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Zero Impact: A Large-Scale Study of Uncitedness

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Abstract

This paper presents a large-scale study of the phenomenon 'uncitedness'. A literature review indicates that uncitedness is related to at least three factors: Field, document type, and time. To explore these factors and their mutual influence further, and at much larger scale than previous studies, the paper focuses on seven subject areas (arts & humanities; social sciences; computer science; mathematics; engineering; medicine; physics & astronomy), seven document types (articles; reviews; notes; letters; conference papers; books; book chapters), and a 20-year publication window (1996-2015). Documents are searched in Scopus, and retrieved year-by-year, discipline-by-discipline, and for each individual document type (total: 29,472,184 documents; 7,508,741 uncited documents). The results show great variance in uncitedness ratios between subject areas and document types. This is probably caused by a somewhat tacitly agreed upon genre hierarchy existing in all subject areas, yet with important local traits and differences. The importance of the time-dimension is documented. Time to first citation varies a great deal between subject areas, and the uncitedness ratio is consequently shown to be quite sensitive to the length of citation windows.

Keywords

Uncitedness; Subject areas; Document types; Citation windows

Introduction

Research activity and impact have traditionally been studied using publication counts and citation scores as proxies. The overwhelming majority of impact studies have focused on cited documents, cited authors, cited journals, cited institutions, and cited countries – i.e., entities that have been cited. By focusing on citedness, and by comparing number of citations, it has proven possible to formulate indicators for distinguishing between different types of entities and their respective impact.

The contrasting phenomenon '*uncitedness'* has also been studied. Notable recent examples include Egghe, Guns and Rousseau (2011) who reported uncitedness ratios of publications authored by Nobel laureates and Fields medalists, Hu and Wu (2014) who studied uncitedness in six selected journals, Liang, Zhong and Rousseau (2015) who studied uncitedness in Library and Information Science, and Zhao (2015) who studied the uncitedness of literature reviews. Clearly, each of these studies contribute with important pieces to a better understanding of the uncitedness phenomenon, yet a more systematic study covering a longer time period, several disciplines, and a variety of document types has so far not been conducted. Two news articles by Hamilton (1990; 1991) published in *Science* appear to come close. They report uncitedness ratios for the journal literature of the sciences (47.4%), social sciences (74.7%), and for the arts & humanities (98.0%). However, as pointed out by Pendlebury (1991: 1410), the numbers are misguided as they cover all document types including letters, meeting abstracts, editorials, obituaries, and "other marginalia, which one might expect to be largely uncited". Hargens and Bott (1991: 1409) also warn against taking these numbers too seriously as "journals in the social sciences and humanities often feature large book review sections and publish extensive commentary and debate. Including such documents in studies of 'uncitedness' will produce results that underestimate the citation levels of research papers and exaggerate differences in citation levels between the natural sciences, the social sciences, and the humanities".

In this study, we seek to establish a larger and more fine-grained base for exploring uncitedness. We will start by presenting a review of existing studies on the subject, demonstrating that uncitedness is related to three main factors: Field, document type, and time. Our large-scale study therefore focuses on seven subject areas (arts & humanities; social sciences; computer science; mathematics; engineering; medicine; physics & astronomy), seven document types (articles; reviews; notes; letters; conference papers; books; book chapters), and a 20-year publication window (1996-2015). Uncited documents are retrieved using the Scopus database. Thus, in this study an uncited document equals a document with zero citations in Scopus, which is not necessarily the same as a document with no citations at all. Uncited documents are retrieved year-by-year, discipline-by-discipline, and for each individual document type. This procedure enables comparisons between disciplines as well as within. Thus, we will compare uncitedness ratios of the six disciplines and uncitedness ratios of the seven document types between and within disciplines.

The next section presents an overview of the literature on uncitedness. It is followed by a section describing the retrieval procedure of the present study as well as the methods applied for analyzing the retrieved data. Results are presented in the results section and discussed in the final discussion and conclusion section.

Review

In 1965 Price estimated that every year 10% of all papers "die" leading to about 10% of all published papers never being cited (Price 1965: 512). Since then, bibliometricians have tried to assess as well as explain the phenomenon of uncitedness. Empirical studies of uncitedness have found rates varying from as low as zero after 5 years (Mackenzie 2009) to 24% after 10 years (van Dalen & Henkens 2004) or 50% after 4 years (Koenig 1983). However, the following overview of the existing literature reveals that unit of analysis as well as methods vary greatly among the studies of uncitedness.

Although citedness is typically the main focus in bibliometric studies, bibliometric analyses are affected by uncited publications (Thelwall, 2016) and thus of great importance. Consequently, researchers have worked with empirical analyses of the relationship between the impact factor and the proportion of uncited material in a collection (e.g. Burrell 2012; Burrell 2013; Egghe 2013; Hsu & Huang 2012; Van Leeuwen & Moed 2005).

The existing studies of uncitedness use different operationalizations of the concept. The typical unit of analysis is uncited articles, however, uncitedness can be calculated on the level of uncited articles as well as uncited authors and topics (Liang, Zhong & Rousseau 2015). Uncitedness refers to the status of academic publications, authors or topics that do not receive any citations within the citation window. Consequently, the concept of uncitedness depends to a large extent of the length of the time windows set for the analysis (Hu & Wu 2014). A publication currently uncited does not indicate that it will never be cited i.e. a socalled never-cited publication. This publication might be a "sleeping beauty" (see van Raan, 2015 for an overview of the literature on sleeping beauties) and demonstrated recently by Ho and Hartley (2017) using three examples from the field of psychology.

Analyses of uncitedness can be done on the level of document or researcher. Document level analyses includes award-winning papers as well as specific document types. Sen and Patel (2012) use award-winning papers over a 25-year period as unit of analysis and find an uncitedness rate of almost 25%. Using all reviews as pool of documents in Web of Science, Zhao (2015) finds that the ratio of uncited reviews declines rapidly in three years after publication and stabilizes at 4% in 5-10 years (Zhao, 2015). The uncitedness of meeting abstracts has been studies by Hu & Rousseau (2013) and the results show that despite the vast amount they are rarely cited. Tang (2008) studies monographic uncitedness and finds that noncitedness rates are much lower than journal noncitedness rates. Researchers are typically used as unit of analysis with a population of prominent researchers. Using Nobel laureates and Fields medalists (Egghe, Guns & Rousseau 2011) find uncitedness rates of 10% and more. Heneberg (2013), however, finds that the high uncitedness rates are caused by the inclusion of uncitable document types in the analyses (e.g. editorials) and focusing only on articles and reviews he finds uncitedness rates of less than 1%. Finally, Thelwall (2016) argue that high uncitedness rates in Scopus may be due to academic-related magazines being indexed in Scopus.

