

Mapping of Science Studies, 1975-2004

HAIYAN HOU^{1, 2}

ZEYUAN LIU^{1, 2}

1 WISE LAB

Dalian University of Technology, Dalian, 116023, China

2 Institute of Science Studies and Management of Science and Technology

Dalian University of Technology, Dalian, 116023, China

Abstract

Attempting to reveal the potential intellectual structure and dynamics in the field of science studies during the past thirty years, this study presents a domain analysis of the discipline based on co-citation analysis. 224058 citations of 10893 papers published in the six international journals in the field of science studies were retrieved from the *Science Citation Index* (SCI) and *Social Sciences Citation Index* (SSCI) during 1975 to 2004. Author co-citation analysis (ACA) is applied to identify the dynamics of the intellectual structure of science studies over three 10-year sub-periods, 1975-1984, 1985-1994, and 1995-2004.

1. Introduction

This study presents a domain analysis based on co-citation analysis to reveal the potential intellectual structure and dynamics in the field of science studies over three 10-year sub-periods, 1975-1984, 1985-1994, and 1995-2004.

1. Data and Methods

We chose four international journals (Social Studies of Science, Science Technology & Human Values, Scientometrics, and Research Policy) in the field of Science Studies according to Edge [1]. We added R & D Management and JASIS because they are closely related to Research Policy and Scientometrics respectively. 224058 citations of 10893 papers published in the six journals were retrieved from the *Science Citation Index* (SCI) and *Social Sciences Citation Index* (SSCI) during 1975 to 2004.

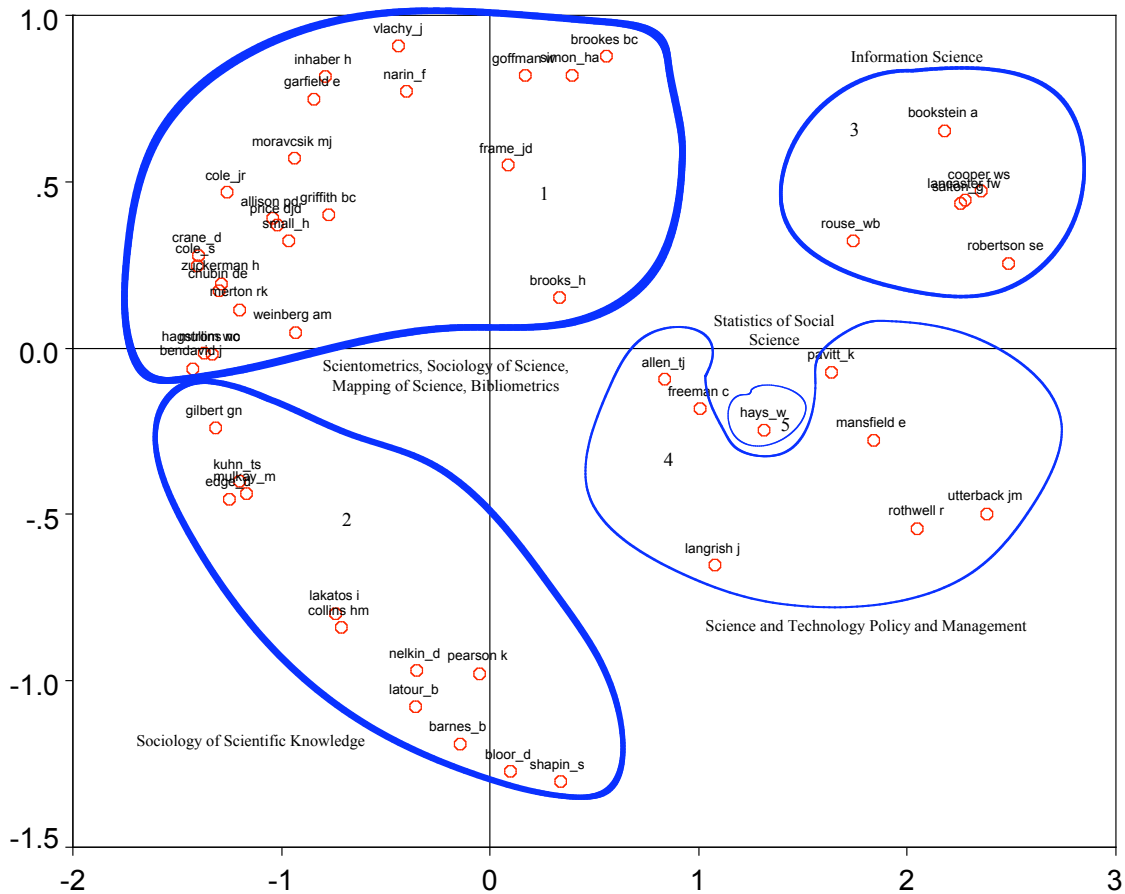
In this study we have mainly adapted author co-citation analysis (ACA) [2]. Author names were standardized. Bibexcel was used to parse the raw data to extract the raw co-citation matrix. Maps were made with multidimensional scaling program, factor analysis in SPSS based on the proximities matrix converted from the raw data matrix. We identified each factor extracted as a research group circled by solid lines. We scored factor 1 the thickest line.

