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THE DIFFICULTY OF ACHIEVING FULL COVERAGE OF INTERNATIONAL SOCIAL SCIENCE LITERATURE AND THE BIBLIOMETRIC CONSEQUENCES

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This review of social science bibliometric literature seeks to establish characteristics of the social science literature and to understand their consequences for the coverage of literature databases and for interpretation of bibliometric social science indicators based on such databases. The paper reviews what we know about social science publishing and database coverage of it. It examines the main reasons why social science bibliometrics are problematic, namely: the centrality of books in social science literature and their high citation rate; and the national orientation of social science literatures. The paper then looks at reasons why social science bibliometrics holds increasing promise, namely: increasing internationalization; and good coverage of scholarly journals.

Introduction

Compared to natural science research, social science research is characterized by more competing paradigms and a national orientation. Because the research differs, the natural and social science literatures are structured differently, and this has bibliometric consequences. In the more consensual and international natural science literature, a core of important, international, mostly English-language journals has been identified and fully indexed by ISI in Philadelphia into the *Science Citation Index* (SCI). The bibliometric community has adopted the SCI as its *de facto* standard source and provided a solid justification for this choice with extensive background research (see for example, *Narin*, 1976). However, the more fragmented and polyglot literature of the social sciences is more difficult to cover in a single database.

Nevertheless, the bibliometric community must choose one database to use for mainline work, and no database even comes close to the ISI's *Social Science Citation Index* (SSCI) in this competition. The SSCI's virtues for bibliometric work include: full

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indexing of author addresses, full indexing of a known set of journals,* broad subject coverage, indexing of citations and international coverage (imperfect, yet unrivalled in the database world). But the characteristics of the social science literature mean that the SSCI's coverage is less comprehensive than the SCI's which creates problems for bibliometricians, holding back the development of social science indicators. Background research has been taking place nevertheless. In the last decade, a number of researchers have compiled small, specialized bibliographies and compared them with the SSCI.

Thus, we are beginning to have an idea of how to interpret bibliometric social science indicators derived from the SSCI. As understanding of social science literatures has grown, and the literatures themselves have evolved, bibliometricians have begun to feel that the time has come to explore social science indicators. The Netherlands recently included social science indicators in their national science and technology indicators, and *Glänzel* recently published national social science indicators (*Tijssen* et al., 1996; *Glänzel*, 1996).

This paper reviews the literature examining SSCI coverage in order to understand the possibilities and limits of social science bibliometric indicators. The rest of the paper will review what we know about social science publishing and SSCI coverage of it. It will examine the main reasons why comprehensive coverage of social science literature is difficult:

1. Fragmented literature and book publishing;
2. Citations to books;
3. National literatures.

The paper will then look at reasons why social science bibliometrics holds increasing promise:

4. Increasing internationalization;
5. Scholarliness of journals.

Fragmented literature and book publishing

The social science literature is fragmented because social scientists develop less consensus and adhere to more competing paradigms than do natural scientists. Lack of consensus within a field has been associated with a higher proportion of books in that

* The SSCI also includes partially indexed journals, but these can be excluded from bibliometric work, so partial indexing is a technicality not discussed here.

field's literature because journal publishing has often been seen both as a signal of greater consensus and as a unifying force in itself (*Pierce*, 1987).

Bibliometricians find that social scientists publish in more types of literature than do scientists. *Bourke, Butler* and *Biglia* examined two bibliographies each covering all Australian university research output. They found that natural scientists published about 85% of the time in journal articles or published conference papers, while for social scientists and the humanities the figure was about 61%. Books, edited books, book chapters, monographs and reports, creative works and "other" accounted for the rest (*Bourke* et al., 1996). *Pestaña, Gómez, Fernández, Zulueta* and *Méndez* examined Annual Reports to construct a bibliography of the research output of the Spanish Scientific Research Council (CSIC). The CSIC has eight divisions, seven natural science divisions and one humanities/social science division. The seven natural science divisions publish 81% of their output in journals while the humanities/social science division publishes 54% in journals (*Pestaña* et al., 1995). *Winterhager* has examined German sociology publishing in the German SOLIS database and finds that 42% is published in journals (*Winterhager*, 1994). *Van der Meulen* and *Leydesdorff* find that Dutch philosophers published articles 66% of the time in 1979-80 and 60% of the time in 1984-85 (*Van der Meulen* and *Leydesdorff*, 1991). Thus, journal-based bibliometric indicators will be based on a smaller fraction of research output in the social sciences than in the natural sciences.