Uncitedness can also be analysed at the level of field or country. Quite a large number of studies have addressed uncitedness within a specific field or selection of fields (for recent examples see Gopalakrishnan, Gopalakrishnan, Bathrinarayanan & Tamizhchelvan 2015; Liang et al. 2015; Mavrogenis, Quaile, Pećina & Scarlat 2018; Rosenkrantz, Chung & Duszak 2018). A few studies deserve specific mentioning. Within the fields of the natural sciences and engineering, medicine and the social sciences Wallace, Larivière, and Gingras (2009) retrieve citations to all research articles, notes and review articles using 2-, 5- and 10-year citation windows. They observe an overall decrease in uncitedness. Lou and He (2015) find a negative, but weak, correlation between affiliation reputation

and uncitedness within 6 subject areas. Liang et al. (2015) find that low numbers of pages, references, authors per paper are associated with uncitedness within library and information science. van Dalen and Henkens (2004) find that the chance of citing a previously uncited article does not decline over time within the field of demographics. It should also be mentioned that studies exist that analyse a set of articles or journals compiled based on geography (e.g. Cuenca et al. 2017; Li 2013; Tahmasebi, Foroughi & Alizadeh-Navaei 2017).

Finally, analyses can include all publications in a database or otherwise be large-scale. Hamilton (1990, 1991) is an example of a largescale study. Unfortunately, the analyses of disciplines and sub-disciplines do not account for document types which may distort the results as pointed out by Pendlebury (1991). Furthermore, using all the scientific papers in Web of Science analyses show that papers whose first author bears a surname that is at the end of the alphabet are at greater risk of being uncited (Arsenault & Larivière 2015).

A number of different approaches have been used in the studies of uncitedness. The phenomenon can be analysed using descriptive analyses of the characteristics (i.e. topics, document types) of uncited publications in a limited number of articles (Law, Lee & Au 2013). However, this does leave the analysis without any means of comparing the uncitedness rates or characteristics with other publications. A control group can be formed using highly cited papers (Kamat 2018; Yamashita & Yoshinaga 2014). However, the typical approach for analysing noncitedness is using cited publications, fields or years as means to compare the uncitedness rates. Some use several citation windows (e.g. Wallace et al. 2009) whereas others use citation windows depending on the publication year (e.g. Liang et al. 2015) who use a publication window from 1991 to 2010 and citation window extending from the moment of publication to February 2014. Thus, they allow the most recent article three to four years to receive at least one citation whereas the oldest has a citation window of over 20 years.

Summing up, a number of studies have clearly shown the importance of analysing uncitedness including two explanatory factors: disciplines as well as document types. The existing studies have so far only included these two factors as separate models of explanations. However, as document types may be used differently across fields (Becher 1989) the effect of each as well as their interaction needs to be taken into account. Furthermore, the existing literature demonstrate the importance of the length of the citation windows as uncitedness depends on the time windows set for the analysis.

Method

Data for the analysis was retrieved from Scopus. December 6, 2018 there was a total of 73,413,715 documents indexed in the database of which 26,112,764 had obtained no citations. The publication window was set to 1996-2015 and limited to seven of the most common document types[1] (articles, books, book chapters, conference papers, letters, notes, and reviews). Appendix 1 provides an overview of how these results were distributed among the 27 subject areas used for indexing in the database. Note that a title may be indexed with more than one subject area code. Seven of the 27 subject areas were selected for detailed examination:

[1] Article, letter, note and review were searched as DOCUMENT TYPE and further limited to SOURCE TYPE: Journal. Conference paper was searched as DOCUMENT TYPE and further limited to SOURCE TYPE: Conference proceeding. Book and book chapter were searched as DOCUMENT TYPE with no further limitation.

- Arts & Humanities
- Computer science
- Engineering
- Mathematics
- Medicine
- Physics & Astronomy
- Social sciences

The selection of subject areas was guided by an aspiration to cover a variation of subject areas and covers 29,472,184 documents of which 7,508,741 had obtained no citations. This amounts to almost 65% of all uncited documents in the 20-year population.

Detailed data for each selected subject area was retrieved by limiting to specific document types and publication years. Like Liang, Zhong and Rousseau (2015), we operate with an open citation window. Thus, an uncited document is a document that has not received any citations in Scopus at time of retrieval (December 6, 2018). Consequently, older documents have had more time to attract citations than younger documents. Detailed comparisons of uncitedness ratios is therefore done year-by-year. Totals are given, but treated as overall indications.

Results

Table 1. provides an overview of unciteness ratios. Note that these are calculated as totals representing the entire publication window (1996-2015) and all document types.

Subject area	0 citations	Total	Uncitedness ratio
Arts and Humanities	525,961	1,369,327	0.38
Computer science	870,164	3,238,993	0.27
Engineering	1,885,708	6,287,907	0.30
Mathematics	415,925	1,929,766	0.22
Medicine	2,221,845	9,666,622	0.23
Physics and Astronomy	801,549	4,242,948	0.19
Social sciences	787,589	2,736,621	0.29

Table 1. Selected subject areas (1996-2015) and the number of uncited publications as well as the total number of publications within the area.

Details for each of the selected subject areas, for each document type, and for the 20-year publication period are shown in the appendices. Table 2. provides an overview of the percentage totals and uncitedness ratio for each document type and subject area.

