move from one institution to another, it also allows us to suggest changes in status or stardom as the named position of authors change. It also permits us to test the hypotheses that not only are corporate authorships moving from practitioner sites to academic ones over time. Moreover although corporate authorship tends to be concentrated (Budd & Seavey, 1990; Al-Ghamdi et al, 1998), the distribution of authorship is more catholic than once it was.

In addition, for each article we logged the full article title (including "stop" words), the journal name, number, date, position of the article in each issue, the editor's name, and issue type (special, standard, invited article). By collecting the full article title, we are able to replicate research that suggests that the greater the number of authors the longer the title (Kuch, 1978; Yitzhaki, 1994) although our findings point to a weak association, if any. Lipetz (1999) suggests a theoretically richer explanation: New disciplines and concepts are mapped by longer explanatory or descriptive article titles. But as these disciplines are mature, standard "short-hands" are developed and employed in subsequent and shorter titles (e.g. "World Wide Web" becoming "WWW" or "Web"). Because we collected the full titles of *Journal* articles as well as the number of authors for each article, we test not only the hypothesis that the greater the number of authors the greater the complexity of the title as well as Lipetz's thesis.

To determine the length of articles, we collected the beginning and ending page numbers for each article. Have *Journal* submissions become longer and can a pattern be demonstrated? To document changes to the *Journal* format and therefore its contents, we captured the number of book reviews, articles, letters to the editor, and other characteristics of each issue.

We collected citation data from each article. These include the number of articles, books, proceedings, government documents, media reports (radio, television, newspapers, newsmagazines, etc), personal communications, and Internet material cited. In addition, we counted the number of auto-citations to the work of any of the authors.

Finally, we collected funding data by type of funding agency. These included "not-funded," "government agency," "foundation," "university," and "other." We are therefore able to document changes in practices over the past fifty years in underwriting *Journal* quality research reports.

Data were collected to individual spreadsheet (Excel) templates. Each data set was checked by the lead author (and professor) to determine not only data accuracy but the exercise grade. Where the data error rate was low for a ten-percent random sample of each set, corrections were made as necessary. Where there was a large error rate, the entire set was rejected and a new collection made. Once quality control was accomplished, each of the data sets was merged into a single spreadsheet. Further quality control was accomplished by ordering authors and corporate authors alphabetically and through a series of counts. The spreadsheet was imported into a statistical package (SPSS) for further analysis.

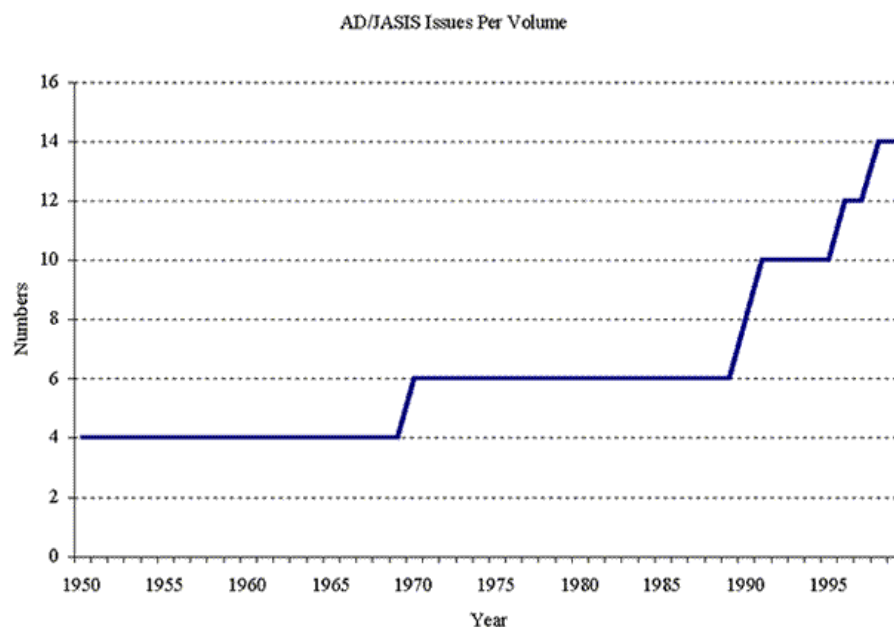
Journal Bibliometrics

The *Journal* has undergone many changes in its fifty-year history. It underwent its name change in 1970 when *American Documentation* became the *Journal of the American Society for Information Science* 21. It has had numerous editors and special editors. The number of issues per volume has increased from four to fourteen. The number of authors per article has risen from 1.2 to 1.8 per article. This section documents these and other changes over the fifty-year life of the *Journal*.

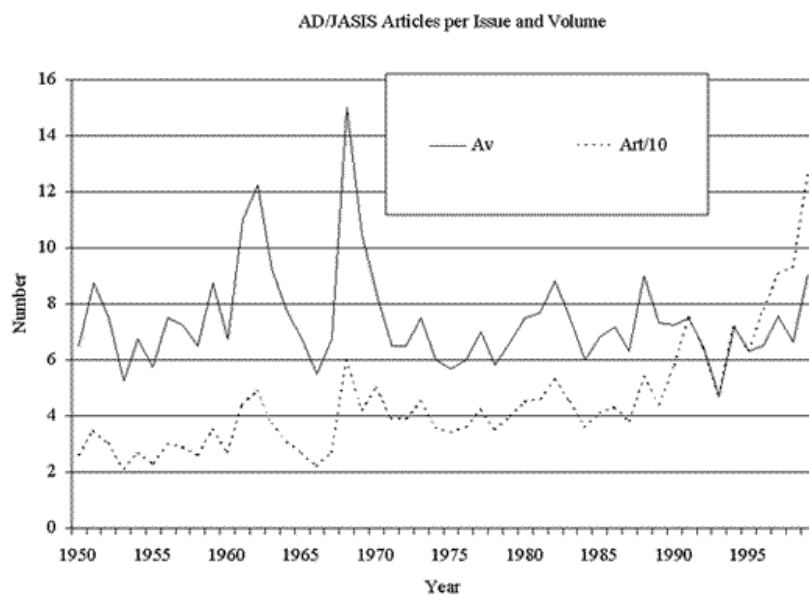
Issues

Although the first issue of the *Journal* appeared in 1950, it was not until 1969 that the first special issue appeared edited by Jack Belzer. There was but one special issue in the 1970s, and the majority of special topics and perspective issues did not appear until the 1980s and more so into the 1990s.

The first volume of *American Documentation* contained four issues and it continued so (with the exception of volume 14 with three issues) through volume 20. Volume 21 consisted of six issues that continued through volume 40. Volume 41 had eight issues. Volumes 42 to 46 had ten issues each. Volumes 47 and 48 had twelve while volumes 49 and 50 had fourteen each. The number of articles per issue ranges from as few as two to twenty-three. The distribution of issues is shown in Figure Issues-1.



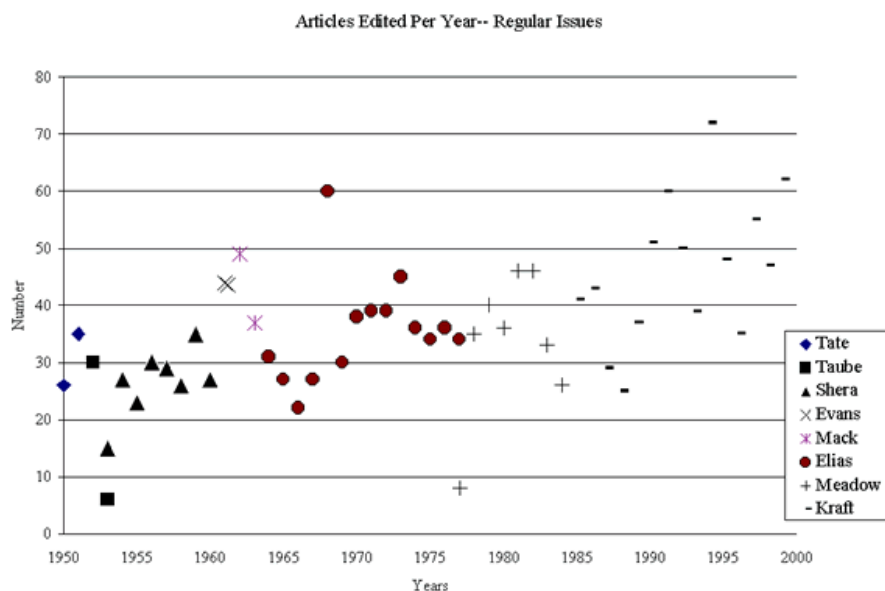
The average number of articles per number per volume and the number of articles per volume (divided by ten) are shown in Figure 2.