One sign of lack of consensus is that authors commonly do not cite relevant work outside their school of thought (*Delamont*, 1989). This fragments the literature such that in the worst cases, no core of literature in a field can be identified (*Nederhof* et al., 1991). A database such as the SSCI must have an internationally recognized core literature to work with to achieve comprehensive international coverage. Low SSCI coverage of a journal literature may signal no core literature. We might expect fragmentation to vary by field, and fields with scientific aspirations to be the least fragmented, and so it is not surprising to find that SSCI coverage varies by field, with economics and psychology literature the best covered.

Two studies provide detailed field breakdowns of their coverage figures. Table 1 reports *Nederhof* et al.'*s* (1989) finding that coverage of Dutch output ranges from 62% of journal articles in experimental psychology to 2% in public administration. Table 2 reports *Butler*'s findings (personal communication of unpublished data, 1998) that coverage of Australian anthropology, archaeology, philosophy, law and economics is more than 40%. In contrast, only 25% of history is covered. In *Butler*'s data there is an inverse correlation (–0.83) between share of journal articles indexed in the SSCI and share of total publications accounted for by books or chapters in edited books. That is,

the more books in a field, the smaller the share of its Australian journal literature covered by the SSCI.

Butler's result supports the fragmentation argument by linking the two signs of fragmentation – many books and no core literature. If fragmentation varies by field, then less consensual fields should have a higher share of books according to *Pierce* (1987) and no core journal literature according to *Nederhof* et al. (1991). In her data, economics and anthropology & archaeology are the least fragmented, with the highest share of articles covered and a low share of books. In contrast history, appears the most fragmented with the lowest share of articles covered and the highest share of books.

Table 1
SSCI coverage by field
Dutch social science

Field	% of articles in SSCI	% pub. in books
Experimental Psychology	62	30
General Linguistics	21	40
Anthropology	15	38
Dutch Language	10	25
Social History	10	40
Public Administration	2	36

Source: *Nederhof*, 1989

Table 2
SSCI coverage by field
Australian social science

Field	Number of articles	% articles in SSCI	% pub. in books
Anthropology & Archaeology	281	44	6
Economics	1074	43	4
Philosophy & Law	418	43	8
Geography	390	39	5
Sociology	649	32	9
Political Science	690	27	8
Asian History	220	27	10
History	532	25	12
Total	4254	35	7

Source: *Butler*

Citations to books

There are reasons beyond fragmentation to explain why social scientists write more books than natural scientists. For example, management scholars have a long tradition of generating income with best selling books that convey their insights. In science, best-selling popularizations such as *A Brief History of Time* or textbooks earn money, but books reporting original research do not. In addition, while scientists must worry about their discoveries being anticipated and are pressured to publish quickly, social scientists do not "discover" and so do not worry about anticipation quite so much. This gives them the time to write books. *Burnhill* and *Tubby-Hille* (1994) report the median number of years after onset of funding that different types of publications appear, Table 3. The median book, they find, takes about 1½ years longer to produce than the median journal article – too long for a researcher worried about being anticipated.

Table 3
Interval between funding and publication by publication type

Type of publication	Years
Monograph	2.5
Peer reviewed article	3.5
Chapter in book	4.5
Book	5.0
Conference proceedings	5.0

The additional time taken to produce a book should allow it to become intellectually more substantial and thus raise its impact. To bibliometricians this implies that although producers of natural science indicators ignore non-journal literature because all the best research finds its way into journals, producers of social science indicators are forced to admit that the best social science is often found in books. This should be reflected in citation rates, and empirical studies find that it is. Books can be very highly cited:

- *Thomas* (1998) collected a bibliography of 300 items published by leading authors in organizational behavior between 1956 and 1975. The 33 most cited items were books.
- *Webster*'s (1998) lists of most cited Polish sociology documents are mostly books – 11 out of 15 cited in the SSCI and 18 out of 19 cited in the Polish Sociology Citation Index.

Table 4 compares the average citation rates for books and journal articles. The table compiles data from four studies; Table 5 explains the data sources and how the citations were counted. Two studies with no citation counts were included for comparison. The numbers have been made as comparable as possible, but the definition of "books" varies and this effects the figures. As the table shows, books are substantially more highly cited than journal articles. *Nederhof* et al. (1989) included lower cited book chapters and monographs in the book category, thus books account for a higher percentage of publications, but are not as well cited as in other studies. *Nederhof* (1993) is a study of economics, where we have already seen that books apparently play a much smaller role, akin to that in natural science. Although books are a relatively small percentage of output, they account for a substantial proportion of citations in the SSCI – as much as 40%. *Broadus*' 1971 review of 11 citation studies in the social sciences found that references to monographs ranged from 31% to 56% of references from book and journal literature in a variety of fields. He compares this with a 1939 study showing chemists gave 5% of their references to monographs and physicists 8% (*Broadus*, 1971, p. 241).