The journal article is the preferred medium for communication in six of the selected subject areas. In Computer science, the number of conference papers is almost twice the number of articles. Yet, in Computer science the number of uncited conference papers is more than three times higher than the number of uncited articles. As a result, the total uncitedness ratio of conference papers in Computer science is 0.33 compared to 0.16 for articles. Reviews are published relatively more frequently in Arts &

Humanities, Medicine, and in the Social sciences compared to the other four subject areas. The total uncitedness ratios of reviews also vary somewhat between subject areas (0.12 in Physics & Astronomy to 0.44 in Arts & Humanities). The four remaining document types show even greater variance in both numbers and uncitedness ratios. In Medicine, a total of almost 600.000 letters equals almost 6% of the total number of publications compared to just 2,465 letters in Mathematics (0,13% of total publications). Notes follow a somewhat similar pattern. Yet, the total uncitedness ratio for letters are higher than the total uncitedness ratio for notes in Arts & Humanities (0.79/0.72) and Social sciences (0.82/0.65). Books and book chapters are used as media for communication in all subject areas, but to very varying degree. The highest shares of books and book chapters compared to total publications are found in Arts & Humanities (3.6% and 13.9%). The highest total uncitednees ratio for books is found in Medicine (0.33), and the lowest in Mathematics (0.16). Note, however, that the coverage of books may be an issue. Especially the first 1/3 of the period show quite modest numbers of indexed books in each subject area. Like the coverage of books, the coverage of book chapters may also be an issue. Data are missing for large parts for the first part of the period. Limiting the analysis to the last 2/3 of the 20-year period (2003-2015) show uncitedness totals in the range 0.49 (Social sciences) to 0.66 (Medicine).

Subject area	**Articles**	**Books**	**Book chapters**	**Conference papers**	**Letters**	**Notes**	**Reviews**
Arts and Humanities	59.58 (0.33)	3.58 (0.18)	13.85 (0.50)	2.13 (0.29)	1.15 (0.79)	2.85 (0.72)	16.86 (0.44)
Computer science	37.17 (0.16)	0.16 (0.19)	1.38 (0.55)	59.73 (0.33)	0.11 (0.57)	0.23 (0.70)	1.22 (0.22)
Engineering	53.45 (0.20)	0.23 (0.16)	1.69 (0.54)	42.12 (0.40)	0.23 (0.63)	0.71 (0.86)	1.58 (0.32)
Mathematics	72.87 (0.16)	0.18 (0.16)	1.25 (0.56)	24.23 (0.35)	0.13 (0.57)	0.20 (0.58)	1.14 (0.14)
Medicine	74.31 (0.18)	0.14 (0.33)	2.26 (0.66)	0.97 (0.36)	5.93 (0.44)	4.34 (0.64)	12.05 (0.18)
Physics and Astronomy	78.94 (0.11)	0.09 (0.21)	0.51 (0.64)	18.50 (0.51)	0.24 (0.31)	0.28 (0.50)	1.44 (0.12)
Social sciences	66.15 (0.22)	1.95 (0.21)	10.57 (0.49)	7.95 (0.44)	0.91 (0.82)	2.39 (0.65)	10.08 (0.31)

Table 2. The percentage of publication types within 7 subject areas and total uncitedness ratios in parenthesis.

All of the reported totals conceal the great variance that exist between subject areas over time. This is evident in the following four figures focusing on four specific document types (articles, reviews, conference papers, and letters). Mainly due to possible coverage issues, the remaining three document types are not presented in detail here (but all data are available in the appendices).

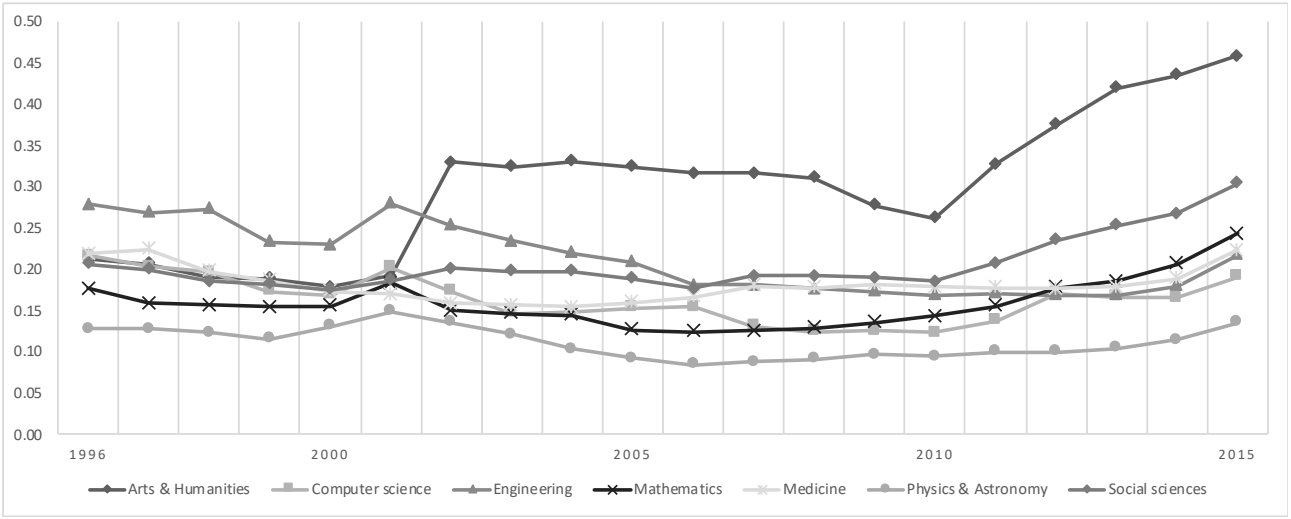

Figure 1. Articles, uncitedness ratios from 1996 to 2015

Articles in the Arts & Humanities and Social sciences have the largest uncitedness ratios (totals: 0.33 and 0.22). However, if limiting the analysis to the first five years (1996-2000), and thereby opening a much longer citation window, Arts & Humanities and Social sciences end up in the middle of the field.

