

The limits of bibliometrics for the analysis of the social sciences and humanities literature

Éric Archambault and Vincent Larivière

There are several limits to the use of bibliometric analysis of scholarly communication in the social sciences and humanities. This paper reviews three of those limits: the lower proportion of social science and humanities journal articles; social sciences and humanities literature's ageing rate, and conversely its post-publication citation rate; and the local relevance of social sciences and humanities knowledge. It also discusses the choice of bibliometric databases when measuring social sciences and humanities research.

While the use of bibliometrics for policy purposes has mostly been limited to the natural and medical sciences, this emphasis is now changing. However, the extension of bibliometrics as an evaluation approach to the social sciences and humanities (SSH) may be a cause for concern unless due care is taken. There are several limits to the use of bibliometric analysis of scholarly communication in the social sciences and humanities (for instance, Glänzel and Schoepflin, 1999; Hicks, 2004; Larivière et al., 2006). Drawing on previously published data and original data, this paper reviews these limits.

Three issues are presented: the lower proportion of SSH journal articles; social sciences and humanities literature's ageing rate, and conversely its post-publication citation rate; and the local relevance of social sciences and humanities knowledge. The choice of bibliometric databases when measuring social sciences and humanities research is also discussed.

The importance of books and serials in social sciences and humanities knowledge diffusion

The importance of adjusting and clearly stating the limits of bibliometric methods becomes apparent when we consider the importance of books and other documents in the process of scholarly communication in various domains. Hicks (2004) argues that books form a sizeable part of publications in some social sciences and humanities disciplines, that they are also cited more often than other forms of publication, and that this impact cannot be extrapolated from that of journal articles. Thus, the validity of evaluations using bibliometric methods can only be assessed properly if the share of the various types of documents used in scholarly communication is known.

Numerous studies provide data on the relative proportion of journal to non-journal forms of publishing. In their analysis of social science co-citation clusters, Small and Crane (1979) found that 39 per cent of items cited in sociology and 24.5 per cent in economics were books, compared with only 0.9 per cent in high-energy physics. Based on these results, Hicks (1999) estimated that between 40 and 60 per cent of the literature in the social sciences is composed of books. In addition, Leydesdorff (2003) found that whereas 79 per cent of citations in articles covered by the Science Citation Index (SCI) were citations of other articles in the database, this percentage was only 45 per cent for the SSCI (a database produced by Thomson Reuters together with the SCI and the A&HCI). Glänzel and Schoepflin (1999) found that the percentage of references to serials varied between 35 per cent in history, philosophy of science and the social sciences and 94 per cent in immunology.

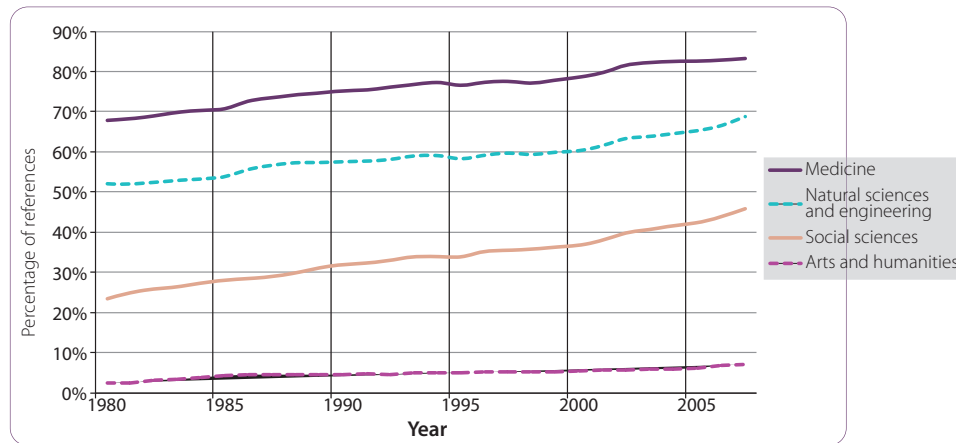
Building on a method presented at length in Larivière et al. (2006), Figure 7.1 presents the percentage of references made to papers indexed in the Thomson Reuters WoS by field (using articles, notes and reviews). The proportion of references made to WoS-indexed papers varies significantly across fields, with medical papers (MED) citing more than ten times the number of WoS-indexed papers or articles in the arts and humanities (A&H). In the natural sciences and engineering (NSE), slightly less than 70 per cent of the references are to WoS-indexed material, whereas this percentage is just under 50 per cent in the social sciences. These data suggest that A&H, including fields such as literature and philosophy, would be best examined using instruments that also consider other types of publications, such as books. The social sciences and the arts and humanities differ significantly from each other in terms of how frequently they refer to papers.

