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An Analysis of Canadian Contributions to the Information Science Research Literature 1989-2008

Abstract: An informetric study of information science publications by scholars at Canadian institutions was conducted for the period 1989-2008. The findings reveal slightly more than linear growth in contributions, with in information behaviour, with greater levels of author and inter-institutional collaboration in recent years.

Résumé : Cette communication présente une étude informétrique des articles publiés par les chercheurs d'universités canadiennes dans le domaine des sciences de l'information entre 1989 et 2008. Les résultats révèlent une hausse légèrement supérieure à la croissance linéaire en termes de contributions et une plus grande collaboration entre auteurs et entre institutions au cours des dernières années.

1. Introduction

Information science (IS) has reached a level of maturity over the past two decades that has allowed it to be investigated as a discipline from both historical and informetric perspectives. A number of studies have examined aspects of IS through different areas of focus, including specific journals (Furner, 2009), national contributions (Meadows, 2008), professional associations (Nilsen, 2007), or a specific institution (Lajeunesse, 2002).

Canadian contributions to information science literature, which extend back approximately 50 years, also merit investigation. To date, there have been few studies that have focused on information science in a Canadian context. Nilsen (2007) provided an historical investigation of CAIS/ACSI, the national society for information science in Canada, and called for additional investigation. From a more informetric perspective, Wolfram and Chu (1989) and Chu and Wolfram (1991) examined the published research contributions made by Canadian-based researchers in the field up to 1988. Two decades have passed since their investigations and there have been many changes in the Canadian IS landscape. Changes have taken place in the education of information researchers with new doctoral programs having been developed and a new generation of IS researchers having emerged. Most Canadian schools of library and information science have seen substantial turnovers in their faculty complement during this time as a result of retirements and program growth.

In this study, the author conducts a follow up investigation of Chu and Wolfram's investigation of information science literature by Canadian-based researchers for the time period 1989-2008. Specific questions of interest include:

- 1) How has the body of literature contributed by IS researchers at Canadian institutions grown?
- 2) From which institutions have research contributions originated?
- 3) In which areas of IS have Canadian researchers contributed?
- 4) How have IS researchers at Canadian institutions engaged in collaborative research with researchers at other institutions?

2. Methodology

Informetric studies of research literature have benefitted immensely from technical advances in bibliographic retrieval systems that have made it possible to analyze large collections of publications. Today's retrieval systems provide search and analytical features that were not present two decades ago. These features make it possible to conduct a more detailed examination of IS literature contributed by researchers affiliated with Canadian institutions.

A dataset of information science literature by Canadian-based researchers was identified by searching Thomson/ISI Web of Science (WoS). The retrieval parameters included topic coverage of "information science" or their appearance in 19 publication sources associated with information science indexed in WoS. Note that the topic "information science" covers the subject area of "information science and library science" used in WoS. Other terminology, such as "information studies," was too broad and produced mostly irrelevant records. Retrieved records were limited to articles and conference proceedings for the time frame 1989 to 2008 where at least one author was associated with a Canadian address. The "Analyze Records" feature of WoS was used to produce frequency distributions of records based on authorship, publication source, and year of publication. Additional manual processing of data was carried out to identify multi-author publications and to classify the publications into six broad categories (Education; Information Behaviour; Information Organization; Information Policy; Information Retrieval; Research Methods; Scholarly Communication and Informetrics; Other). Multi-author publications were then reviewed for institutional affiliations to identify patterns of inter-institutional collaboration using both descriptive data and multi-dimensional scaling.

3. Summary of Results

The WoS search yielded 726 records with a Canadian affiliation for the twenty-year time period. This represents a substantially larger number of publications than the 454 found by Chu and Wolfram (1991) for the 1960-1988 time frame of their study. Figure 1 summarizes the cumulative growth of the identified publications for 1989 to 2008. Based on visual inspection, the growth appears to be linear, indicating a steady stream of contributions with no substantial annual growth; however, a second order polynomial (i.e., non-linear) function provided the best fit based on the calculated R-squared goodness-of-fit, indicating slightly more than linear growth.

The publication outlets for Canadian contributions for the time period of the study constitute 54 journals and conference proceedings. The most popular venues for research have been the *Canadian Journal of Information (and Library) Science-Revue Canadienne des Sciences de l'Information (et de Bibliotheconomie)*, the *Journal of the American Society for Information Science (and Technology)*, and *Information Processing & Management*, which represent 49% of the publications found.

Each publication was also categorized by year based on nine broad subject categories. The frequency distribution of publications revealed growth in most areas, with information behaviour showing the greatest relative growth over the 20 year period and systems-based information retrieval studies showing a relative decline after a sharp increase in the early 1990s, although it is still the most prolific area of contribution.

A breakdown of the institutional affiliations of the authors reveals that the top eight contributing Canadian institutions include the seven universities with graduate programs in library and information science, along with the University of Waterloo. Of note among the top 30 contributing institutions are six non-Canadian universities (University of Illinois, Wolverhampton University, UCLA, Indiana University, University of Wisconsin, and City University London), indicating multiple collaborations among these institutions with Canadian counterparts. Collaborations have increased over time, with the average number of co-authors per publication having increased from 1.5 authors in 1989 to 2.5 in 2008. Of the 726 publications, 404 represent multiple author efforts. However, only 190 of the publications (26% of all publications) represent inter-institutional collaborations. There has been a sharp increase in these collaborations during the study period. Between 1989 and 1997 an average of 7% of publications involved more than one institution. For the period 1998 to 2008, this average increased to 40%. The University of Western Ontario exhibited the highest number of inter-institutional collaborations (11), followed by the University of Toronto (8), McGill University (5) and Dalhousie University (5). The vast majority of collaborations for all Canadian institutions in the field were with other Canadian institutions. In many cases there were no international collaborations recorded. The one exception is Western. Six of the 11 institutions with which Western researchers have collaborated are located in the United States or the United Kingdom.