2. Results and discussion

2.1. Intellectual structure of science studies, 1975-1984

Fig. 1 shows a two-dimensional MDS map of the intellectual structure of the top 50 authors during 1975-1984. In this period, there were five main research groups. We noticed that the most influential research group is one big group (factor 1) composed of researchers in scientometrics, sociology of science, mapping of science and bibliometrics.

Fig. 1: Top 50 authors in science studies, 1975-1984.

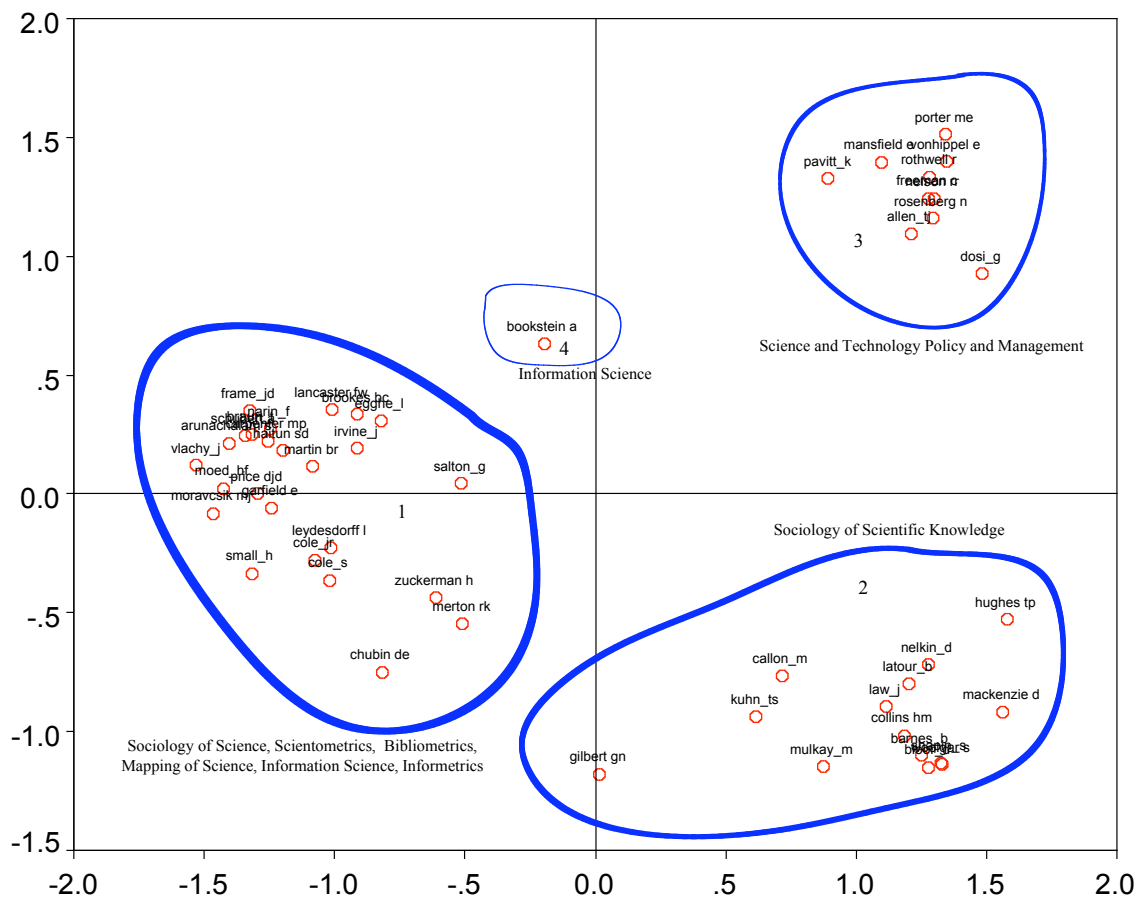


Researchers concentrating on sociology of science formed the second active group (factor 2), which was followed by information science (factor 3), science and technology policy and management (factor 4) and statistics of social sciences (factor 5).

2.2. Intellectual structure of science studies, 1985-1994

Comparing with the first period, we noticed that the intellectual structure of the top 50 authors during 1985-1994 changed a bit (see Fig. 2). Factor 1 is still composed of researchers from sociology of science, scientometrics, bibliometrics, mapping of science, together with some information scientists and a new comer, Egghe, devoting into informetrics. Science and technology policy became a bit more important than the first period, and factor 5 in Fig. 1 disappeared in the second period. Fig. 1 and Fig. 2 indicate that the theoretical-oriented and methodological-oriented research dominated the domain of science studies from the middle of 70s to the middle of 90s.