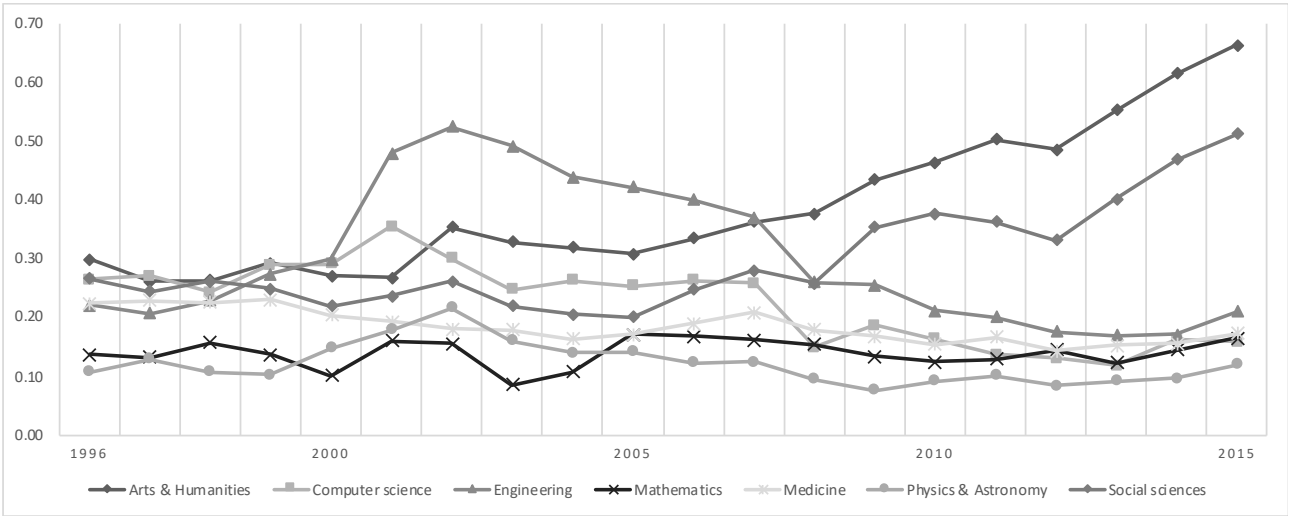

Figure 2. Reviews, uncitedness ratio from 1996 to 2015

Reviews in the Arts & Humanities and Social sciences have the largest uncitedness ratios (totals: 0.44 and 0.31). Limiting the analysis to the last 1/3 of the period reveal substantial differences between these two subject areas and the rest.

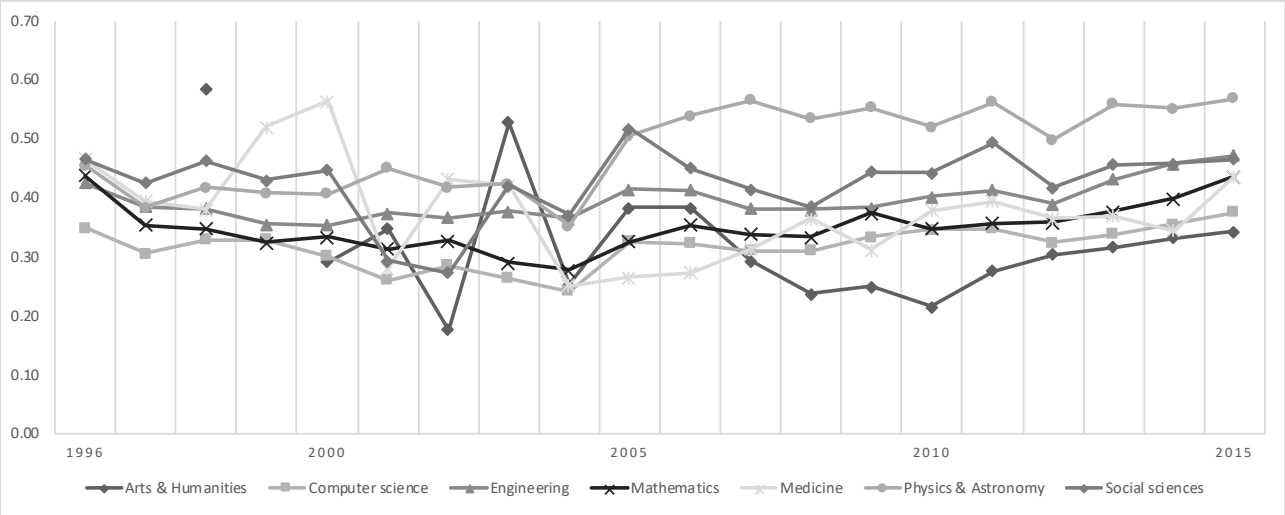

Figure 3. Conference papers, uncitedness ratio from 1996 to 2015

Compared to other document types, total uncitedness ratios for conference papers are quite close, ranging between 0.29 (Arts & Humanities) and 0.51 (Physics & Astronomy). Note that data for Arts & Humanities are not covering all years as no data were available for the years 1996, 1997 and 1999. Furthermore, the data is small and unstable during the first decade which is the case for several of the subject areas. Consequently, the variation during these years should be interpreted with care as some of it is due to small and unstable numbers.

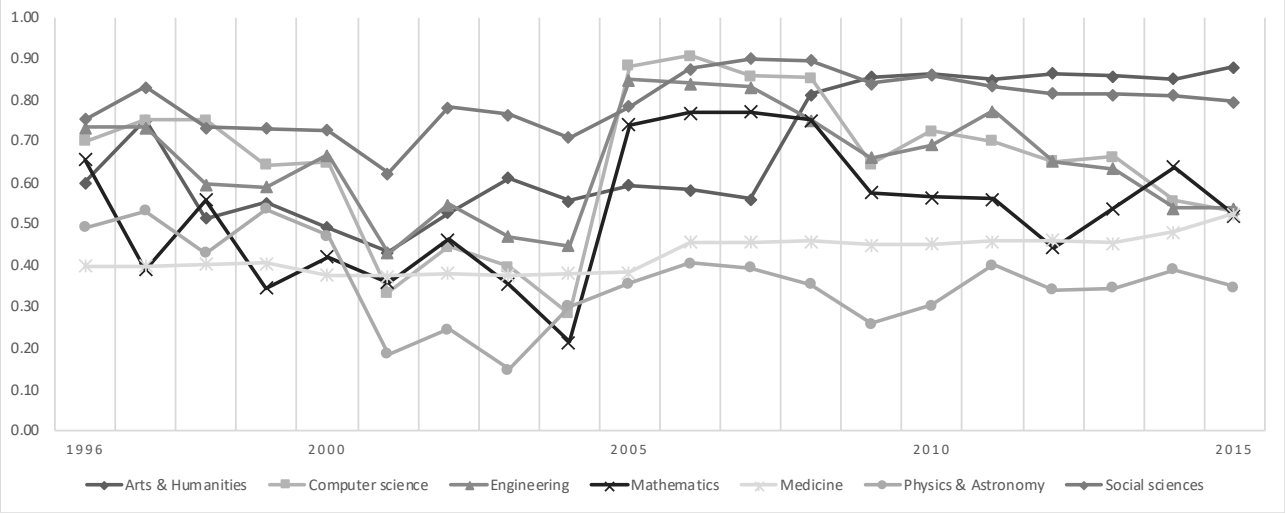

Figure 4. *Letters, uncitedness ratio* from 1996 to 2015

The uncitedness ratio of letters shows the greatest variance between subject areas and over time. Medicine and Physics & Astronomy have the lowest total ratios (0.44 and 0.31), Arts & Humanities and Social sciences have the highest (0.79 and 0.82). However, letters is also a document type that is not covered consistently throughout the entire period by Scopus. Medicine and Social Sciences produce

stable and high numbers of letters whereas the other subject areas are characterized by much smaller numbers of letters and a more unstable coverage during the period. Again, any interpretation of these groups should be done with care.