Indicators built from SSCI indexed material – journal articles and citations to them – will miss the 40% of citations received by books. Because authors' book and journal citations are not well correlated, indicators built from total citations will differ from indicators built from citations to journals. Three studies illustrate these points:

- *Hicks* and *Potter* (1991) collected a bibliography of 17 authors' output in the field of sociology of scientific knowledge. The correlation coefficient of the citation per book and journal article figures was 0.35.
- *Nederhof* et. al (1989) lists the citations per book and journal article for 19 departments; the correlation between the two is 0.32.
- *Bourke* et al. (1996) compared the rankings of departments using total and journal only citation counts.* They conclude: "In the social sciences and humanities, the use of journal citation rates as a surrogate for total publication citation rates is more likely to be misleading than in the sciences. It still does, however, provide useful information when used in conjunction with informed peer review" (*Bourke* et al., 1996, 54).

This discussion of books has addressed two points: the proportion of literature that appears in books (relatively easy to calculate), and citations to books (more difficult to calculate). A third relevant point is the references from books, specifically whether they are distributed differently than references from journals. This last is particularly difficult to discover because a database of references from books must be constructed first.

* Journal citation counts included citations to ISI and non-ISI journals

Table 4
Citations to books and journals

Study	Country	Fields	% journals	% books	% other	c/p journals	c/p books	% cites to books	Number of items in bibliography
Bourke et al. 96	Australia	Various	39	5	56[a]	0.9	5.2	40	2281
Hicks and *Potter* 91	Various	Sociology of scientific knowledge	85[b]	15[c]	–	1.2	5.7	43	313
Nederhof, 89	Netherlands	Various	44	34[d]	22	0.28	0.34	NA	NA
Nederhof, 93	UK	Economics	37	3	61	0.76	3.2	18	500
Burnhill, 94	UK	Various	47	15[e]	37	–	–	NA	997
Villagrá Rubio, 92	Spain	Various	82	18	–	–	–	NA	4594

[a] Includes: edited books, book chapters, conference papers, reports/monographs, other and uncoded.
[b] "Journal articles" includes book chapters, journal articles and journal articles reprinted as book chapters.
[c] "Books" includes whole books, edited books, edited journals and monographs.
[d] Items published in books, i.e. books, edited books, book chapters.
[e] Includes edited books.

Table 5
Data sources and method for Table 4

Study	Data source	Citation count years:
Bourke et al., 96	IAS95 - Database of research output 1989 to 1993 for the Research School of Social Sciences (RSSS) and Research School of Pacific (and Asian) Studies (RSPAS), Institute of Advanced Studies (IAS), at the Australian National University (ANU).	Citations received 1988 to 1994 to items published between 1988 and 1992.
Hicks and *Potter,* 91	Bibliography of sociology of scientific knowledge collected by snowball method.	0-3
Nederhof, 89	Bibliographies of Dutch university output in eight fields constructed by correcting lists obtained from university annual reports. All figures averaged across the eight fields.	0-2
Nederhof, 93	Grant related bibliographies of six British economics research groups.	0-2
Burnhill, 94	All publications related to research grants of the UK Economic and Social Research Council (ESRC) in 1984-85.	
Villagrá Rubio, 92	Database of Spanish university journal and book output in economics, sociology, political science, linguistics and literary sciences derived from the ECOSOC database which contains all articles in Spanish journals and the ISBN database, the official bibliography of Spanish books. These were supplemented with searches in 11 international databases including Social Scisearch.	

Before the SSCI was available, the first step in any citation study was manually constructing a database of citations. Thus, early studies could be performed almost as easily using citations from books as from journals. In 1971, *Broadus* surveyed the literature of citation studies in the social sciences and found 11 studies, 6 of which used books (technically monographs) as sources of citations. He found evidence that books referenced more widely than journal articles. That is, in comparison to a journal article, a higher percentage of references from a book will be to work outside its specialty (*Broadus*, 1971, p. 238).

More recently, *Cronin* et al. (1997) constructed such a database comprising 30,000 references from 90 books randomly chosen from those reviewed in top sociology journals and published between 1985 and 1993. *Cronin* et al. compared lists of the 26 authors most cited in the monographs and in the top 24 sociology journals.* They found:

- Nine authors featured on both lists.
- The five authors ranked 22 to 26 on the book list did not appear among the top 532 authors most cited in the journals.