Based on the data presented in Figures 1 and 2, the *Journal* was faced with intense pressure to increase its article flow. Through 1969, each volume was published with four issues. As is shown in Figure 2, there was a trend toward a greater number of articles per issue and therefore per volume. In 1970, the *Journal* was published with six issues so that by 1998, it contained fourteen issues. The practice of increasing the number of issues in the face of an increasing number of articles tends to maintain the average number of articles per issue relatively flat. While it is probably too early to speculate, the data points for 1999 in Figure 2 may suggest that *JASIS* is again experiencing "article pressure."

Articles

As the discussion above implies, the *Journal* has experienced growth both in the number of issues per volume but also in the number of articles per volume. Figure 3 demonstrates that growth. It also differentiates between regular articles and special and perspectives articles. Perspectives articles, those gray-bordered pages, may not rise to the same "quality" as regular articles. These are typically published as discrete numbers. Perspectives articles are edited by special editors but are frequently a part of regular issues. Thus an issue containing both perspectives and regular articles will likely have more than one editor.



Figures 4 and 5 are scatterplots of the number of regular and special articles per year by each of the Journal's editor's. Figure 4 plots regular issues while Figure 5 provides similar data for special editors.

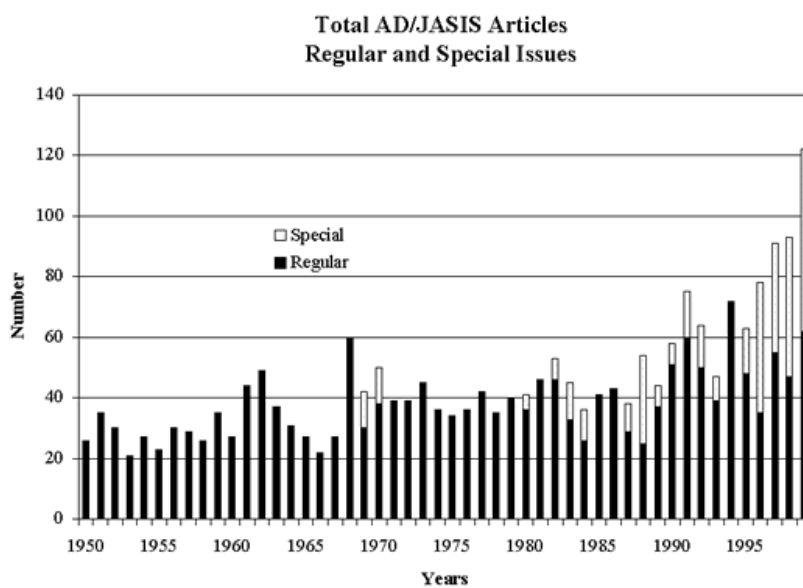
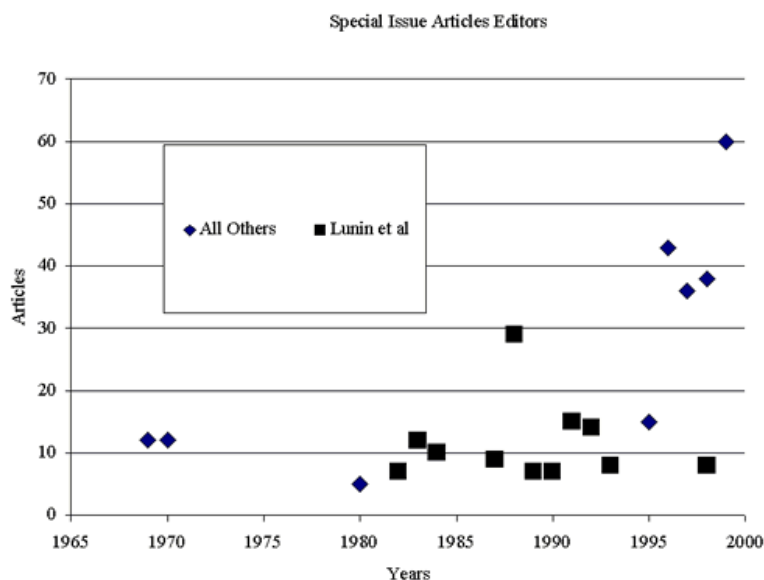


Figure 5



Special issues and their articles, as Figures 3, 4, and 5 show are taking an ever more important role in *JASIS*. Given the stated greater peer review status for regular articles over special ones and given the increase in number and proportion of special articles and issues, the need may arise for bibliometric consideration of the weight and place for both regular and special articles.

Article Characteristics

The number of issues, the number of articles, and an increase in co-authorship have been established. Articles may also undergo other changes. These include their size, the number of citations within the article to the work of others, the number of auto-citations or citations to the work of one or more of the authors, and the length in words of article titles.

Citation patterns within *AD/JASIS* articles have undergone change over the past five decades. Not only have the number of citations per article tended to increase so have the number of auto-citations. Moreover, the pattern has changed among the types of material cited: books, peer reviewed articles, government reports, media publications and broadcasts, proceedings, personal communications, reports, and most recently the Internet and the Web. Table 1 provides the average (mean) number of citations per article by type for each of the five decades. The Table offers two measures of citation means per article. The first value, not in parentheses, reflects mean citation values for those articles in which a source type has been cited. The second, in parentheses, is the mean value for all articles in each period. The total value for all years and each period is essentially the same and thus only one value is given.

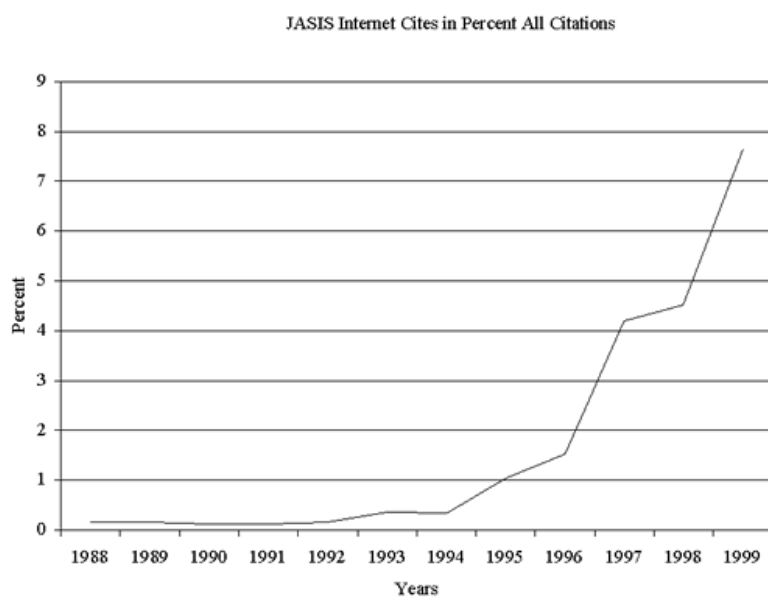
| | All Years | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 |
|-----------------|---------------|--------------|--------------|--------------|----------------|----------------|
| Total | 18.6 | 6.7 | 8.8 | 13.3 | 20.5 | 29.3 |
| Articles | 10.3 (8.9) | 3.5 (3.0) | 5.3 (3.2) | 6.2 (5.7) | 10.7 (10.0) | 15.9 (15.0) |
| Books | 6.3 | 2.6 | 4.2 | 6.5 | 6.5 | 9.0 |

| | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|
| | (5.3) | (2.3) | (2.3) | (3.6) | (6.0) | (8.3) |
| Government Documents | 1.1 (0.5) | 0.7 (0.5) | 2.7 (0.5) | 0.9 (0.7) | 1.4 (0.5) | 1.0 (0.5) |
| Media | 0.0 (0.0) | 2.3 (0.0) | 0.0 (0.0) | 0.4 (0.0) | 0.3 (0.1) | 0.2 (0.1) |
| Personal Communication | 0.4 (0.2) | 0.3 (0.2) | 2.9 (0.3) | 0.5 (0.2) | 0.4 (0.1) | 0.2 (0.0) |
| Proceedings | 2.3 (1.5) | 0.3 (0.2) | 2.3 (0.7) | 1.5 (1.0) | 2.4 (1.6) | 3.3 (2.7) |
| Reports | 1.1 (0.6) | 0.3 (0.0) | 2.5 (0.8) | 1.2 (0.7) | 1.6 (0.0) | 0.9 (0.6) |
| WWW | | | | | | 1.2 (0.6) |
| Other | 1.9 (1.2) | 0.4 (0.3) | 2.8 (0.7) | 2.5 (1.5) | 1.8 (1.1) | 2.0 (1.5) |
| *Values not within () are means for articles containing at least one of the citation type. Values within () indicate means including articles without citation type. | | | | | | |

Table 1 is informative. It indicates first that the average number of all citations has been increasing. It also informs that the utility of various resources change as well. For example, citations to peer reviewed articles, books, and proceedings have been increasing. Citations to media resources, including newsmagazines and broadcasts are relatively flat. For those that cite them, government documents and personal communications rose in "popularity" in the 1960s, but are not now a major citation source. This is probably due to the degree of participation of authors from the government and commercial sector during that time. These data are explored below.