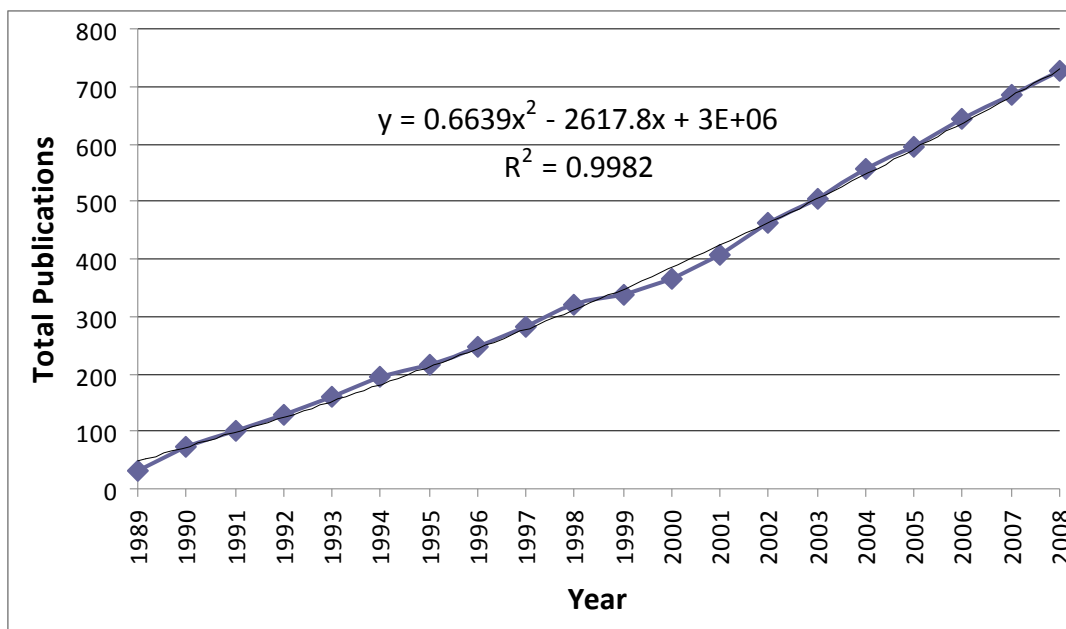


Figure 1. Growth of Publications in Information Science by Canadian Researchers

On a related theme, the author was interested in determining patterns that may exist in inter-institutional collaboration frequency (e.g., geographic, areas of expertise). A multidimensional scaling analysis was conducted for the most collaborative Canadian institutions using the PROXSCAL algorithm in SPSS for co-occurrence data (Leydesdorff & Vaughan, 2006). The analysis resulted in an acceptable Stress-I goodness-of-fit value of 0.0582 (Figure 2). Close geographic proximity is reflected among the placement of the University of Toronto, McMaster University, and the University of Waterloo, as well as between McGill University and l'Université de Québec (at least for the Montreal campus). Conversely, there is a large distance between McGill University and l'Université de

Montréal, as well as between York University and the University of Toronto. The close proximities in the chart between geographically distant institutions such as UBC or University of Alberta and a number of universities in central and eastern Canada point to other influencing factors for these collaborations. In the Internet Age, where geography is less of a barrier to collaboration, common research interests, faculty/student connections, and social networks are likely contributing factors. The limited inclusiveness of relevant French language publications in WoS could also contribute to the observed outcome.

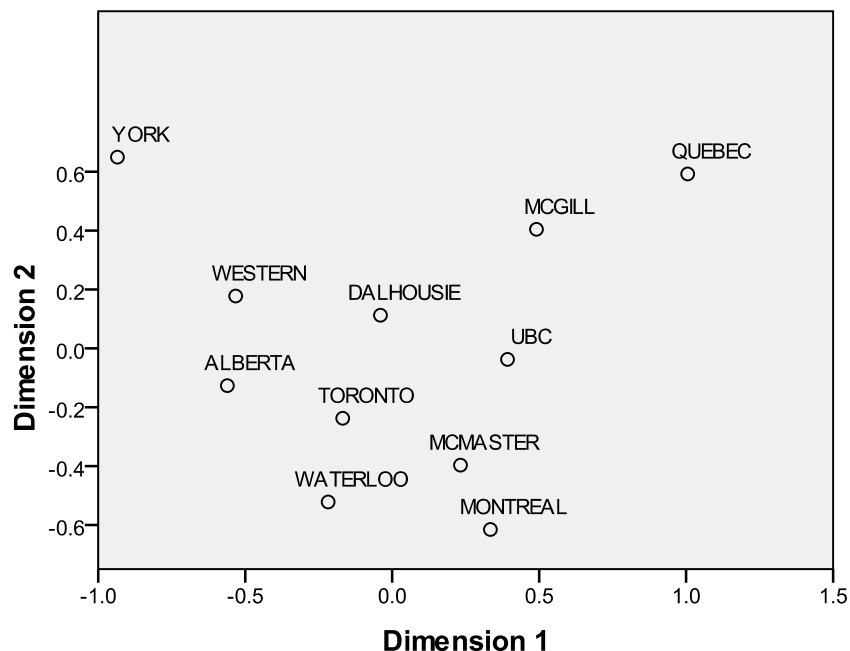


Figure 2. MDS Plot of Inter-institutional Collaboration Frequency

Overall, the findings reveal an active IS research scene in Canada with shifting areas of emphasis and an increase in collaborative efforts. A more detailed analysis with implications and conclusions will appear in the full paper.

4. References

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