Rates of literature ageing and citation

The rate at which scientific literature ages and the rapidity with which it is cited have important implications for the way in which scientific impact must be measured in different academic fields. These patterns are particularly

important in determining the length of the citation windows used for citation counts. To measure the NSE paper citation rate, a short window (typically two or three years) is frequently used, as knowledge is rapidly diffused and cited. As can be seen in Figure 7.2, in A&H references

Figure 7.1 — Share of references made to journal articles indexed in the WoS, by field, 1980–2007



Source: Saisan and D’Hombres, 2008, pp. 19-21

Figure 7.2 — Median age of cited literature by field (100-year citation window), 1980–2005

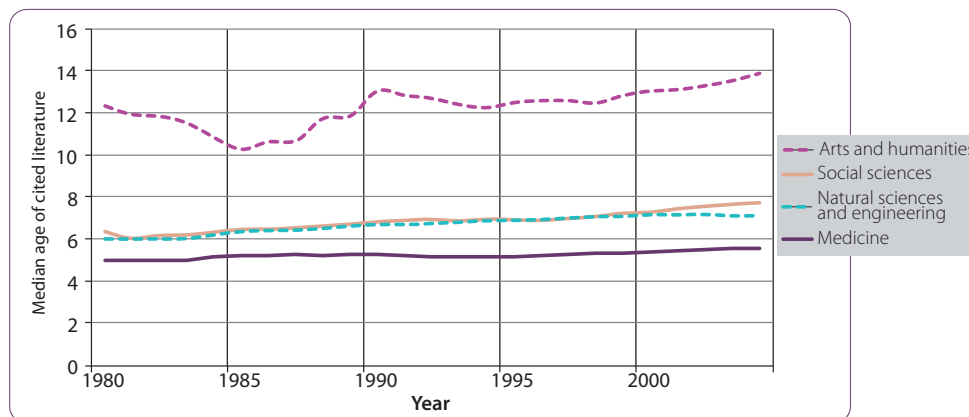


Figure 7.3 — Citations of papers per year following publication

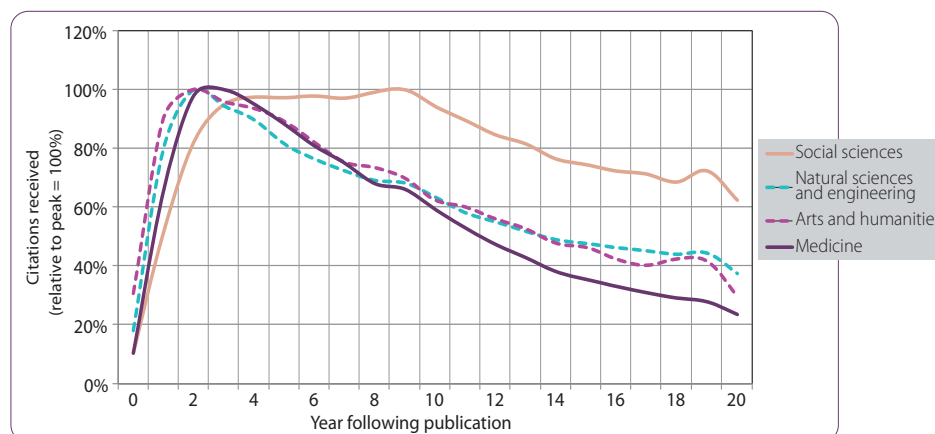


TABLE 7.3 > Coverage by Scopus and WoS of a sample of Canadian social science and humanities papers, 2009