The World Wide Web and other Internet resources (user groups, lists) are a recently created potential citation resource. The values found in Table 3 for the Web in the 1990s understate the importance of the resource since has not been commonly cited before 1994. Figure 6 is a plot of the percent of WWW citations found in JASIS to all citations for the years 1994 through 1999.

Figure 6



Despite the documented ephemeral or unstable quality of Web based material (Koehler, 1999), citations to the Internet in *JASIS* articles have increased dramatically in the last several years. Figure 6 charts a very slow beginning in 1988 when list, user groups, and later gophers were introduced and cited. With the advent of the World Wide Web and effective browsers, citations to the Web increased from less than one percent in 1994 to nearly eight percent of all citations in 1999. Should Web citations remain at or rise from the eight-percent level, the Web must be considered not only a major new contributor to citations but also as a legitimate source. This phenomenon, if ubiquitous to scholarly publication, may result in major changes to bibliometric and bibliographic methodologies.

Journal articles have also increased in size and (for whatever significance it may have) articles titles have become longer. We measured article size as its number of pages and derived this from the beginning and ending page numbers for the articles. The measure is prone to potential error. For example, we counted partial pages as whole pages. If and as a journal changes its page layout, font size, typeface, etc., page spacing will be effected. We adopted this approach because we believe all others are far too resource intensive for any increase in quality we might gain. To derive the title word count, we counted all words – including standard stop words (e.g. the, a, etc) – in the title. As is shown in Table 2, both the number of title words and article lengths increased between 1950 and 1999. In sum, the *Journal* began growing at birth and continues to do so.

| | Total | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 |
|----------------------|-------|---------|---------|---------|---------|---------|
| Pages/Article | 8.4 | 7.1 | 6.9 | 7.8 | 7.9 | 10.0 |
| Words/Title | 9.1 | 7.2 | 8.5 | 9.4 | 8.9 | 10.1 |

It has been suggested in the literature (Kuch, 1978; Yitzhaki, 1994) that there may be relationships between number of pages, title words, or citations in an article and the number of co-authors. There likewise might be relationship between the number of co-authors and the number of auto-citations found in an article. To test these hypotheses we counted the number of title words, we calculated page lengths, we counted total citations, and we calculated auto-citations. We defined auto-citations as the number of times an article cited the work of any of its authors. A correlation matrix for the variables is presented in Table 3.

| | Title Word Count | Page Length | Total Citations | Auto-Citations % |
|----------------------------|------------------|-------------|-----------------|------------------|
| All Years 1950-1999 | | | | |
| Co-Author Count | .132 | .066 | .045 | .131 |
| Title Word Count | | .111 | .126 | -.033 |
| Page Length | | | .201 | -.057 |
| Total Citations | | | | -.152 |
| 1950-59 | | | | |
| Co-Author Count | .233 | .130 | .044 | .152 |

| | | | | |
|--|------|-------|-------|-------|
| Title Word Count | | .114 | -.030 | .031 |
| Page Length | | | .437 | -.156 |
| 1960-69 | | | | |
| Co-Author Count | .020 | .004 | -.062 | .121 |
| Title Word Count | | -.009 | -.075 | .023 |
| Page Length | | | .388 | .174 |
| 1970-79 | | | | |
| Co-Author Count | .141 | .186 | -.079 | .124 |
| Title Word Count | | .094 | .141 | -.082 |
| Page Length | | | .420 | .094 |
| 1980-89 | | | | |
| Co-Author Count | .090 | .157 | -.053 | .165 |
| Title Word Count | | .027 | .027 | .018 |
| Page Length | | | .267 | .068 |
| 1990-99 | | | | |
| Co-Author Count | .059 | .034 | -.039 | .255 |
| Title Word Count | | .108 | .100 | -.072 |
| Page Length | | | .162 | -.147 |
| Coefficients in <i>italics</i> significant at $p \leq .05$ | | | | |

Table 3 is, on the whole, under-whelming. There are positive, statistically significant correlations for article length and the number of total citations. The coefficient for the entire period is weak (.201). Coefficients by decade suggest that there was a more relationship at times than at others. In the 1990s, there is little relationship between length and citations. As for the rest, at least for the *Journal*, anticipated correlations rise to the level of "publication myth."

Changes in content have been documented. These include a shift from reports, book reviews, and the like to more scholarly or academic publications within the pages of the celebrated journals. There have also been changes to citation patterns. Together with the increase in "research articles," there has been an increase in the average number of citations per article. We believe that there has also been an increase in the number of auto-citations in part because of the increase in the number of authors, in part because of the growth in the size and scope of the literature, and in part because of the shift in the employment characteristics of the authors. Korytnyk (1988) has demonstrated, for example, that librarians -- including those with Ph.D.s -- are less likely to publish than are their library school faculty peers. More authors, we suggest, have more of their own material to cite. She also finds that male faculty are more likely to publish than female.

The material cited is also changing. Citations to proceedings and government documents were once far more common once than they now are -- at least as a percent of total citations. This may be a function of the publication habits of

information practitioners and academics. Drott (1995) has shown that publication patterns in the information sciences differ from other fields, with a greater treatment of conference proceedings as terminal publications. We hypothesize that as the *Journal's* author base has moved from practitioners to academics and away from almost sole reliance on the library professions to a wider information science base, *Journal* authors' reliance on proceedings for citations declined in parallel with their publication preferences.

Article/Author Funding

Research leading to articles published in *AD/JASIS* has not historically been funded by outside agencies. Table 4 provides the distribution of funding sources as reported by authors in footnotes or acknowledgements in their articles. More than three-quarters of the research were not funded. Governments provided the majority of reported research funds followed by other sources, universities, and foundations. Most research was funded either by a single donor type. The three categories in Table 4 -- Found+, Gov+, and Univ+ -- indicate multiple donors where a foundation, government, or university source is indicated first.

| Funding Source | N | Percent |
|-----------------------|----------|----------------|
| None Reported | 1712 | 76.53 |
| Foundation | 27 | 1.21 |
| Found+ | 2 | 0.09 |
| Government | 337 | 15.06 |
| Gov+ | 54 | 2.41 |
| Other | 64 | 2.86 |
| University | 36 | 1.61 |
| Univ+ | 5 | 0.22 |
| Total | 2237 | 100.00 |

There is a variation in donor patterns over time for *AD/JASIS* research. This variation is shown in Table 5. Over the *Journal's* five decades, government has been the single most important source of research funding. In the last decade, 1990-1999, government as a reported source has declined by almost half. Other funding sources have contributed to filling the void, but not completely.

| Funding Source | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 |
|-----------------------|----------------|----------------|----------------|----------------|----------------|
| None | 96.8 | 70.5 | 66.4 | 75.1 | 77.9 |
| Foundation | 0.4 | 0.5 | 1.5 | 0.2 | 2.6 |
| Government | 1.8 | 26.6 | 26.2 | 21.1 | 12.4 |
| University | 0.4 | | 0.8 | 2.0 | 3.6 |
| Other | 0.7 | 2.2 | 5.1 | 1.3 | 3.7 |

Table 6 presents data by decade on research funding by gender. With the exception of the first decade, women first authors have been less successful in securing research funding for research leading to *AD/JASIS* publications. This "margin of unsuccess" by gender has, however, narrowed significantly in the last decade.

Perhaps more importantly, the data on funding sources reported in Tables 4, 5, and 6 speak eloquently on the kind of research undertaken by those leading to *Journal* publication. Because much of this research has not required external funding, it suggests that information science itself is "small science" in the sense defined by Derek J. de Solla Price (1963).

Information science as reflected in the *Journal* has flourished in the absence of an infusion of external funding. The data suggest that this may not forever be so. First, there is an increase in reported funding. Second, author cohorts are increasing in size. The advent of the Internet has additionally complicated information science in the direction of technology and its inherent complexities and costs. We may anticipate therefore an increase in funded research articles with a growing average number of authors reporting on more technology based or technology driven research.

| Table 6 | | | | | | |
|--|------------------|----------------|----------------|----------------|----------------|----------------|
| Research Not Receiving Reported Funding by First Author Gender in Percent | | | | | | |
| | All Years | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 |
| Female | 78.6 | 92.1 | 76.8 | 72.2 | 81.1 | 77.6 |
| Male | 75.9 | 97.8 | 69.5 | 64.3 | 72.9 | 77.4 |

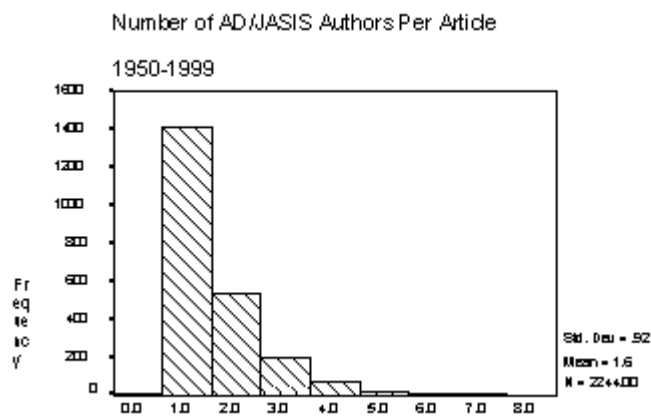
These data as presented in Tables 5 and 6 reflect the underlying demographic changes in *AD/JASIS* publishing. The underlying author and corporate author populations have shifted from a tendency toward single authorship toward multiple authorship, from government and industry toward the academy, from male dominance toward greater female participation, and from authors with a US base toward a wider global participation. These demographic shifts are discussed in what follows.