Cronin et al's analyses confirm *Broadus'* in suggesting that references in books are distributed differently from references in journal articles. This highlights another consequence of coverage problems – indicators constructed from journal references alone will differ from indicators that include book references as well.

To summarize, the evidence examined here suggests that books comprise at least 40% and possibly as much as 60% of the social science literature. Books are very highly cited individually and collectively account for about 40% of citations. Citations to and from books are distributed differently from citations to and from journal articles. The centrality of books in scholarly communication in the social sciences contrasts with their absence in literature databases, including the SSCI. The SSCI indexes journals and all references from those journals whether to journal articles or books. The bibliometric consequences are these:

1. because only journals are indexed, bibliographies constructed from the SSCI will exclude books;
2. citations from journals to books are in the SSCI, but bibliometricians can easily incorporate such citations only in small studies. Citations to books do not correlate with citations to journal articles, and so their absence is significant;

* ISI's impact factor was used to identify the top journals. 26 authors exceeded Cronin's minimum threshold of 27 citations in total, or an average of three per year.

3. citations from books are not compiled anywhere and are forever excluded from bibliometric analysis. Again, citations from books do not correlate with citations from journal articles, and so their absence is also significant.

Although journal literature forms an appropriate base for indicators in the more consensual and internationally-oriented natural sciences, the foregoing suggests that journal-based social science indicators will be problematic given the heterogeneous literature of the social sciences.

National literatures

Because social sciences investigate society they are oriented to their social context and are inherently more national. Research agendas are influenced by national trends and by policy concerns of the national government. Social science theoretical concepts are subtle, and without the unifying language of mathematics, are expressed in national languages and can often be fully appreciated only in the original language.

Both producers and consumers of social science are nationally oriented. Research shows that compared to natural scientists, social scientists both write for and read fewer foreign language or even foreign journals. Regarding writing, *Kyvik* found that in Norway 54% of social scientists published in a foreign language while 80% of natural scientists did (*Kyvik*, 1988, p. 165).* Conversely, 75% of social scientists but only 35% of natural scientists published in Norwegian. Taking authors' citation patterns as an indication of their reading habits, we can examine *Yitzhaki*'s data for sociology. *Yitzhaki* (1998) found that American and British authors publishing in US and UK journals cited English language material 99% of the time, although English language sociology probably accounts for 70% of the world literature.** German authors in two German journals cited German language material 63% and 86% of the time although German literature probably accounts for 5% of world sociology. French authors in two French journals cited French material 65% and 68% of the time although French literature probably accounts for 8% of world sociology. Or less quantitatively, American and European geologists are interested in Iceland's volcanoes, and geneticists learn much from Iceland's isolated population because they have very good

* Figures are the proportion of the total number of tenured academics at Norwegian universities publishing scientific work during 1979-81.

** References collected from one US and three UK journals. A fourth journal diverged from this pattern; articles in the British journal Theory, Culture and Society gave 10% of their references to non-English language material. Estimate of English language share of sociology publications derived from SOCIOFILE produced by Sociological Abstracts Inc.

genealogical records (*Thorsteinsdottir*, 1998), but Dutch journals in public administration remain unknown to foreign experts (*Nederhof*, 1991, p. 338). The heavy emphasis on local audiences and local material among social scientists is another factor fragmenting the social science literature making it more difficult to cover comprehensively in a single international database.

The bibliometric consequences of social scientist's national orientation are well illustrated by *Webster/Winclawska*'s analysis of a Polish sociological citation index (PSCI) constructed from the four leading Polish sociological journals (*Webster*, 1998; *Winclawska*, 1996).* In the first analysis, *Winclawska* began with a list of Polish sociologists and counted their citations in the international SSCI and the Polish index between 1980 and 1988. She found that of the top 10 most cited journals in the Polish index, only the three foreign ones are indexed in the SSCI.**

In the second analysis the author, now *Webster*, counted citations to Polish sociologists between 1981 and 1995. She found:

- Lists of the top 20 most cited Polish sociologists in each index had 12 names in common. The most cited sociologist on the Polish list (with 253 citations) was ranked 41st in the SSCI (with 19 citations). The most cited sociologist on the SSCI list (with 254 citations) was ranked 20th on the PSCI list (with 41 citations).
- Lists of the top 20 most cited documents by Polish sociologists in each index contained none in common. All but one of the SSCI cited documents were in English; all the PSCI cited documents were in Polish.
- Sociologists from Warsaw dominate Polish sociology. They constitute 41% of the list of sociologists. In the PSCI they receive 60% of the citations; in the SSCI – 80%.

Webster/Winclawska's analyses illustrates the bibliometric consequences of fragmented literature. Bibliometric indicators based on foreign literature paint one picture of Polish sociology, and the Polish sociology index another.