Language of paper	Scopus		WoS		Scopus & WoS		Sample
	Coverage	(n)	Coverage	(n)	Coverage	(n)	(n)
English	53%	120	43%	97	58%	132	226
French	16%	10	7%	4	20%	12	61
Coverage Canadian sample	45%	130	35%	101	50%	145	289
English as multiple of French coverage	3.2		6.5		3.0		

Source: Compiled by Science-Metrix using Scopus and the Web of Science (WoS) (online versions, week of 23 March 2009).

are made to documents that have a median age twice that observed in other scholarly domains. The useful life of knowledge produced in A&H is longer than in other fields. This suggests that a longer citation window should be used when measuring impact in those fields. In social sciences, the age of what is cited differs from A&H and is highly similar to NSE.

Whereas Figures 7.1 and 7.2 examine how papers refer to the past in their references, Figure 7.3 shows the pattern of citations of papers after their publication. Papers in MED, NSE and – surprisingly – A&H are cited rapidly after publication, but the citation rate drops fairly quickly. Papers in the social sciences are less readily cited and only reach their citation peak some ten years after publication. The implication is that we should allow for longer citation windows when examining the impact of research in the social sciences than for NSE and MED. A window of approximately five years might be the minimum required to determine the effect of a social sciences and humanities publication on the community.

The local relevance of social science and humanities knowledge

Another aspect requiring careful consideration when performing bibliometric analyses of the social sciences and humanities is the relatively local orientation of social science and humanities research. Whereas the problems identified in the NSE tend to be universal by nature, social science and humanities research topics are sometimes more local in orientation. The target readership may be limited to a country or region (Glänzel, 1996; Hicks, 1999, 2004; Ingwersen, 1997; Nederhof et al., 1989; Nederhof and Zwaan, 1991; Webster, 1998; Winclawska, 1996). In many cases, the concepts and subjects covered in social sciences and humanities can be expressed and understood only in the culture that shapes them. Social science and humanities scholars reportedly publish more often in their mother tongue, and in journals with a limited distribution (Gingras, 1984; Line, 1999).

To assess the coverage of national literature by Thomson Scientific, Archambault et al. (2006) compared the journals list covered by its citation indexes with a comprehensive

source of scientific journals from all over the world – the Ulrich directory. This showed that journals with UK editors were heavily over-represented in the Thomson Reuters database, especially in the social sciences and humanities. According to Ulrich, 18 per cent of journals have a UK-based editor. The Thomson Scientific figure is 27 per cent – an over-representation factor of 55 per cent. Social science and humanities journals with editors located in the Russian Federation, the USA, Switzerland, and the Netherlands are also over-represented, whereas virtually all other countries are under-represented. Archambault et al. (2006) also considered the actual language of journals. This revealed a clear selection bias in favour of journals in which the articles were written in English. Whereas 75 per cent of peer-reviewed journals indexed in Ulrich are in English, the Thomson Scientific figure is 90 per cent – an over-selection rate of about 20 per cent.¹ This evidence shows that in respect of the combined SSCI and AHCI coverage, there is a 20 to 25 per cent bias in favour of English-language scientific output in the SSH. Furthermore, French, German and Spanish journals are under-represented by 28, 50 and 69 per cent respectively.