AD/JASIS Authors

Our author sample consists of 3518 authors for 2257 articles. There are 1787 discrete authors for the 2257 articles. These numbers differ because 829 (36.9%) of the articles have two or more authors. There are 1787 discrete authors since many have authored more than one article.

The number of authors per article ranges in this study from one to eight. In a very small number of cases, corporate rather than human authors were indicated (3 or 0.1%). While most *AD/JASIS* authors are one-time publishers, many are not. The distribution of the number of authors per article is shown in Figure 7.

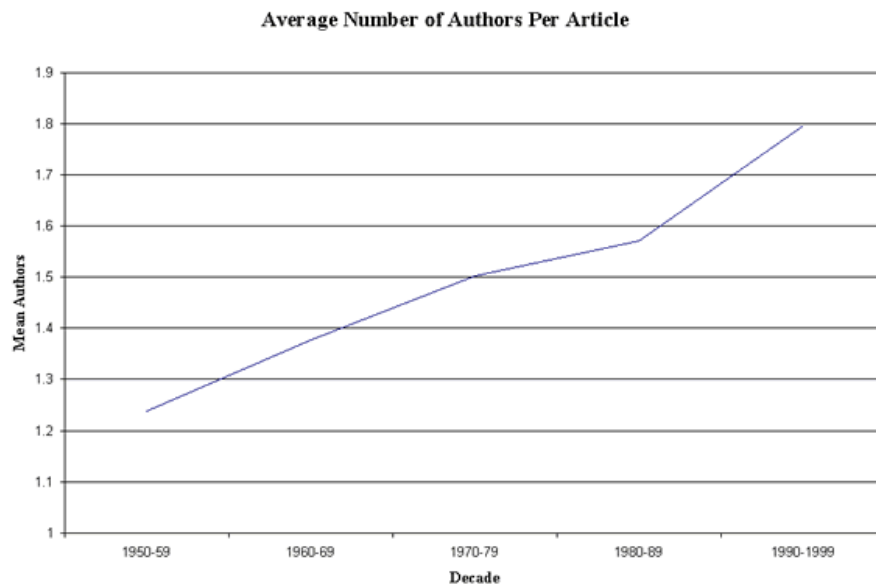
Figure 7



The number of co-authored articles and the number of co-authors per article have been increasing across the *Journal's* history. Assessing multiple authorship is problematic. As Harsanyi (1993) has shown, different disciplines interpret the order of authorship differently. Some list co-authors alphabetically. Some list co-authors by the order of contribution to the article. We know of at least one book where the order of authorship was decided by a coin toss (Nye and Keohane, 1972). His father described one practice to the senior author where the order of authorship was rotated within a group of researchers who published many articles and reports. According to Terry (1996: 379), there are no established norms in librarianship and the information sciences for citation order.

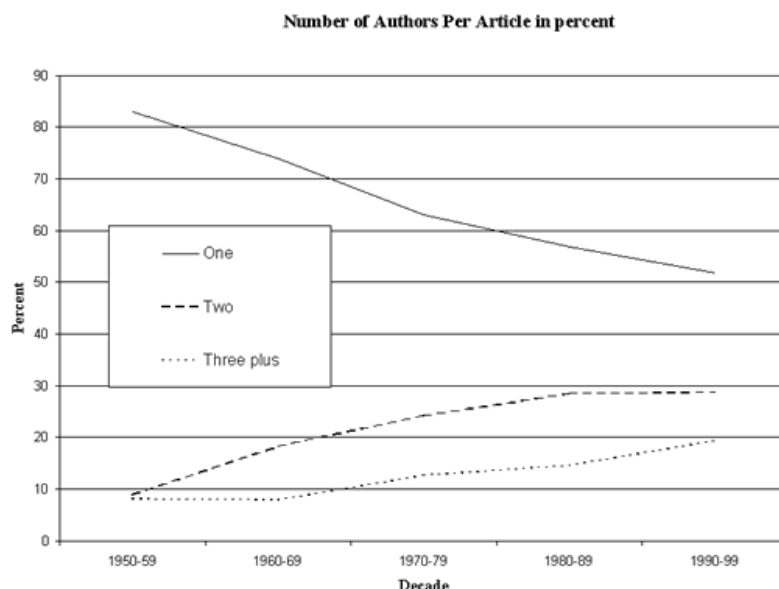
As is shown in Figure 8, the percent of articles published in the *Journal* with a single author has declined from more than 80% in the 1950s to almost half in the 1990s. Articles with two co-authors tripled from about 10% to about 30% and articles with three or more authors doubled from about 10% to 20%.

Figure 8



As one may infer from Figure 9, the number of authors per article has likewise increased over the five decades in the life of the *Journal*. In the 1950s, the average number of authors per articles was about 1.2 per paper and rose to 1.8 per paper in the 1990s.

Figure 9



Frequent Publishers

By far the majority of authors publishing in the *Journal* published one article only. A number of these authors, Ray Bradbury for example, have had exemplary careers in an area where scholarly non-fiction publishing is not the norm. Others, like Bella Haas Weinberg, have published extensively elsewhere. That said, and we certainly believe that all who publish in the *Journal* represent a select elite, some are simply more equal than others.

Table 7 provides a list of 126 *Journal* authors who have published four or more articles in either *AD* and/or *JASIS* between 1950 and 1999. This list numbers all author contributions, including second and subsequent authorships. The column labeled "Articles Published" provides the number of articles published, the column "First Volume" gives the first volume in which any given author's work first appeared, and the column "Latest Volume" indicates the most recent year in which the author's work appears.

The data provided in Table 7 suggest that there is no consistent pattern of *AD/JASIS* publication for the more prodigious of authors. Several authors accomplished multiple publications and co-publications in as little as one or two volumes, while others have published over a span of more than three decades. The average (mean) publication span described in Table 7 is just under fifteen years. It should be noted that many authors on this list are still actively publishing. These authors may be expected to expand their publication careers. Moreover we are not suggesting that any of the authors listed have necessarily completed their publishing if they have not published in *JASIS* in recent years. Indeed many are still quite active and publishing in journals other than *JASIS*. Our data reflect publication in *AD* or *JASIS* and just that.

| Author | | Articles Published | First Volume | Latest Volume |
|-----------|----------|--------------------|--------------|---------------|
| Perry | James W. | 17 | 1 | 10 |
| Bookstein | Abraham | 16 | 23 | 49 |
| Kent | Allen | 15 | 5 | 11 |
| Salton | Gerard | 15 | 16 | 42 |