Discussion and conclusion

The uncitedness of document types have been shown to vary a great deal. One obvious example is articles compared to notes. The uncitedness ratio of articles is quite low compared to the uncitedness ratio of notes. This is what one would expect when knowing about the traditional scholarly communication system. In most research areas the journal article is the preferred medium for communicating new research results (Garvey & Griffith 1972). Notes is a document type that is much more inclusive. It covers a wide range of textual products such as "squibs, forum pieces, and other kinds of riposte […] notes of various kinds that report technical innovations or observations and compilations of findings" (Swales 2004: 214). Thus, the traditional journal article holds a greater potential for being cited than the note does.

The citation potential of a specific publication is tied to the document type, which at least partly helps to explain the varying uncitedness ratios between document types. An article has a greater citation potential than a meeting abstract. Genre researchers often speak about 'genre hierarchies'. One example is the placing of tragedy over comedy throughout much of the history of western civilization (Swales 2004), another is the hierarchy of eighteenth-century French art where paintings of real objects was held in lower esteem than paintings of imagined objects (e.g., an episode from the Odyssey or the Aeneid) (Rosenberg 2000). A similar hierarchy exists in scholarly communication, yet it is only rarely explicated. The bibliometric publication-based evaluation models are exceptions to this rule of inexplicitness. The Danish Bibliometric Research Indicator, for instance, operates with a point-based evaluation system where different document types are awarded a different number of points[2].

However, as noted by Becher (1989), it would be wrong to assume that the same genre hierarchy exists in all subject areas. Our results also indicate that the genre hierarchy varies somewhat from subject area to subject area. This is perhaps most evident when focusing on the uncitedness ratios of conference papers and letters. In Arts & Humanities, conference papers hold the second lowest total uncitedness ratio (0.29) of the seven document types. In Physics and Astronomy, conference papers hold the second highest total uncitedness ratio (0.51). The reason for this divergence may be that conference papers tend to be treated as precursors leading to later journal articles in some research areas, and as the final research report in others (Garvey, Lin, Nelson & Tomita 1972). Drott (1995) found that only 13% of the *1987 Annual Meeting of the American Society for Information Science* papers were followed by journal articles two years after the conference. Liu and Danziger (1996) examined five conferences in the field of Medicine, and found that between 28% and 42% of conference papers were followed by journal articles within a three-year period following the conference. Although these documents are all treated as the same document type ('conference paper'), they should perhaps be seen as different genres with different purposes.

The same may very well apply for letters. Our results show that the total uncitedness ratios of letters vary tremendously between subject areas with relative high ratios in Arts & Humanities (0.79) and

[2] https://ufm.dk/en/research-and-innovation/statistics-and-analyses/bibliometric-research-indicator/bfi-rules-and-regulations

Social sciences (0.82), and much lower ratios in Physics & Astronomy (0.31) and Medicine (0.44). As noted by Hyland (2000: 85), concern with priority and speed of dissemination has made the scientific letter "a feature of very fast-moving scientific specialisms such as physics, chemistry and microbiology". A famous example is Watson and Crick (1953). As noted by Swales (2004: 79), this is actually not a research article, but "a 900-word scientific letter – in effect, a telegram from the scientific front". As this letter (like others of the same kind) reports new and important findings, it is no surprise that it obtains citations from others. Why, then, do we find these high uncitedness ratios in Arts & Humanities and Social sciences? This may very well be caused by letters playing a quite different role in these research areas where priority and speed of dissemination are not seen as important as it is in the natural sciences. Most of the letters that we can recall from our own and related fields (including, in fact, a letter published by us (Frandsen & Nicolaisen 2017)), are not letters reporting new and important findings. Instead, they are rejoinders, corrections, or similar brief comments of much more limited public interest than the letters of the very fast-moving subject areas. The citation potential is therefore much lower, which helps to explain the quite varying uncitedness ratios that we are able to report.

Our results underline the importance of the time dimension. Operating with open citation windows, as we do, leaves older and younger documents a different citation potential. It is therefore no surprise that younger documents generally have a higher uncited ratio than older documents. The older documents have of course had more time to obtain citations than the younger documents. Still, it is interesting to compare document types and subject areas over time instead of just relying on total citation ratios. Note, for instance, how the uncitedness ratios of both articles and reviews vary over time. Clearly, the total uncitedness ratios are highest in Arts & Humanities and Social sciences. Yet, operating with a long citation window evens the field. Articles and reviews published in the first quarter of the publication period match the uncitedness ratios of the other five subject areas. Operating with shorter citation windows are thus not in the favor of Arts & Humanities and Social sciences. The cited half-life phenomenon has been known since Burton and Kebler (1960) published their now famous article in *American Documentation*. Since then, bibliometricians have shown that cited half-lives vary between journals and fields (an even within fields). Our results do not contradict that. On the contrary, they indicate that the time-to-first-citation (TFC) also varies between subject areas. At least for articles and reviews, it takes longer time in Arts & Humanities and Social sciences than in the other five subject areas. Thus, our results complement the results of Nane (2015) who used Web of Science to study TFC for a selection of 80,745 documents, published in the year 2000, from three fields (Biochemistry & Molecular Biology, Economics and Mathematics). She was also able to report quite varying rates between the three fields, and even reverse rates over time.

In mere numbers, this is the largest study of uncitedness to date. Our results clearly confirm the importance of document types, field and time when studying uncitedness. However, our results also show that the interaction of these three important factors also need to be taken into account. Uncitedness depends on the field, the document type and the time from publication, however, document type and time also depends on the field. The genre hierarchy as well as aging of the literature differs across subject areas. Consequently, our study finds that future studies of uncitedness needs to consider the field, document type and time as interacting factors.