Choice of bibliometric databases and indicators

Traditionally, most bibliometric studies have been based on the Thomson Reuters WoS, but Elsevier's Scopus database is becoming a legitimate alternative. Although there is evidence that WoS and Scopus are by and large congruent in their global content and in the NSE (Archambault et al., 2009), the social sciences and humanities coverage evidence is unclear. Examining the extent of WoS and Scopus's coverage in the context of Canadian social science and humanities research diffusion is therefore relevant. Canada, having both English-speaking and French-speaking scholars, is an interesting case. A random sample of 300 papers was drawn from the annual reports of researchers supported by the Social Sciences and Humanities Research

1. Gingras and Mosbah-Natanson (in this Report) give different estimates for the difference in English-language social science and humanities journals included in the WoS and the Ulrich directory. Their assessment refers to 'academic and refereed journals' whereas this paper states 'peer-reviewed journals'. Because the second is a subset of the first, both statements seem consistent with each other.

Council (SSHRC). Following the exclusion of a few anomalies, and with a resulting sample of 289 Canadian scholarly papers, the Scopus coverage was determined at 45 per cent and the WoS coverage at 35 per cent. Combining the two databases would not necessarily lead to a cost-effective solution, as the combined total coverage was 50 per cent – that is, five percentage points more than Scopus alone. Importantly, papers written in English are 3.2 times more likely to be covered by Scopus, which covered 16 per cent of French-language papers, whereas English-language papers were 6.5 times more likely to be covered by WoS. Based on this evidence, Scopus is slightly better overall, and much better at covering French-language research diffusion. In addition, Scopus is set to further expand its coverage of humanities journals. A sizeable number of Canadian journals will soon be added, thus increasing the gap between the two databases.

Overall, these data show that we cannot effectively compare the scholarly output of French-speaking and English-speaking Canadian scholars using these databases. By extension, it would be misleading to use these databases to compare the social sciences and humanities production of Canada's different provinces.

The data presented here show that social sciences and humanities knowledge production can be observed using bibliometric methods only when the greatest care is taken. The existing peer-reviewed journal databases are incomplete and do not satisfactorily cover languages other than English. This means that whenever language issues influence output in one way or another, it is impossible to perform robust comparisons, let alone rankings. This is not to say that questions cannot be studied using bibliometric methods; it simply means that we must be careful when

drawing normative conclusions, especially if the questions examined are likely to be shaped by linguistic and geographic variables. In particular, developing countries are certainly under-represented, especially those that are not English-speaking. Moreover, as always, it is perilous to compare fields (such as the social sciences and the humanities) if the morphology of scholarly communication in each area is not taken into account. It is, for instance, important to bear in mind that books are the preferred mode of knowledge dissemination in the humanities. Furthermore, the current databases are not reliable enough to allow for the computing of statistics on book-based diffusion and the associated impact as measured in respect of books.

The development of a robust bibliographical book database comprising complete references as well as more universal coverage of social sciences and humanities journals would expand our capacity to understand social sciences and humanities knowledge diffusion and use. As long as our tools remain non-existent or limited, the bibliometric analysis of the social sciences and humanities will be less comprehensive than that of the natural sciences. Perhaps too much effort has been spent discussing what is good and what is not, and hence on what should be included in and excluded from databases. With the rapid development of electronic data interchange, inclusiveness and extensiveness should be the goal. Knowing that the supposedly best journals are included in the Thomson Reuters database is of no use when we want to understand how, for example, research on education has evolved in African countries over the past ten years. There are many relevant questions that bibliometric methods can help answer; however, for the time being, the most important question overall is how long we have to wait until this can be done. 😊

Éric Archambault and Vincent Larivière

Éric Archambault is President of Science-Metrix and Associate Researcher at the Canadian Observatoire des Sciences et des technologies. He specializes in science and technology measurement using bibliometric methods as well as S&T programme evaluation and policy analysis. He holds a doctoral degree from SPRU at the University of Sussex, England.

Vincent Larivière is a researcher at UQAM's Observatoire des Sciences et des Technologies and a Ph.D. candidate at McGill University. His doctoral research, for which he holds a scholarship from the Canadian SSHRC, examines the contribution of Ph.D. students to the advancement of science.