| | | | | |
|------------------|---------------------|----|----|----|
| <i>Saracevic</i> | <i>Tefko</i> | 14 | 19 | 50 |
| <i>Egghe</i> | <i>Leo</i> | 13 | 37 | 50 |
| <i>Bernier</i> | <i>Charles L.</i> | 11 | 7 | 36 |
| <i>Borgman</i> | <i>Christine L</i> | 11 | 43 | 47 |
| <i>Gordon</i> | <i>Michael D</i> | 11 | 8 | 50 |
| <i>Taube</i> | <i>Mortimer</i> | 11 | 3 | 16 |
| <i>Berry</i> | <i>Madeline M.</i> | 10 | 5 | 6 |
| <i>Brooks</i> | <i>Terrence A</i> | 10 | 34 | 50 |
| <i>Buckland</i> | <i>Michael K</i> | 10 | 30 | 50 |
| <i>Harter</i> | <i>Stephen P</i> | 10 | 26 | 49 |
| <i>Kantor</i> | <i>Paul B.</i> | 10 | 27 | 49 |
| <i>Rouse</i> | <i>William B.</i> | 10 | 25 | 49 |
| <i>Chen</i> | <i>Hsinchun</i> | 9 | 46 | 50 |
| <i>Cooper</i> | <i>Michael D</i> | 9 | 23 | 49 |
| <i>Lancaster</i> | <i>F. W.</i> | 9 | 15 | 48 |
| <i>Losee</i> | <i>Robert M</i> | 9 | 38 | 50 |
| <i>Narin</i> | <i>Francis</i> | 9 | 23 | 34 |
| <i>Rousseau</i> | <i>Ronald</i> | 9 | 39 | 49 |
| <i>Tague</i> | <i>Jean</i> | 9 | 16 | 48 |
| <i>Bates</i> | <i>Marcia J</i> | 8 | 28 | 50 |
| <i>Bourne</i> | <i>Charles P</i> | 8 | 12 | 31 |
| <i>Fidel</i> | <i>Raya</i> | 8 | 34 | 50 |
| <i>Kilgour</i> | <i>Frederick G.</i> | 8 | 12 | 50 |
| <i>McCain</i> | <i>Katherine</i> | 8 | 35 | 49 |
| <i>Meadow</i> | <i>Charles.</i> | 8 | 33 | 46 |
| <i>Richmond</i> | <i>Phyllis A.</i> | 8 | 5 | 27 |
| <i>Shera</i> | <i>Jesse H.</i> | 8 | 1 | 22 |
| <i>Yovits</i> | <i>M. C.</i> | 8 | 20 | 44 |
| <i>Cooper</i> | <i>William S.</i> | 7 | 19 | 34 |
| <i>Davis</i> | <i>Charles H.</i> | 7 | 18 | 50 |
| <i>Dillon</i> | <i>Martin</i> | 7 | 31 | 43 |
| <i>Garfield</i> | <i>Eugene</i> | 7 | 5 | 41 |
| <i>Kraft</i> | <i>Donald H.</i> | 7 | 15 | 32 |
| <i>Lunin</i> | <i>Lois F</i> | 7 | 20 | 40 |
| <i>Schultz</i> | <i>Claire K.</i> | 7 | 12 | 22 |
| <i>Shaw</i> | <i>W M</i> | 7 | 26 | 50 |
| <i>Swanson</i> | <i>Don R.</i> | 7 | 13 | 40 |
| <i>White</i> | <i>Howard D.</i> | 7 | 28 | 49 |
| <i>Wong</i> | <i>S. K. M.</i> | 7 | 37 | 49 |
| <i>Yao</i> | <i>Y Y</i> | 7 | 41 | 49 |
| <i>Artandi</i> | <i>Susan</i> | 6 | 14 | 33 |
| <i>Beath</i> | <i>Cynthia</i> | 6 | 42 | 48 |
| <i>Branin</i> | <i>Joseph</i> | 6 | 42 | 48 |
| <i>Hayes</i> | <i>Robert M.</i> | 6 | 14 | 47 |
| <i>Kochen</i> | <i>Manfred</i> | 6 | 18 | 40 |

| | | | | |
|------------------|-------------------|---|----|----|
| O'Connor | John | 6 | 12 | 21 |
| Rorvig | Mark E. | 6 | 41 | 50 |
| Slamecka | Vladimir | 6 | 14 | 24 |
| Soergel | Dagobert | 6 | 23 | 50 |
| Van Raan | A | 6 | 41 | 49 |
| Wall | Eugene | 6 | 15 | 37 |
| Willet | Peter | 6 | 33 | 47 |
| Yu | C. T. | 6 | 26 | 42 |
| Belzer | Jack | 5 | 15 | 26 |
| Beyerly | Elizabeth | 5 | 6 | 13 |
| Case | Donald | 5 | 36 | 45 |
| Clapp | Verner W. | 5 | 3 | 14 |
| Costello | John C. | 5 | 12 | 13 |
| <i>Croft</i> | <i>W. B.</i> | 5 | 32 | 46 |
| Eastman | Caroline M | 5 | 40 | 50 |
| Evens | Martha W. | 5 | 36 | 50 |
| Frants | Valery I. | 5 | 39 | 50 |
| <i>Griffith</i> | <i>Belver C.</i> | 5 | 15 | 39 |
| Gull | C. D. | 5 | 2 | 38 |
| Hersh | William | 5 | 45 | 47 |
| Jahoda | G | 5 | 15 | 25 |
| Lipetz | Ben-Ami | 5 | 11 | 50 |
| Lynch | Clifford | 5 | 39 | 49 |
| <i>Moed</i> | <i>Henk F.</i> | 5 | 42 | 50 |
| Raghavan | Vijay V. | 5 | 28 | 49 |
| Resnick | A | 5 | 12 | 15 |
| <i>Rice</i> | <i>Ronald E.</i> | 5 | 34 | 49 |
| <i>Robertson</i> | <i>Stephen E.</i> | 5 | 26 | 47 |
| Rush | James E. | 5 | 21 | 28 |
| Savage | T. R. | 5 | 12 | 18 |
| Schatz | Bruce | 5 | 46 | 50 |
| Spink | Amanda | 5 | 47 | 49 |
| Straub | D | 5 | 42 | 48 |
| Zamora | A | 5 | 22 | 35 |
| Adams | Carl | 4 | 42 | 48 |
| Ball | Marion J. | 4 | 39 | 45 |
| Ball | Norman T. | 4 | 1 | 6 |
| Beheshti | Jamshid | 4 | 35 | 47 |
| <i>Belkin</i> | <i>Nicholas</i> | 4 | 26 | 50 |
| Bishop | Charles | 4 | 4 | 12 |
| <i>Borko</i> | <i>Harold</i> | 4 | 14 | 35 |
| Born | Lester K. | 4 | 1 | 7 |
| Burrell | Quentin | 4 | 44 | 46 |
| <i>Carpenter</i> | <i>Mark</i> | 4 | 23 | 32 |
| Chatman | Elfreda | 4 | 37 | 50 |
| Cuinan | Mary J. | 4 | 19 | 41 |

| | | | | |
|---|---------------------|---|----|----|
| D'Elia | George | 4 | 42 | 48 |
| Diodato | Virgil | 4 | 34 | 45 |
| Egan | Margaret E. | 4 | 1 | 4 |
| Foulk | C. R. | 4 | 32 | 36 |
| Fox | E.A. | 4 | 34 | 44 |
| Frieder | Ophir | 4 | 48 | 50 |
| Haas | Stephanie W | 4 | 40 | 48 |
| Herner | Saul | 4 | 3 | 35 |
| Humphrey | Susanne M. | 4 | 35 | 50 |
| Koenig | M | 4 | 30 | 48 |
| Korfhage | Robert R. | 4 | 23 | 50 |
| Larson | R | 4 | 42 | 47 |
| <i>Leimkuhler</i> | <i>Ferdinand F.</i> | 4 | 19 | 40 |
| <i>Marcus</i> | <i>Richard S.</i> | 4 | 29 | 34 |
| Orr | Richard H. | 4 | 10 | 16 |
| <i>Pao</i> | <i>Miranda</i> | 4 | 29 | 40 |
| Power | Eugene | 4 | 2 | 9 |
| Rayward | W. Boyd | 4 | 45 | 50 |
| Rohde | Nancy | 4 | 42 | 48 |
| Shapiro | Jacob | 4 | 42 | 50 |
| Shaw | Debora | 4 | 30 | 50 |
| Shaw | R | 4 | 1 | 16 |
| Sichel | H S | 4 | 36 | 43 |
| Sievert | Maryellen | 4 | 40 | 47 |
| Soloman | Paul | 4 | 44 | 48 |
| <i>Svenonius</i> | <i>Elaine</i> | 4 | 23 | 45 |
| <i>Tagliacozzo</i> | <i>Renata</i> | 4 | 18 | 29 |
| Watters | Carolyn | 4 | 43 | 50 |
| Wellisch | Hans | 4 | 23 | 45 |
| Wilbur | John | 4 | 43 | 49 |
| <i>Williams</i> | <i>Martha E.</i> | 4 | 22 | 37 |
| Names in <i>italics</i> in Table 9 are also found on White and McCain's (1998) Table 2. | | | | |

Does multiple publication in the *Journal* automatically bestow elite status on the authors and conversely is it necessary to publish in the *Journal* to achieve elite status in the field of information science? The answer to both questions appears to be "no."

Recognizing that different accrediting procedures may yield very different results (Egghe, Rousseau & Van Hooydonk, 2000), we compared the list provided in Table 7 to White and McCain's (1998) list of leaders of the information science discipline between 1972 and 1995. Their work is based upon a co-citation analysis from twelve "key journals" and they report the 120 most frequently cited authors in the information science disciplines. There is a general correspondence between our data for the most prolific of authors (ten or more *Journal* publications): eleven of sixteen (69%) authors listed on Table

7 are also listed by White and McCain. However, the overlap declines as the number of publications declines -- 17 of 28 (61%) for mid-range (7-9 articles), and 17 of 82 (21%) for low-end (4-6 articles) publishers.

There are "giants" in the field who did not make the White and McCain list but who are listed here: for example Mortimer Taube and Jesse Shera. By the same token, White and McCain (1998: Table 4) provide a measure of field eminence based on mean co-citation counts in three periods (1972-79, 1980-87, 1988-95) for their 120 authors. Of the first twenty-five, only thirteen (52%) were multiple (four plus articles) *Journal* authors. In fairness, the White and McCain ranking includes "transcendent giants" from other fields unlikely to publish in the information science journals: J.R. Cole, Diana Crane, Thomas Kuhn, Robert Merton, Herbert Simon, Derek de Solla Price, and Harriet Zuckerman. These are not "information scientists" but sociologists, philosophers, economists, and historians. Others in the White and McCain "top twenty-five" include Bertram Brookes, Maurice Line, Henry Small, Karen Sparck Jones, and C. J. van Rijsbergen. All qualify as information scientists. Yet, they too do not have multiple (4 plus) *Journal* articles.