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Appendix 1. All subject areas (1996-2015)

Subject area	Number of publications*	Number of uncited publications*	Uncitedness ratio
Agricultural and Biological Sciences	2,526101	279,928	0.11
Arts and Humanities	1,369327	525,961	0.38
Biochemistry, Genetics and Molecular Biology	4,193821	355,283	0.08
Business, Management and Accounting	790144	259,736	0.33
Chemical Engineering	1,348035	255,258	0.19
Chemistry	2,945191	264,037	0.09
Computer Science	3,238993	870,164	0.27
Decision Sciences	286678	57,654	0.20
Dentistry	220195	49,229	0.22
Earth and Planetary Sciences	1,561434	300,620	0.19
Economics, Econometrics and Finance	565612	158,165	0.28
Energy	881690	246,838	0.28
Engineering	6,287907	1,885,708	0.30
Environmental Science	1,537048	249,031	0.16
Health Professions	401151	83,133	0.21
Immunology and Microbiology	1,046528	73,162	0.07
Materials Science	3,228650	641,292	0.20
Mathematics	1,929766	415,925	0.22
Medicine	9,666622	2,221,845	0.23
Multidisciplinary	358618	109,850	0.31
Neuroscience	905472	75,419	0.08
Nursing	573771	156,097	0.27
Pharmacology, Toxicology and Pharmaceutics	1,190485	192287	0.16
Physics and Astronomy	4,242948	801,549	0.19
Psychology	784050	103,476	0.13
Social Sciences	2,736621	787,589	0,29
Veterinary	329263	70,433	0.21
Undefined	255730	160,303	0.63

* DOCUMENT TYPE: Article; Book; Book chapter; Conference paper; Letter, Note; Review

Appendix 2. Number of publications

Subject area	Year	Articles	Books	Book chapters	Conference papers	Letters	Notes	Reviews
Arts & Humanities	1996	19,972	4	10	-	205	451	3,330
	1997	19,960	2	-	-	296	495	3,457
	1998	20,403	4	16	82	175	528	3,476
	1999	20,964	3	9	-	169	463	3,919
	2000	21,531	2	-	1,197	214	612	4,021
	2001	22,887	6	22	72	192	567	4,088
	2002	33,195	35	197	1,587	312	1,365	10,137
	2003	31,159	1,598	5,014	55	434	1,377	11,672
	2004	32,546	1,773	5,953	1,363	380	1,604	11,673
	2005	34,688	1,924	5,926	1,304	394	1,347	13,408
	2006	38,321	2,197	8,354	2,431	551	1,596	12,190
	2007	42,718	2,677	12,588	1,048	576	1,713	10,773
	2008	44,301	2,961	11,643	2,059	681	1,978	11,363
	2009	41,617	3,881	15,791	1,332	1,825	2,399	18,692
	2010	42,804	4,748	17,004	3,502	1,922	2,607	21,540
	2011	56,093	5,349	17,050	2,418	1,697	3,077	19,132
	2012	66,037	5,611	24,376	2,595	1,365	3,461	15,905
	2013	77,538	6,172	23,329	2,101	1,731	4,057	12,947
	2014	77,911	4,868	19,246	3,854	1,386	4,754	17,131
	2015	71,184	5,248	23,144	2,185	1,178	4,520	22,070
	Total	**815,829**	**49,063**	**189,672**	**29,185**	**15,683**	**38,971**	**230,924**
Computer science	1996	30,700	21	99	24,000	20	48	826
	1997	31,025	3	135	28,924	12	43	896
	1998	32,410	51	266	33,109	12	66	1,023
	1999	32,348	11	99	23,696	14	81	591
	2000	37,399	21	230	29,753	37	126	730
	2001	45,977	16	348	33,885	386	1081	1,013
	2002	40,982	24	210	44,493	438	803	1,723
	2003	34,447	80	365	59,301	460	225	3,586
	2004	37,682	66	588	45,314	237	220	3,817
	2005	45,120	258	2,134	70,950	170	481	4,358
	2006	55,428	288	1,842	86,117	192	261	2,890
	2007	60,777	318	2,752	119,102	196	325	1,491
	2008	66,552	307	2,213	156,059	137	312	991
	2009	76,837	378	3,114	176,762	186	353	1,265
	2010	78,033	418	3,358	188,608	167	316	1,351
	2011	88,320	728	2,587	171,156	157	447	2,354
	2012	97,707	431	4,414	160,432	163	458	3,306
	2013	101,304	625	7,371	155,471	151	447	2,449
	2014	104,095	559	5,718	158,164	146	551	2,332
	2015	106,892	689	6,866	169,341	172	661	2,570
	Total	**1,204,035**	**5,292**	**44,709**	**1,934,637**	**3,453**	**7,305**	**39,562**
Engineering	1996	107,063	275	70	59,073	139	195	2,315
	1997	105,803	225	112	65,824	94	246	2,102
	1998	105,285	76	397	63,719	84	283	2,088
	1999	104,889	84	215	41,993	95	497	1,370
	2000	113,147	90	362	62,792	162	787	1,372
	2001	131,911	54	388	68,664	1,012	7,229	3,013
	2002	118,877	91	641	87,141	1,239	5,320	5,036
	2003	110,728	211	2,427	103,466	1,768	1,821	7,699
	2004	122,732	213	1,340	143,585	621	1,349	8,018
	2005	133,984	615	5,245	184,753	496	2,313	10,162
	2006	153,077	724	4,935	164,038	765	1,274	7,299
	2007	166,866	744	5,657	171,365	963	1,440	5,092
	2008	183,519	833	6,240	189,154	883	1,975	3,578
	2009	208,237	928	6,248	173,540	1,210	2,894	4,077
	2010	211,331	1,063	7,116	185,964	858	2,605	4,459
	2011	222,394	846	5,738	184,558	895	2,617	5,991
	2012	232,406	1,419	10,737	167,119	755	3,140	7,364