Fig. 2: Top 50 authors in science studies, 1985-1994.



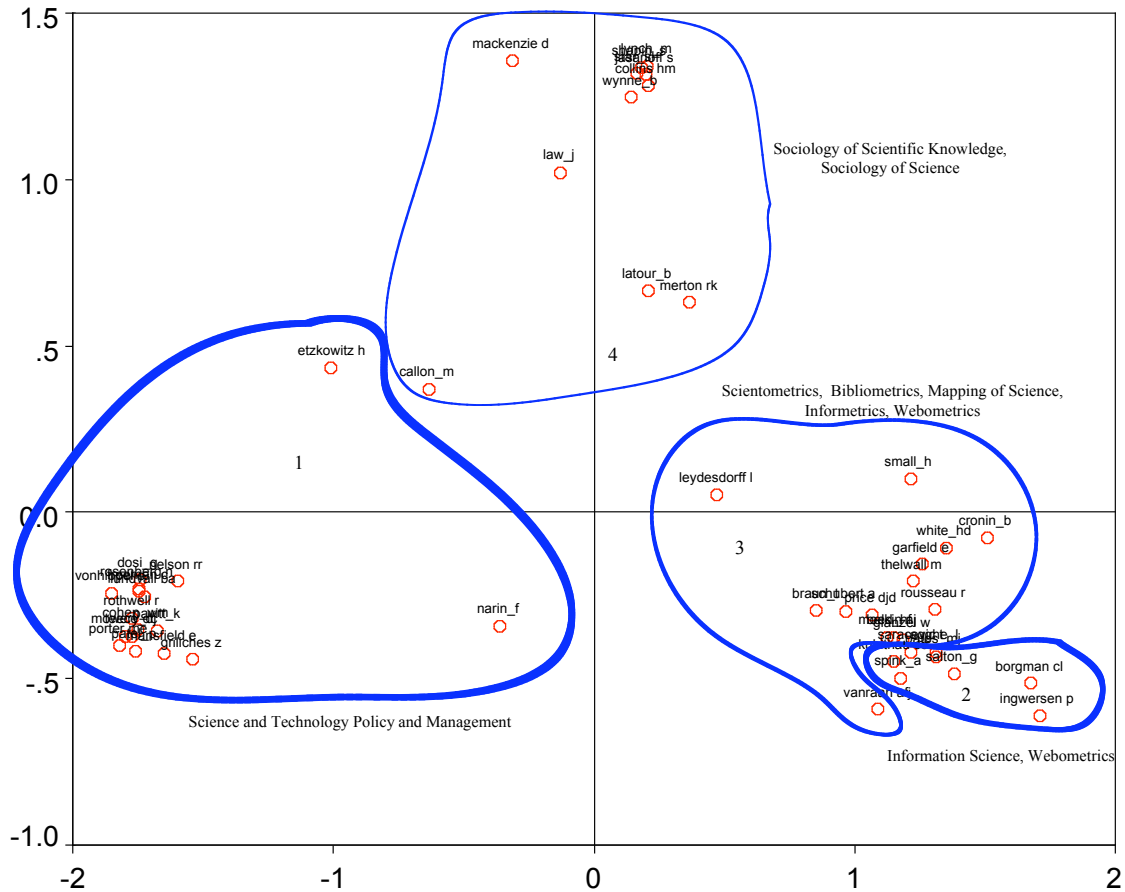
2.3. Intellectual structure of science studies, 1995-2004

Fig. 3 shows the two-dimensional MDS map of the intellectual structure of the top 50 authors during the last decade. Comparing with the last two periods, it is visible that science and technology policy and management has become the most active research

group which indicates that the application-oriented research began to dominate the domain of science studies during the last ten years.

The researchers focusing on the new field of webometrics scatter in two research groups. One is in factor 2 (information science and webometrics) and another one is in factor 3 (see Fig. 3). The researchers in the field of sociology of science and scientific knowledge have become less active than before.

Fig. 3: Top 50 authors in science studies, 1995-2004.



3. *Conclusions*

We have visualized dynamics of the intellectual structure in the field of science studies during the past thirty years. We noticed that the application-oriented research group has become more and more active than the theoretical and methodological-oriented groups. Nevertheless, the social-oriented research group has become less and less active than before.

References

1. David Edge, Reinventing the wheel, In Sheila Jasanoff, Gerald E Markle, James C Petersen, et al., editors, Handbook of Science and Technology Studies, pages 323, Sage Publications Inc, 1995.
2. K. W. McCain, Mapping authors in intellectual space: A technical overview, JASIS, 41: 433443, John Willey and Sons, 1990.