It should also be noted that several of the authors listed in Table 7 could not have met the temporal test for White and McCain (1998). Amanda Spink, for example, began publishing in 1996 and although prolific could not have been cited in prior years. Second, our list represents all authors while the White and McCain work is necessarily limited to first author citations because of their reliance on ISI's *Social Sciences Citation Index*.

Author Gender

Journal authors have been historically predominantly men. We made a concerted effort to identify *Journal* authors by gender. To achieve this, we made the assumption that gender specific names are associated with the "appropriate gender" people. While there are rare exceptions, the error rate for this assumption is acceptable. Using gender specific names assumes, however, that we were sensitive to cultural naming conventions worldwide. We were sensitive to the need to be aware, but often lacked culture specific knowledge. To augment our ability to identify names, we utilized directories, we searched for authors in on-line databases and on the WWW, and when that failed, we circulated lists of the "gender unknown" among our peers. Based on this approach, we were able to "ascribe" gender to more than 93 percent of the sample.

Table 8 provides the distribution of all *Journal* authors for the 2244 articles published in the *Journal* between 1950 and 1999 and entered into our database. The number of "gendered" authors per article ranges from zero (a corporate author, no human author named) to eight.

| | Frequency | Percent |
|-----------------------|------------------|----------------|
| Women | 869 | 24.7 |
| Men | 2423 | 69.0 |
| Not Identified | 222 | 6.3 |
| Total | 3514 | 100.0 |

Table 9 provides the genders for first authors for those same *Journal* articles. We were somewhat more successful in identifying first author genders perhaps because first authors may be more prominent or better known in the disciplines represented by the *Journal*.

That said, there appears to be a slight bias against women and in favor of

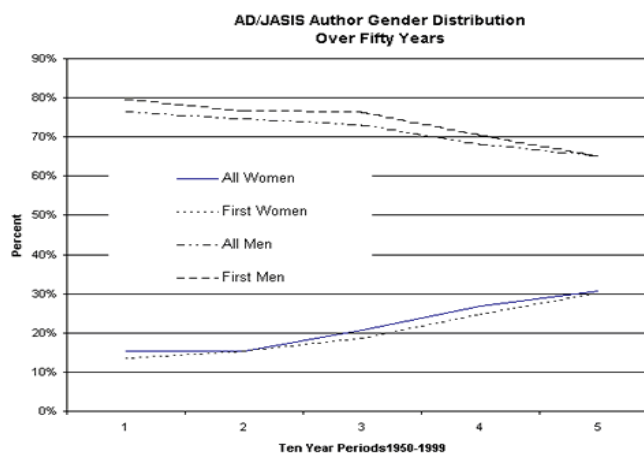
men as first authors. Does it matter? There is a common perception that the first author is indeed *primus inter pares*. Either the first author has made the more significant contribution to the article or is the more senior member of the team. There is a minority view that the order of authorship has little significance. From a practical point of view, it is true that most indexes list at least the first three authors of an article and some reduce all but the first author to the status of "et al."

Finally, men are more likely to be members of the *AD/JASIS* elite than women (see Table 7) than they are represented as either "all authors" or as first authors. Of the 126 authors of four or more *Journal* articles, 23% are female, 76.2% male, and one (0.8%) unidentified.

| | Frequency | Percent |
|-----------------------|-----------|---------|
| Women | 507 | 22.6 |
| Men | 1612 | 72.0 |
| Not Identified | 120 | 5.4 |
| Total | 2239 | 100.0 |

Figure 10 illustrates the trend in total authorship and first authorship for both men and women from 1950 to 1999. The figure provides average values for each of the five ten-year periods studied. It illustrates two trends. The first is that male and female authorship patterns are slowly converging. The second although men tend to be first authors at a percentage greater than they are authors overall and women tend to be first authors at a somewhat lower rate, those values are also converging.

Figure 10



If female and male authorship are converging, article co-authorship with both men and women authors should also be increasing as a percent of co-authored material. Table 10 suggests that increased mixed co-authorship may indeed be occurring over time, but not too dramatically. The column labeled "Mixed" provides the article percent where there were multiple authors and at least one was of a gender different from the others. The columns "All-Female" and "All-Male" indicate the article percent where gender was homogenous. The columns "Part Female" and "Part Male" report article percentages where some members were the indicated gender and others were unknown. Finally, the column "Unknown" maps the percentage of articles where the author genders are all unknown.

Table 10
Gender Distribution of Multi-Authored AD/JASIS Articles 1950-1999,
in percent

| Decade | N | Mixed | All Female | Part Female | All Male | Part Male | Unknown |
|--------------|-----|-------|------------|-------------|----------|-----------|---------|
| 1950-59 | 45 | 55.6 | | | 20.0 | 22.2 | 2.2 |
| 1960-69 | 95 | 31.6 | 2.1 | | 45.3 | 15.8 | 5.3 |
| 1970-79 | 146 | 39.0 | 3.4 | 0.7 | 45.2 | 7.5 | 4.1 |
| 1980-89 | 180 | 44.4 | 8.9 | 1.7 | 37.2 | 6.7 | 1.1 |
| 1990-99 | 363 | 46.3 | 8.3 | 0.6 | 39.1 | 5.0 | 0.8 |
| Total | 829 | 43.4 | 6.4 | 0.7 | 39.4 | 8.0 | 2.1 |

Do authorship patterns in *AD/JASIS* indicate a growth in gender parity in publication? Tables 8 and 9 clearly demonstrate that men have predominately been the *AD/JASIS* Authors, but Figure 10 and Table 10 suggest that the overall gender weighting toward male authorship has been somewhat mitigated over time.

There are several possible explanations for the gender distribution. First, as is shown in the corporate authorship section, *AD/JASIS* corporate authorship has changed from one dominated in the early years by corporate, government, and military first authors (27.4%, 23.8%, and 2.8% respectively in the first decade) to greater domination by academics (88.3% in the fifth decade). According to the US Census (1997) men held almost 70 percent of the academic and professional degrees in the US population over 25 years of age in 1997. Second, within the academic group, schools of library science represented a plurality of corporate first authors in the fourth and fifth decades (44.1% and 44.0% of the entire group, respectively). According to the Association of Library and Information Science Educators (ALISE, 1998), approximately half of library school faculties since the late 1980s have been women. While it is true that women comprise about half of the library school faculty population, it has only been in the last decade, the 1990s, that the distribution of female first authors has begun to approximate their presence in the field. In the 1950s, only 15% of *American Documentation* articles authored by LIS faculty were written by women, in the 1980s it had risen to 27%, but in the 1990s the proportion increased to 40%.

As the publishing population shifted from male dominated fields and as women came to populate the represented groups over time, the *AD/JASIS* author gender ratio has necessarily changed to greater representation of women authors. Nevertheless, women appear to have published fewer articles in *AD/JASIS* than their numbers in the various professions publishing in the *Journal* would otherwise dictate and they have not achieved "elite" status at the same rate as their male counterparts as well. It has been suggested (Korytnyk, 1988) that, *ceteris paribus*, women publish less than men do. It may also be that women are more likely to publish *elsewhere* than men are.

Corporate Authors

AD/JASIS authors reside in a wide and changing variety of homes and within those corporate homes, a wide variety of departments and subdivisions. For Table 11 we classified corporate first authors into nine groups. These represent the general institutional types – universities, government, corporations, libraries (academic and government libraries, with the exception of national libraries are not included here), and so on. "Organizations" include

not-for-profits. "Government" includes international governmental organizations. The classification "R&D" was applied for those institutions, whether public or private, that have as their mission research and development. Included in this group are the national laboratories like Oak Ridge National Laboratory and private research organizations like Bell Laboratories.

| | N | Decades – Column Percent | | | | | All Years |
|---------------------|------|--------------------------|---------|---------|---------|---------|-----------|
| | | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-99 |
| Commercial | 386 | 27.38 | 40.68 | 16.06 | 16.67 | 5.23 | 17.79 |
| Educational | 1433 | 25.79 | 37.57 | 70.47 | 70.14 | 88.47 | 66.04 |
| Government | 147 | 23.81 | 7.63 | 4.92 | 6.02 | 2.01 | 6.77 |
| Library | 49 | 9.52 | 1.69 | 0.26 | 3.01 | 0.67 | 2.26 |
| Hospital | 1 | | | | | 0.13 | 0.05 |
| Military | 17 | 2.78 | 1.41 | 0.78 | | 0.27 | 0.78 |
| Organization | 79 | 7.14 | 8.19 | 4.15 | 2.08 | 0.94 | 3.64 |
| R&D | 58 | 3.57 | 2.82 | 3.37 | 2.08 | 2.28 | 2.67 |
| | | | | | | | |
| Total N | 2170 | 252 | 354 | 386 | 432 | 746 | |

AD/JASIS institutional corporate authorship has undergone a major reorientation over its fifty years. In 1950-59, educational and mostly academic institutions comprised a quarter of the corporate first authors but that number has risen substantially over the years, so that by the 1990s, academics dominated with almost 90 percent of the publications. That commercial, government, and other corporate authors (the leading publishers of the 1950s) barely participated as authors in the 1990s points to a major change in the orientation of *Journal* and perhaps in information research and publishing. On the one hand, information science research may be the domain of the academics. Perhaps that is so, but given the importance of information science and information technology at the close of the 1990s, it seems unlikely that 90% of publishing interest would lie in the academic world. It is more likely that government, corporate, and some academic researchers have found other outlets for their work.