	2013	257,889	1,843	15,617	163,851	977	2,815	5,732
	2014	273,142	1,710	14,655	181,710	806	2,824	6,072
	2015	297,304	2,143	18,372	185,855	858	2,958	6,359
	Total	**3,360,584**	**14,187**	**106,512**	**2,648,164**	**14,680**	**44,582**	**99,198**
Mathematics	1996	42,237	1	29	6,551	32	35	405
	1997	42,531	-	1	11,378	18	24	454
	1998	43,632	44	-	12,617	43	26	526
	1999	44,641	-	1	6,086	32	52	398
	2000	49,385	9	36	8,774	50	59	623
	2001	57,760	22	44	11,250	112	150	638
	2002	53,049	11	11	16,372	210	161	888
	2003	48,660	27	190	20,669	170	136	1,979
	2004	52,612	30	306	22,822	94	101	1,683
	2005	56,132	139	1,055	31,022	162	106	2,535
	2006	63,728	187	1,144	24,700	225	189	1,770
	2007	71,477	243	1,567	30,578	174	243	880
	2008	78,804	216	1,549	28,485	196	326	650
	2009	90,090	284	1,654	31,777	167	345	754
	2010	87,801	290	1,983	37,491	138	285	945
	2011	93,330	350	1,747	34,796	125	372	1,416
	2012	101,962	377	2,482	33,030	145	297	1,854
	2013	107,046	377	3,140	31,838	132	270	1,312
	2014	110,590	397	3,279	33,509	138	355	1,125
	2015	110,765	481	3,875	33,798	102	364	1,217
	Total	**1,406,232**	**3,485**	**24,093**	**467,543**	**2,465**	**3,896**	**22,052**
Medicine	1996	260,340	5	-	435	16,402	9,761	30,053
	1997	266,678	4	-	246	15,950	9,918	32,378
	1998	259,920	5	-	279	17,699	8,890	34,270
	1999	261,175	14	93	811	20,430	8,390	36,871
	2000	269,491	35	316	756	20,470	9,967	41,996
	2001	275,718	41	643	314	20,423	12,304	41,112
	2002	271,038	53	865	1,621	20,697	13,448	47,254
	2003	269,514	172	2,744	2,550	21,507	14,099	62,725
	2004	274,173	180	3,369	2,431	21,875	14,549	73,130
	2005	300,557	463	8,094	3,904	23,907	16,791	73,887
	2006	337,428	561	10,765	3,861	33,402	16,259	72,328
	2007	371,119	710	12,134	6,318	34,298	19,164	68,233
	2008	390,310	842	14,332	6,208	35,523	24,582	65,003
	2009	418,589	915	14,036	8,052	35,338	26,070	65,934
	2010	437,975	1,147	17,007	10,909	37,390	27,159	66,746
	2011	461,601	1,257	15,661	9,871	38,241	32,051	67,586
	2012	473,264	1,806	32,640	9,653	37,493	34,794	77,767
	2013	507,900	1,894	27,812	8,729	40,289	40,183	68,239
	2014	545,621	1,652	28,626	6,978	41,104	41,116	71,393
	2015	531,251	1,938	29,618	9,388	40,616	39,938	67,805
	Total	**7,183,662**	**13,694**	**218,755**	**93,314**	**573,054**	**419,433**	**1,164,710**
Physics & Astronomy	1996	123,456	52	-	14,399	258	269	1,485
	1997	128,181	65	104	17,820	156	169	1,330
	1998	130,667	35	29	19,955	191	266	1,666
	1999	134,811	7	44	11,713	224	204	1,380
	2000	140,868	3	-	16,685	252	279	1,558
	2001	146,688	9	9	19,639	910	688	1,795
	2002	140,963	7	23	24,650	871	684	2,509
	2003	130,333	21	407	28,844	1268	256	5,082
	2004	135,689	12	51	29,497	370	313	4,061
	2005	143,781	177	1,041	46,459	304	465	4,949
	2006	164,534	196	1,212	50,262	416	517	4,125
	2007	170,754	223	953	54,277	431	590	2,450
	2008	183,198	259	1,340	51,533	515	552	2,036
	2009	194,231	341	1,901	53,859	552	748	2,131
	2010	191,639	438	2,012	60,684	582	794	2,588
	2011	203,731	434	1,788	58,693	455	914	4,071
	2012	208,170	380	1,980	57,298	514	992	5,738

	2013	222,520	381	2,853	54,713	506	995	3,897
	2014	226,722	336	2,270	54,950	635	1,027	4,271
	2015	228,598	545	3,594	59,172	611	1,037	3,878
	Total	**3,349,534**	**3,921**	**21,611**	**785,102**	**10,021**	**11,759**	**61,000**
Social sciences	1996	52,043	3	-	945	360	960	5,313
	1997	52,671	2	8	673	356	900	5,289
	1998	54,365	7	161	1,587	327	1,263	5,366
	1999	56,339	6	35	433	419	1,051	5,514
	2000	58,027	8	38	4,308	410	1,169	5,524
	2001	61,856	10	187	1,835	494	1,985	5,694
	2002	62,689	15	116	3,093	901	2,372	13,212
	2003	56,028	1,423	6,843	4,630	942	1,915	18,910
	2004	58,083	1,501	7,226	3,911	764	2,229	20,940
	2005	62,868	1,839	9,567	4,474	904	2,467	24,856
	2006	73,296	2,152	11,352	10,795	1,898	2,614	21,534
	2007	87,212	2,464	12,096	17,897	2,108	3,295	16,194
	2008	97,678	3,010	16,387	23,962	2,164	3,702	14,021
	2009	109,990	4,263	21,322	22,027	1,967	4,308	14,115
	2010	118,988	4,478	21,467	26,139	2,065	4,649	15,747
	2011	129,857	4,946	26,177	27,658	2,059	5,974	16,987
	2012	139,846	6,784	39,515	17,540	1,664	6,080	16,899
	2013	154,715	7,782	39,825	13,243	1,804	5,863	13,674
	2014	160,634	6,255	33,968	14,668	1,711	6,632	16,421
	2015	163,041	6,397	42,954	17,726	1,503	6,089	19,715
	Total	**1,810,226**	**53,345**	**289,244**	**217,544**	**24,820**	**65,517**	**275,925**