Given the national orientation of social science literatures, it is important to calibrate our expectations of what can be achieved by those striving to maintain a global database of national literatures. A database producer faces tough choices when aiming to be comprehensive but marketing to people primarily interested in their four national journals. Why would anyone only interested in four journals push their library to subscribe to a complex and expensive database? If the library subscribes to the four journals, the researchers are satisfied. Therefore, it seems something of a miracle that an international database such as the SSCI exists. Obviously, the SSCI can only cover

* The SSCI does not index any Polish journals, and these four were not cited in the SSCI between 1980 and 1988.

** The 3 foreign journals received 22% of the citations to the top 10 journals from the Polish index.

the national literatures of at most a few countries. For other countries, any international database represents that part of their social science of interest to an international audience. Maintaining a database is far more difficult than compiling a list, and so database coverage can be compared against world-wide journal lists that are more comprehensive. *Schoepflin* (1990) compared the UNESCO 1986 *World List of Social Science Periodicals* with the list of journals indexed in the SSCI. Table 6 below is taken from *Schoepflin*'s article. It compares the number of journals produced in the US, UK, Germany and France that appear on the UNESCO list and in the SSCI. UNESCO's list at 3515 journals is 2½ times as long as SSCI's at 1417. Interestingly, SSCI indexes more American journals than UNESCO, so they comprise 60% of SSCI's list, but only 17% of UNESCO's. This confirms that the SSCI probably provides good local coverage for its core country – the US. The UK may also be a well-covered core country as it is also over-represented in the SSCI at 18%. German and French literatures are not as well covered in the SSCI, nor is the rest of the world. *Schoepflin*'s work confirms that the national orientation of the social science literature is replicated in the database of that literature, the SSCI. This is no surprise, but it should serve to keep our expectations in check, and we should not seek full coverage of locally oriented social science research, unless we are in the database's core countries.

Table 6
Comparison of SSCI and UNESCO journal lists

	Number of Journals			Percentage share		
Country	SSCI		UNESCO	SSCI		UNESCO
USA	852	>	611	60	>	17
UK	256	<	334	18	>	10
Germany	48	<	184	3	<	5
France	25	<	269	2	<	8
Rest of world	236	<	2117	17	<	60
Total	1417	<	3515	100	=	100

The proportion of a nation's output accounted for in indicators will depend not only on the number of a nation's journals indexed in the SSCI; it will also depend on how often researchers publish in English-language, international journals. Determining the share of national output indexed in the SSCI is laborious, nevertheless a variety of studies have examined this. Table 7 summarizes the relevant parts of these studies, presenting the percentage of social science journal output indexed in the SSCI for a variety of countries. Table 8 explains the data sources underlying the figures.

There is quite a range in the figures. UK economics seems well covered with 73% of its articles indexed (*Nederhof*, 1993). This accords with *Shoepflin*'s analysis which showed UK journals are relatively well covered. About one-third of Australian and Dutch social science journal output is covered (*Butler*, 1998; *Tijssen* et al., 1996; *Royle* and *Over*, 1994) and a small percentage of Spanish output (*Pestaña* et al., 1992; *Villagrá Rubio*, 1992). Apparently, the Spanish publish much more in Spanish than the Dutch do in Dutch.

Table 7
SSCI article coverage

Study	Country (number of country's journals indexed in SSCI)	Number of journal articles	% of journal articles in SSCI	% of all publications in SSCI
Nederhof, 93	UK (278) – economics only	193	73	27
Burnhill	UK (278)	468	46	22
Butler	Australia (20)	4254	35	
Tijssen	Netherlands (83 - 3 Dutch[a])	all Dutch	30	
Royle and *Over*	Australia (20)	1901	27[b]	
Pestaña	Spain (3)	1242	4	2
Villagrá Rubio	Spain (3)	3757	1[c]	1
Winterhager	Germany (52)	49446		25

[a] Elsevier English language journals are attributed to the Netherlands.
[b] Comparable figure for science: 74% of 6304 articles indexed in SCI.
[c] Strictly speaking this is percentage in "international journals", i.e. those indexed in any of 11 international databases including Social Scisearch.