Table 12 presents data on the distribution of departments within the institutions described in Table 11. Table 11 suggests that a wide variety of disciplines have found the *Journal* to be an appropriate vehicle for dissemination of their research findings. As is the case with changing institutions, Table 12 suggests that the *Journal's* disciplinary focus has changed over time. This is particularly true for authors from library schools. For the *Journal's* first three decades, library scientists, though an important segment, were not the dominant group. By the 1980s, library school authors were in a clear plurality.

At the same time that there was an increase in library school author participation, there was also a general growth in other academic departments with a research interest in information science. The computer science, management (which includes information systems management), and to a far smaller degree communications faculties also took a larger share of the *Journal's* pages. There was also a decline in participation from other disciplines and professions.

There was a general decline in librarian, government, and commercial authorship, if you will, among the applied practitioners of information science. There was a similar decline for the science, social science, and humanities disciplines suggesting perhaps the *Journal* has either defined itself or has been seen to have been defined as the publishing organ of the core disciplines of information science.

| Department | N | Decades – Column Percent | | | | | All Years |
|-------------------------|------|--------------------------|---------|---------|---------|---------|-----------|
| | | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | |
| Administration | 28 | 7.59 | 1.44 | 1.92 | 1.00 | 0.78 | 1.79 |
| Commercial | 7 | 3.16 | 0.48 | 0.38 | | | 0.45 |
| Communications | 12 | | 0.96 | 1.15 | 0.33 | 0.94 | 0.77 |
| Computer Science | 268 | 1.27 | 12.02 | 25.29 | 17.39 | 19.31 | 17.15 |
| Education | 13 | 0.63 | | 1.92 | 0.67 | 0.78 | 0.83 |
| Engineering | 128 | 13.92 | 14.42 | 9.96 | 8.36 | 3.92 | 8.19 |
| Government | 1 | | | | 0.33 | | 0.06 |
| Humanities | 21 | 2.53 | 2.88 | | 1.00 | 1.26 | 1.34 |
| Law | 3 | | 0.48 | | | 0.31 | 0.19 |
| Library | 149 | 20.25 | 15.87 | 8.43 | 8.36 | 5.81 | 9.53 |
| Library School | 534 | 15.82 | 21.15 | 26.82 | 39.13 | 43.64 | 34.17 |
| Medicine | 68 | 3.80 | 6.25 | 4.21 | 4.35 | 3.92 | 4.35 |
| Management | 105 | 2.53 | 3.37 | 5.75 | 7.36 | 8.95 | 6.72 |
| Military | 16 | 6.33 | 0.96 | | | 0.63 | 1.02 |
| Organization | 13 | 2.53 | 0.96 | | 1.34 | 0.47 | 0.83 |
| Publisher | 6 | 1.90 | | 0.77 | 0.33 | | 0.38 |
| Science | 134 | 15.82 | 16.83 | 8.43 | 6.02 | 5.34 | 8.57 |
| Social Science | 57 | 1.90 | 1.92 | 4.98 | 4.01 | 3.92 | 3.65 |
| Total N | 1563 | 158 | 208 | 261 | 299 | 637 | |

Research Partnership Patterns

Are AD/JASIS authors, when there are co-authors, more or less likely to choose co-researcher from similar parent institution, the same institution, the same department in similar institutions, or the same department in the same institution? We define a similar institution as one that performs essentially the same function – the governments of France and Canada are similar institutions as are the University of Oklahoma and Virginia Tech. Different departments in the same institution might include the Departments of Government and Computer Science at Cornell University or the U.S. Army Corps of Engineers and the Office of Management and Budget in the United States Government. We classified both parent institutions and departments or sub-divisions for both first and second corporate authors according to classifications shown in Tables 11 and 12 to allow us to compare for similar organizations. We also retained the specific name of the organizations for comparison for specific institutions. The data in the comparison of similar organizations includes specific institutions as they are not only specifically the same and therefore similar.

Tables 13 and 14 report trends in co-authorship participation by first and second authors for all papers with multiple authors. Table 12 provides the co-author corporate affiliation linkages for institutions – governments, universities, corporations. Table 13 demonstrates that there has been a tendency for the *Journal's* authors to seek co-authors on an increasing basis not only from like institutions but from within the same institutions. Thus academic authors seek other authors from within academe, government authors from within government, and so on. Moreover, although less pronounced, *Journal* authors appear to prefer to choose their co-authors from within the same specific institution.

| Table 13 | | | | | | |
|--|---------|---------|---------|---------|---------|-------------|
| AD/JASIS First and Second Corporate Authors Comparison of Parent Institutions 1950-1999 | | | | | | |
| In percent by column | | | | | | |
| | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-99 |
| Similar Institution | | | | | | |
| Yes | 67.7 | 72.1 | 70.3 | 76.9 | 86.5 | 80.4 |
| No | 32.3 | 27.9 | 29.7 | 23.1 | 13.5 | 19.6 |
| Total N | 31 | 43 | 64 | 130 | 297 | 565 |
| Same Institution | | | | | | |
| Yes | 35.7 | 44.7 | 52.3 | 55.7 | 56.8 | 53.1 |
| No | 64.3 | 55.3 | 47.7 | 44.3 | 43.2 | 46.9 |
| Total N | 56 | 47 | 65 | 140 | 296 | 604 |

Journal authors may be parochial when choosing institutional co-authors, but as is shown in Table 14, that pattern is less certain when selecting co-authors by discipline. Table 16 indicates co-author departmental dyads between 1950 and 1999. While there is a tendency to choose one's co-author from similar departments and therefore similar disciplines, this practice is less pronounced than for institutions. Moreover, there may be a slight trend toward choosing co-authors from outside one's discipline.

| Table 14 | | | | | | |
|---|--|---------|---------|---------|---------|---------|
| AD/JASIS First and Second Corporate Authors Comparison of Department 1950-1999 | | | | | | |
| In percent by column | | | | | | |
| | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-99 |
| Similar Department | | | | | | |
| Yes | 81.0 | 76.2 | 62.8 | 58.6 | 65.7 | 65.2 |
| No | 19.0 | 23.8 | 37.2 | 41.4 | 34.3 | 34.8 |
| Total N | 21 | 42 | 78 | 111 | 312 | 564 |
| Same Departmental Name | Note: Departments with the same name but parts of different institutions are included in this part of the table. | | | | | |
| | | | | | | |

| | | | | | | |
|----------------|------|------|------|------|------|------|
| Yes | 76.2 | 66.7 | 52.6 | 52.7 | 60.8 | 59.0 |
| No | 23.8 | 33.3 | 47.4 | 47.3 | 39.2 | 41.0 |
| Total N | 21 | 42 | 78 | 110 | 296 | 547 |

Table 15 is a crosstabulation of the data presented in Tables 13 and 14. It demonstrates two interesting and perhaps contradictory trends. There is both an increasing tendency to choose co-authors from within one's own department within one's own institution. But there is also a tendency to choose co-authors from disciplines outside one's own from institutions other than one's own. *AD/JASIS* corporate authors show less enthusiasm for selecting co-authors of different disciplines from within their own institutions or from similar disciplines from outside disciplines.

| Table 15 | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| AD/JASIS First and Second Corporate Authors Comparison of Department 1950-1999 | | | | | | |
| In percent by column | | | | | | |
| | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-99 |
| | N=7 | N=14 | N=31 | N=48 | N=132 | N=222 |
| Same Institution - Same Department | 42.9 | 57.1 | 51.6 | 35.4 | 50.9 | 48.8 |
| Same Institution - Different Department | 42.9 | 14.3 | 6.5 | 20.8 | 9.5 | 10.9 |
| Different Institution - Similar Department | | 7.1 | 6.5 | 18.8 | 8.6 | 10.6 |
| Different Institution - Different Department | 14.3 | 21.4 | 35.5 | 25.0 | 31.1 | 29.8 |

Corporate Author Elites

The distribution of corporate "elite" authors has changed over the five decades of the *Journal*. Table 16 lists the nineteen corporate authors that have contributed approximately one percent or more of all authors to *AD/JASIS*. The Table includes all corporate authors indicated in the articles and is not limited to first authors. Corporate authors are listed in alphabetical order by geography. The category "US Government" includes only those who did not specify a specific agency or department of that government.