Appendix

Links calculated for free e-journals in the areas studied

Library and Information Science free e-journals links

row	Title	Total links	Self-links	In-links
1	First Monday	48400	687	43800
2	D- Lib Magazine	31700	179	31000
3	Ariadne	23000	115	22500
4	Information Research	9100	147	8690
5	Journal of electronic publishing	7180	31	6960
6	LIBRES	1410	14	1410
7	Cybermetrics	1260	13	1090
8	Journal of digital information	917	25	890
9	Library philosophy and practice	454	0	453
10	Issues in science and technology librarianship	433	3	443
11	School library media research	68	0	64

Psychology free e-journals links

Row	Title	Total-links	Self-links	In-links
1	Psyche	14100	67	13700
2	Early childhood research and practice	3070	16	2920
3	Current research in social psychology	1680	4	1680
4	Current psychology letters, behavior, brain and cognition	457	0	474
5	Psicol_gica	474	2	472
6	Australian Journal of Educational & Developmental Psychology	272	0	273
7	Evolutionary Psychology: an international journal of evolutionary approaches to psychology and behavior	273	0	267
8	MPR-online, Methods of Psychological Research	264	2	262
9	Dynamical Psychology: an international, interdisciplinary journal of complex mental processes	207	0	200
10	Irish journal of psychology medicine	178	0	180
11	PsyArt	172	1	173

12	The Australian e-Journal for the Advancement of Mental Health	87	1	85
13	Behavior and social issues	59	0	59

Free e-journals links of Education

In-links	Self-links	Total links	Title	Title
8490	141	9490	Journal of Extension	1
2920	16	3070	Early childhood research and practice	2
2690	48	2720	Journal of statistics education	3
1630	17	1690	Online Journal of Distance Learning Administration	4
1520	9	1530	Interactive multimedia electronic journal of computer-enhanced learning	5
1360	53	1390	Education policy analysis	6
1150	7	1150	Practical Assessment, Research & Evaluation	7
793	3	805	New Horizons in Adult Education	8
756	5	887	Educause Review	9
605	4	673	Radical Pedagogy	10
514	0	515	Journal of information technology education	11
468	4	499	Reading matrix: An international online journal	12
337	0	333	Education technology and society	13
322	1	323	International Education Journal	14
330	1	328	Journal of technology, learning and assessment	15
255	3	260	International Journal of Special Education	16
189	2	190	Journal of Research in Rural Education	17

Free e-journals links of Physiology

In-links	Self-links	Total links	Title	Row
657	3	660	Athletic Insight: The Online Journal of Sport Psychology	1
142	2	143	SOSOL Sociology of Sport Online	2
10	0	11	The sport journal	3

Free e-journals links of Economics

In-links	Self-links	Total links	Title	Row
721	0	700	Economics Bulletin	1
664	19	688	Academy of Marketing Science Review	2
618	39	649	Demographic Research	3
480	2	484	IMF Staff Papers	4
347	5	363	B Quest	5
138	2	142	Electronic Journal of Business Research Methods	6
136	0	133	Nova Economia	7
84	0	85	Asian Development Review	8
37	0	37	Journal of Electronic Commerce Research	9

Free e-journals links of Sociology & Social Science

In-links	Self-links	Total links	Title	Row
2080	390	2120	Electronic Journal of Sociology	1
1970	6	1990	Qualitative Report	2
1660	33	1670	Journal of Artificial Societies and Social Simulation	3
764	0	759	IDEA: a Journal of Social Issues	4
9	0	9	Journal of Mundane Behavior	5

Free e-journals links of Management

In-links	Self-links	Total links	Title	Row
74	6	84	Public Administration and Management	1
31	2	33	Management	2
12	2	14	Electronic Journal of Business Research Methods	3

Free e-journals links of English Language

In-links	Self-links	Total links	Title	Row
4210	75	9490	Language Learning and Technology	1
1750	3	1990	Romanticism On the Net	2
1280	5	1290	Early Modern Literary Studies: a journal of sixteenth- and seventeenth-century English literature	3
1260	10	1290	T E S L - E J	4
328	6	334	Reading in a foreign language	5
84	2	86	The New Compass: A Critical Review	6

Free e-journals links of History

In-links	Self-links	Total links	Title	Row
14400	45	14500	Bryn Mawr Classical Review	1
545	9	559	Renaissance Forum	2
503	0	502	The North Star	3
207	0	205	Eras	4
197	0	198	Mirator	5
113	2	114	Electronic journal of oriental studies	6

Free e-journals links of French Literature

In-links	Self-links	Total links	Title	Row
727	15	742	ALSIC - Apprentissage des Langues et Systèmes d'Information et de Communication	1