Table 8
Data sources for Table 7

Study	Data source
Nederhof, 93	see Table 5
Burnhill	see Table 5
Butler	IAS95 database (see Table 5) though with some non-ANU university papers included, figures from personal communication
Tijssen	research papers of Dutch universities, personal communication
Royle and *Over*	bibliography of articles published in journals or serials constructed from the 1990 and 1991 Annual Reports of La Trobe University, Monash University and University of Melbourne
Pestaña	bibliography constructed from Annual Reports of the Spanish Scientific Research Council (CSIC) 1990-92
Villagrá Rubio	see Table 5
Winterhager	Das Sozialwissenschaftliche Literaturinformationssystem (SOLIS)

The problems of SSCI journal coverage are largely problems for those outside the US. I have not identified any studies of SSCI coverage of American journals, partly no doubt because bibliometrics is not much practiced in the US, but presumably also because there is no problem – as suggested by *Schoepflin*'s comparison with the UNESCO list. In America, social scientists may even be more keen on bibliometrics than scientists. *Hargens* (1990) found in a stratified sample survey of 204 American sociologists and biochemists, that the sociologists and their departments counted citations more than the biochemists, see Table 9.

Table 9
Use of citation counts for evaluation by field

Item	Biochemists	Sociologists	t-value
Used SCI/SSCI to determine how frequently particular individuals have been cited	39% (98)	51% (106)	-1.75
Mean evaluation of citation counts as a way to evaluate individual scholars' contributions (1 = not useful, 10 = extremely useful)	4.41 (91)	5.40 (96)	-2.90
Percentage of departments that have ever used citation counts in decisions about hiring, promotion, or salaries	35% (34)	60% (30)	χ^2 3.91 1 (1*df*)

Source: *Hargens*

Even for the US, there remains the problem that books are not indexed. Apart from that, indicators of American social science output should be reliable though not comparable internationally. Outside the US and possibly the UK, bibliometric social science indicators will represent the internationally-oriented research. *Webster* summarizes this point well, concluding that the SSCI indicates the presence and the impact of Polish sociology on the international arena, focusing on areas of research done in Poland which are of interest to the international community and the 'best' Polish sociologists and Polish sociological works; but the SSCI "does not allow for an in-depth analysis of the local dimensions of the discipline." (*Webster*, 1998, p. 31)

Increasing internationalisation

That some fields may be well suited for bibliometric indicators and for the rest internationally oriented research is captured, are signs that social science bibliometric indicators may be worthwhile. There are other indications that the prospects for social science indicators may be improving as social scientists become more internationally

oriented. There is some weak bibliometric evidence on this point from the studies reviewed here:

- *Pestaña* et al. (1995) mention that the Spanish CSIC research output is growing more international, though they do not say if this trend is strong in the social sciences sections.
- *Van der Meulen* and *Leydesdorff* found that the proportion of Dutch philosopher's output published in foreign, scholarly journals increased from 3% to 17% between 1979-80 and 1984-85 (*Van der Meulen* and *Leydesdorff*, 1991, p. 309).

More convincing arguments for increasing internationalization focus on forces working towards the homogenization of social sciences. First among these is greater internationalization in economies and cultures themselves. This increasingly places issues on more than one country's agenda; examples include: AIDS; educational effectiveness; Hollywood's effect on local culture; managing a global company; and the virtues of different styles of capitalism. Greater economic interdependence and more international travel also generates interest in and more opportunities for cross-cultural study and academic interchange, facilitated of course by the internet.

Secondly, in recent years, the EU began to fund social science research, and this should increase the international orientation of European social scientists and hence the share of their work written in English and indexed in the SSCI.

Third, the transitions of East and Central European nations have allowed their scholars to participate in international social science, not only by freeing communication and travel but also by reducing what *Webster* refers to as "political bias" in their work and by reducing the use of Marxist paradigms not used by the US social scientists who dominate the SSCI. *Webster* points to the role of travel and emigration in raising SSCI citation counts for Polish authors. She says that: "a considerable number" of the foreign authors citing Polish sociologists had previously been associated with Polish institutions and then emigrated. She also says that in the PSCI, citations of foreign works are becoming more frequent and more up-to-date.

Perhaps the most intriguing evidence on increasing internationalisation of social science and hence of the SSCI is provided by comparing the *Winclawska* and *Webster* studies. Her first study covered pre-transition Polish sociology, 1980 to 1988 her second covered pre & post transition sociology. Pre-transition, the SSCI missed 90% of Polish sociologists; post transition, it missed only 30% – a number much closer to the *Polish Sociology Citation Index* (PSCI), Table 10.

Table 10
Share of Polish sociologists receiving at least 1 citation

Time period	SSCI	PSCI
pre-transition (1980-1988)	10%	75%
pre & post (1981-1995)	70%	76%

A fourth force supporting the internationalisation of social science is that some concepts and paradigms are spreading across the social sciences. Concepts like public choice theory, postmodernism, and feminist theory increasingly frame social science in many places. If by adopting the same frameworks, previously divergent national communities converge on fewer paradigms, this might generate an internationally agreed upon core literature in the social sciences to match that in the sciences. If so, social scientists would need to follow more than four journals; international social science literature databases would have an easier time covering the literature; and bibliometric indicators would be more reliable.