| Table 16 | | | | | | |
|--|----------------|----------------|----------------|----------------|----------------|----------------|
| AD/JASIS Leading Corporate Authors (All) - 1950-1999 in percent | | | | | | |
| | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-99 |
| | N=298 | N=444 | N=550 | N=658 | N=1280 | N=3230 |
| Univ Arizona | | | | | 2.8 | 1.1 |
| Univ California, | | 0.2 | 2.9 | 0.3 | 2.5 | 1.6 |

| | | | | | | |
|--------------------------------------|------|------|------|------|------|------|
| Berkeley | | | | | | |
| Univ Chicago | 3.7 | 0.5 | 2.4 | 1.4 | 0.5 | 1.3 |
| Drexel Univ | 0.3 | 0.5 | 0.9 | 3.8 | 0.5 | 1.2 |
| IBM | 1.0 | 4.3 | 1.1 | 0.5 | 0.1 | 1.0 |
| Indiana Univ | | | 0.5 | 0.6 | 4.0 | 1.8 |
| Library of Congress | 8.1 | 1.6 | 0.4 | 0.8 | 0.1 | 1.2 |
| Univ Maryland | | 0.2 | 2.5 | 2.4 | 3.0 | 2.1 |
| MIT | 3.0 | 2.3 | 0.7 | 1.1 | | 0.9 |
| Univ Michigan | 1.0 | 1.1 | 1.8 | 1.8 | 2.0 | 1.7 |
| Univ Minnesota | 0.7 | | | 0.3 | 2.7 | 1.2 |
| Nat'l Library of Medicine | | 0.9 | 0.4 | 1.7 | 0.9 | 0.9 |
| Univ N. Carolina, Chapel Hill | | 0.2 | | 0.5 | 2.3 | 1.0 |
| Ohio State Univ | 0.3 | 0.2 | 3.1 | 1.5 | 0.2 | 1.0 |
| Univ Pittsburgh | | 0.5 | 5.5 | 1.1 | 1.1 | 1.6 |
| Rutgers Univ | | 1.8 | 1.3 | 1.8 | 1.7 | 1.5 |
| Sheffield Univ | | | 0.2 | 2.4 | 1.1 | 1.0 |
| US Government | 8.7 | | | 0.5 | 0.5 | 1.1 |
| W. Ontario Univ | | 0.2 | 0.5 | 1.4 | 1.3 | 0.9 |
| All Others | 73.2 | 85.6 | 75.8 | 76.3 | 72.8 | 75.9 |

The data in Table 16 indicate several phenomena. First, with the possible exceptions of the U.S. Government in the 1950s, IBM in the 1960s, the University of Pittsburgh in the 1970s, Drexel University in the 1980s, and Indiana University in the 1990s, no single institution supplied more than a small proportion of all *AD/JASIS* authors. The overall "leader" is the University of Maryland, supplying 2.1% of authors between 1950 and 1999. The U.S. Government in general together with the Library of Congress was responsible for more than 16% of *American Documentation* authors in the 1950s.

Not all "leaders" are universities: among them are the U.S. Government including the Library of Congress and the National Library of Medicine and IBM. Not all corporate authors in *American Documentation* or the *Journal of the American Society for Information Science* are "American:" Sheffield University in the United Kingdom and the University of Western Ontario in Canada.

Corporate leaders change both by type and by institution. Perhaps *JASIS* is developing a more international focus since two of its leading corporate authors are not U.S. based. These trends are addressed in the next section.

AD/JASIS as a Transnational Actor

The *Journal* is becoming more global in character. More of its corporate authors are found in countries other than the United States and over time the distribution of those authors is becoming more diverse. Moreover, although the trend is slight, these same corporate authors co-author more with

corporate authors in other countries.

This suggests that the *Journal* has become an important agent in the transnationalization of information science scholarship. The international relations literature (see Keohane & Nye, 1971 and Maghroori & Ramberg, 1982) defines transnationalism as intercourse or exchanges among two or more entities at least two of which are located in different countries and at least one of which is not a state organ with inherent powers to conduct foreign relations. That is to say that monarchs, presidents, and ministers of foreign affairs are assumed to be on their face state actors competent to conduct foreign relations. Others may be so competent but only when specifically authorized. The non-state sector to non-state sector in global relations is of growing importance (see for example Rosecrance et al, 1977). This phenomenon has been divided into two types: economic and social interdependencies. With the advent of the Internet, there may perhaps be a third – communications. Trade, commerce, multinational corporations, tourism, communications, and other activities manifest these.

Part of this transnational growth is the globalization of scholarship. The *Journal* is part of that growing globalization of scholarship. Table 17 shows the global distribution of *Journal* authorship by nationality of the first corporate author.

| Table 17 | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|------------------|
| AD/JASIS Corporate Global Distribution 1950-1999, column percent | | | | | | |
| | 1950-59 | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 1950-1999 |
| | N=227 | N=365 | N=389 | N=444 | N=740 | N=2165 |
| Africa | | | 0.5 | 0.9 | 0.5 | 0.5 |
| Asia – Not Socialist | 1.3 | 2.2 | 0.8 | 2.0 | 2.0 | 1.8 |
| Asia – Socialist | | | | 0.2 | 0.5 | 0.2 |
| Europe-West (Except UK) | 3.1 | 3.6 | 1.8 | 2.9 | 8.5 | 4.8 |
| UK | 3.1 | 1.4 | 7.5 | 3.2 | 4.9 | 4.2 |
| Europe-East | | 0.3 | 0.5 | 1.4 | 0.9 | 0.7 |
| Middle East | 0.4 | 0.3 | 0.3 | 1.4 | 0.9 | 0.7 |
| Oceania | | | 0.8 | 0.7 | 5.1 | 2.0 |
| North America | | | | | | |
| Canada | 0.4 | 0.5 | 5.9 | 6.3 | 6.6 | 4.8 |
| US | 91.6 | 91.8 | 82.0 | 80.9 | 69.5 | 80.1 |
| South & Central America | | | | 0.2 | 0.4 | 0.2 |

Table 17 describes four trends in its globalization of information science. It should be noted that these trends are none too pronounced and should not be over interpreted. First, while US corporate authors continue to dominate the *Journal's* pages, that dominance is in clear decline. Second, there continues to be a preference for articles from corporate authors located in countries where

English is among the first languages. This is illustrated by the data for Canada, the United Kingdom, the United States, and Oceania (Australia and New Zealand) that constituted 86.1% of corporate authors in the 1990s. Remember too that the Asian and African figures contain data for India and South Africa, both countries where English is spoken as a first language. Third, *Journal* publications have wider global corporate authorship, thus African, South and Central American, and Asian authors are more prevalent than before. And finally, there may some evidence that the end of the cold war has led to greater corporate authorship from Eastern Europe, including the Soviet Union and now Russia, and Socialist Asia, particularly the Peoples Republic of China.

There is further evidence of transnational trends in *Journal* publication although again the evidence is weak and should not be over interpreted. Table 20 describes changing corporate co-authorship patterns for all articles with two or more authors. If any of the two to eight co-authors were resident in different countries, Table 18 indicates that as "different." If all co-authors resided in the same country, it is reported as "same."

| Table 18 | | | | | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|
| AD/JASIS Distribution of Co-Authored Articles by Country, 1950-1999, in column percent | | | | | | |
| | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1999 | 1950-1999 |
| | N=80 | N=94 | N=148 | N=182 | N=388 | N=892 |
| Same | 97.5 | 93.6 | 92.6 | 91.8 | 89.7 | 91.7 |
| Different | 2.5 | 6.4 | 7.4 | 8.2 | 10.3 | 8.3 |

Conclusions

The *Journal* has undergone much more change than to its name. We report trends and changes based on publication patterns found in the articles of *AD* and *JASIS*. This paper traces those changes through journal, issue, and article based variables. These include the frequency of publication, the stability of editorship, the number and size of articles, the number of authors per article, use of citations, and funding patterns. We also explore the authority issues, including frequency of authorship, corporate authorship by institution and department, and the nationality of the corporate author. *Journal* articles offer many explicit and several implicit variables that point to the evolution of the *Journal* as well as the discipline it represents. We argue that the *Journal* has undergone an inevitable evolution over its fifty years. It has become far more complex. Not only has it increased its publication frequency from four to fourteen numbers per volume, its content has shifted toward greater dedication of space to research articles, more research is funded by external agencies, the number of co-authored work has increased, the corporate author base has shifted from government and the corporate sector to the academic, the corporate author base has also shifted from almost solely a US base to a more international one, and there is greater participation by women as authors.

Based on our analysis of articles published in *AD* and *JASIS* from 1950 to 1999, we find that there has been a slow but perhaps inevitable shift based first on the single non-funded researcher and author to a much wider research and publishing participation among authors, regions, corporate authors, and countries. This suggests not only cross-fertilization of ideas, but also more complex research questions. A small trend toward greater external funding further reinforces this hypothesis.

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Note

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