Webster's work suggests that the ascendancy of an international social science may place small-country social scientists in the position of applying these frameworks to their societies, recognized internationally mostly when their societies present picturesque episodes that become fashionable topics in big countries. Anyone may develop method and theory amongst themselves, but big-country social scientists remain impervious to this. This conclusion is suggested by comparing the topics of the works most highly cited in the PSCI and SSCI. Polish sociologists highly cite (in articles published in the four Polish journals indexed in the PSCI) handbooks in general sociology by Polish authors, works on the social structure of Polish society, and works on interesting theoretical or methodological issues. Works highly cited in the SSCI include: 6 dealing with theoretical issues, each at least 20 years old; and the rest dealing with social unrest in Poland in the early 1980s and the fall of Communism in Eastern Europe. *Webster* concludes that: "the international sociological community does not notice Polish attempts to tackle universal issues in sociology; it is primarily interested in 'fashionable' topics and fads associated with the 'velvet revolution' and systemic transformation." (*Webster*, 1998, pp. 23-24).

Increasing internationalisation may not be entirely fair to all researchers, but there is bibliometric evidence to support the idea that several disparate forces are working to homogenize social sciences internationally. If true, this trend would make the structure of the literature more science-like and more easily covered in the SSCI, and the time may have come to begin international social science indicators.

Scholarliness of journal articles

The prospects for social science indicators are also improved by the fact that the literature not covered by the SSCI can sometimes be less than scholarly. Thus, SSCI coverage of scholarly articles is higher than it first appears. *Van der Meulen* and *Leydesdorff* point out that as of 1979-80, some Dutch philosophy journals were produced by one university and published primarily the work of that university's scholars. By 1984-85, the journals' coverage had broadened somewhat (*Van der Meulen* and *Leydesdorff*, 1991, p. 312). In addition, some work has a more popular orientation. As national bibliometric natural science indicators are not much good for measuring how much research finds application, so too bibliometric social science indicators can only be expected to measure the scholarly and not cultural impact of research. *Burnhill* and *Tubby-Hille* found that in the UK "projects in education [were] reaching practitioners through such periodicals as the *Times Education Supplement*, with researchers in sociology, social administration and socio-legal studies publishing in such periodicals as *New Society* and *Nursing Times*." (*Burnhill* and *Tubby-Hille*, 1994, p. 142).

Burnhill and *Tubby-Hille* (1994) have investigated this issue in some depth. Their publications database was constructed from end-of-award reports of grant holders to the granting agency, supplemented by a survey. They checked whether listed journals were peer-reviewed using two directories of periodicals which identify peer-reviewed serials – EBSCO and Ulrich's.* The survey also asked authors whether the publications they listed were peer-reviewed. The authors and the directories agreed on 62% of the journals. (This includes an element of missing information on the surveys.) Only 42% of journals believed by authors to require peer review were so classified by EBSCO or Ulrich's. *Burnhill* and *Tubby-Hille* concluded that neither the survey nor the directories are wholly accurate. *Burnhill* and *Tubby-Hille* then examined SSCI coverage of "peer-reviewed" journals. The SSCI indexed 82% of articles in journals regarded as peer-reviewed by the directories or at least two authors. However, the SSCI coverage dropped to 67% if articles in self-reported "scholarly" journals are included.

Burnhill and *Tubby-Hille* did not report SSCI coverage by field. However, they did report scholarliness of articles by field (Table 11). In this table, "peer-reviewed" means articles in journals judged to be peer reviewed by the directories or by two or more authors. "Authors consider scholarly," means an author reported the article to have

* The two directories were: EBSCO, *The Serials Directory: An International Reference Yearbook* (EBSCO Publishing Seventh Edition, Birmingham, Alabama, 1993) and *Ulrich's International Periodicals Directory*, 1992-1993 (RR Bowker, New Jersey, 1993).

been peer reviewed on the survey. "Other" are remaining journal articles. The share of publications in books was also listed. The rows are ordered by the share of articles in peer-reviewed journals. Agreement between this and previous field tables is not 100%. However, psychology is again seen to be the most natural science-like field - with a high percentage of articles in peer-reviewed journals and relatively few books. Economics also has a fairly high share of articles in peer-reviewed journals - 64% - and few books.

Table 11
Scholarliness of journal articles by field
UK social science

Field	% of journal articles (468 total across all fields)			% of total publications
	Peer-reviewed	Authors consider scholarly	Other	Books
Psychology	87	7	5	11
Statistics/computational methods	75	13	13	8
Geography & planning	73	19	8	7
Political science & international relations	64	8	28	29
Economics	64	6	30	10
Social anthropology	63	0	37	22
Management & business studies	60	12	29	10
Education	48	11	40	14
Sociology/ social administration	48	11	41	17
Economic & social history	44	20	37	24
Linguistics	23	15	62	20
All social science	62	13	26	15

Source: *Burnhill* and *Tubby-Hille*

Nederhof et al. (1991) have also looked quite closely at this issue. They surveyed Dutch and foreign scholars asking them about the scholarliness of a number of journals in which Dutch social scientists published.* They found that journals considered scholarly in university annual reports** were not always considered so by experts.

* Non-scholarly journals are those "usually directed at nonspecialists such as high school teachers or, in short, the general public . . ." They are devoted to enlightenment or knowledge transfer to the non-scholarly public (*Nederhof*, 1991, p. 335).

** The source for most bibliographies underlying the studies covered in this paper.

The share of non-scholarly journals ranged from 11% in experimental psychology to 25% in public administration. If departmental output were recounted including only articles in journals judged scholarly, in the best case, one experimental psychology department would have lost only 1% of its output, and in the worst case, one public administration department would have lost 61% of its output. *Nederhof et al.* recalculated the share of articles covered by the SSCI in two ways based on their survey results. They calculated the share of articles in scholarly journals that were indexed in the SSCI, and they calculated the share of "core" journal articles indexed in the SSCI where core journals were those:

1. known to more than 20% of their respondents
2. possessing a high scholarly quality (mean of at least 7.5 on a 10 point scale)
3. and found useful to the research of at least 20% of the respondents.

Table 12 displays their results. The table shows that when just the scholarly core of a field is considered, SSCI coverage can be quite comprehensive. However, some fields remain mostly local in orientation. In public administration, a core literature could not even be identified.

Table 12
Percentage share of articles indexed in SSCI by quality of journal
Dutch social science
(numbers in parentheses are the number of articles)

Field	University Annual Reports	Scholarly journals	Core journals
Experimental psychology	58 (260)	69 (257)	100
General linguistics	21 (38)	22 (38)	85
Dutch language	10 (27)	11 (27)	20
Public Administration	3 (12)	5 (12)	no core

Table 13
SSCI coverage of highly-ranked journals by field
German social science

Field	% in SSCI
Developmental psychology	94
Sociology	26
Education	8

Source: *Schoepflin*

Schoepflin (1990) reports similar results derived from a survey of German professors asked to rate journals according to their visibility and their perceived value. Table 13 reports the share of highly-rated journals covered by the SSCI, and the same pattern is visible. Developmental psychology is sufficiently international in orientation that its journals are well covered while education's journals are not.

Summary

This review of social science bibliometric literature has sought to establish characteristics of the social science literature and to understand their consequences for the coverage of the SSCI and for interpretation of bibliometric social science indicators based on the SSCI. We have seen that the natural and social science literature differs. Therefore, constructing literature-based indicators of social science output differs from constructing natural science indicators.

None of the authors discussed here believe SSCI-based bibliometric indicators alone can form a basis for evaluation, though *Van Raan* has argued recently that with appropriately constructed datasets, bibliometric indicators are a necessary complement to peer review in the social sciences (*Van Raan*, 1998). None of these authors are American and most work regularly with bibliometric natural science indicators.

The social science literature is heterogeneous which causes intractable problems for bibliometrics. Social science more often than natural science is published in books. The SSCI indexes refereed journal articles; so paper counts based on it will represent a smaller fraction of the literature than do natural science indicators. Books earn a large proportion of citations, and journal and book based citation counts do not correlate strongly. The SSCI reports all citations from indexed journals, including those to non-indexed journals and books. However, only in small studies can these book citations be accurately attributed to individuals and so institutions, sectors or countries.

The social sciences are more nationally oriented than the natural sciences, but the related bibliometric problems are not insoluble. Researchers publish less often in English and are less interested in work produced in other countries. In this context, the SSCI focuses on US literature, and the review uncovered no literature pointing to problems in coverage of US journals. However, the problem of books and citations to them will effect even US indicators.

However, there are signs that social science research is becoming more international. Further, if some attempt is made to eliminate non-scholarly publications from consideration, the share covered by SSCI rises dramatically. Thus, bibliometric non-US indicators, when interpreted as representing internationally-oriented scholarly literature, may be reasonably reliable. This is particularly true for some countries, such as English-speaking countries, and some fields, such as psychology and economics.

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