Appendix 3. Number of uncited publications

Subject area	Year	Articles	Books	Book chapters	Conference papers	Letters	Notes	Reviews
Arts & Humanities	1996	4,228	1	10	-	123	211	992
	1997	4,114	1	-	-	222	239	903
	1998	3,901	2	3	48	90	244	913
	1999	3,953	1	1	-	93	206	1,141
	2000	3,853	0	-	348	105	289	1,088
	2001	4,390	1	2	25	83	258	1,092
	2002	10,943	14	144	278	164	823	3,580
	2003	10,088	110	1,501	29	265	899	3,822
	2004	10,755	111	1,583	343	211	1,029	3,714
	2005	11,238	139	1,854	499	234	851	4,129
	2006	12,121	158	3,039	932	321	1,019	4,064
	2007	13,534	179	4,121	307	322	1,050	3,904
	2008	13,786	255	4,172	487	554	1,285	4,271
	2009	11,553	391	7,069	332	1,560	1,696	8,106
	2010	11,226	702	7,340	752	1,659	1,813	9,965
	2011	18,368	842	8,702	665	1,441	2,204	9,587
	2012	24,793	1,125	13,394	788	1,181	2,602	7,703
	2013	32,552	1,845	13,887	662	1,484	3,369	7,141
	2014	33,908	1,232	12,040	1,275	1,178	4,017	10,507
	2015	32,636	1,603	16,303	748	1,037	3,973	14,600
	Total	**271,940**	**8,712**	**95,165**	**8,518**	**12,327**	**28,077**	**101,222**
Computer science	1996	6,640	8	64	8,347	14	35	218
	1997	6,306	0	97	8,840	9	26	242
	1998	6,363	28	223	10,862	9	40	247
	1999	5,602	2	96	7,766	9	51	171
	2000	6,316	2	175	8,951	24	100	212
	2001	9,312	2	314	8,818	129	1,018	358
	2002	7,121	5	153	12,661	195	725	516
	2003	5,058	8	190	15,623	182	175	884
	2004	5,561	6	333	10,953	67	152	1,002
	2005	6,917	26	1,086	23,084	150	381	1,100
	2006	8,537	30	806	27,774	174	177	757
	2007	7,979	29	1,558	36,940	168	244	384
	2008	8,281	36	1,223	48,383	117	203	148
	2009	9,682	54	1,590	58,804	120	206	236
	2010	9,646	76	1,614	65,049	121	159	219
	2011	12,118	198	1,369	59,284	110	247	321
	2012	16,681	95	2,392	51,951	106	270	430
	2013	16,837	138	3,930	52,512	100	266	289
	2014	17,232	103	3,393	56,170	81	282	381
	2015	20,445	177	4,005	63,527	91	341	408
	Total	**192,634**	**1,023**	**24,611**	**636,299**	**1,976**	**5,098**	**8,523**
Engineering	1996	29,841	167	59	25,101	102	107	509
	1997	28,447	119	95	25,248	69	144	435
	1998	28,740	29	350	24,284	50	195	475
	1999	24,444	21	122	14,901	56	391	375
	2000	26,051	24	154	22,135	108	660	408
	2001	36,883	2	174	25,615	434	7,016	1,443
	2002	30,046	22	327	31,880	678	5,106	2,634
	2003	25,908	22	1,421	38,907	828	1,628	3,779
	2004	27,002	13	503	52,258	277	1,144	3,516
	2005	27,934	52	2,749	76,404	421	2,022	4,275
	2006	27,787	45	2,268	67,599	642	953	2,908
	2007	30,166	53	2,800	65,345	801	1,161	1,880
	2008	32,412	82	3,075	71,702	664	1,609	927
	2009	35,971	118	3,058	66,339	799	2,382	1,037
	2010	35,792	124	3,767	74,521	593	2,123	941
	2011	38,073	152	3,241	76,062	692	2,147	1,198
	2012	39,310	232	5,815	65,065	492	2,569	1,293

	2013	43,532	338	8,806	70,505	618	2,328	973
	2014	49,026	281	8,559	83,116	434	2,321	1,034
	2015	64,587	421	10,602	87,460	462	2,452	1,329
	Total	**681,952**	**2,317**	**57,945**	**1,064,447**	**9,220**	**38,458**	**31,369**
Mathematics	1996	7,444	0	5	2,864	21	12	55
	1997	6,733	-	1	4,023	7	13	60
	1998	6,851	28	-	4,382	24	21	82
	1999	6,906	-	1	1,965	11	27	54
	2000	7,695	1	20	2,927	21	34	63
	2001	10,616	2	13	3,527	40	95	102
	2002	7,974	1	6	5,344	97	88	138
	2003	7,131	2	91	5,990	60	84	170
	2004	7,571	2	182	6,338	20	49	180
	2005	7,104	6	433	10,084	120	47	432
	2006	7,932	28	548	8,724	173	96	297
	2007	8,999	21	754	10,315	134	127	142
	2008	10,153	24	808	9,470	147	168	100
	2009	12,221	28	860	11,865	96	188	100
	2010	12,536	34	1,016	12,987	78	164	117
	2011	14,516	43	916	12,382	70	242	183
	2012	18,096	70	1,546	11,816	64	192	266
	2013	19,881	75	1,916	11,983	71	156	161
	2014	22,809	77	2,086	13,340	88	220	162
	2015	26,955	109	2,313	14,705	53	222	201
	Total	**230,123**	**551**	**13,515**	**165,031**	**1,395**	**2,245**	**3,065**
Medicine	1996	56,814	4	-	202	6,529	5,375	6,719
	1997	59,791	1	-	97	6,344	5,384	7,382
	1998	51,480	4	-	106	7,104	5,075	7,715
	1999	48,712	7	47	421	8,248	4,631	8,490
	2000	46,832	8	126	426	7,668	5,631	8,569
	2001	46,935	10	292	88	7,617	7,550	7,920
	2002	42,935	16	457	699	7,849	8,537	8,527
	2003	42,357	28	1,277	1,073	8,087	8,639	11,158
	2004	42,470	33	1,920	608	8,310	9,123	11,911
	2005	48,113	45	4,003	1,035	9,152	11,027	12,614
	2006	56,041	61	5,605	1,054	15,246	11,113	13,658
	2007	66,930	119	6,743	1,973	15,653	13,691	14,149
	2008	69,264	242	8,311	2,263	16,293	16,824	11,616
	2009	76,285	192	8,628	2,511	15,841	17,414	11,093
	2010	78,130	288	10,654	4,123	16,859	17,273	10,274
	2011	82,022	401	10,493	3,883	17,502	20,363	11,168
	2012	83,722	788	23,774	3,512	17,280	21,867	11,053
	2013	91,088	747	18,989	3,220	18,281	26,143	10,396
	2014	103,308	634	20,867	2,397	19,734	26,828	11,090
	2015	118,633	836	22,095	4,091	21,269	26,935	11,665
	Total	**1,311,862**	**4,464**	**144,281**	**33,782**	**250,866**	**269,423**	**207,167**
Physics & Astronomy	1996	15,781	19	-	6,540	127	85	159
	1997	16,329	17	89	6,812	83	63	172
	1998	16,067	20	29	8,307	82	88	177
	1999	15,648	0	30	4,773	120	79	141
	2000	18,435	1	-	6,770	119	117	229
	2001	21,838	0	0	8,822	168	511	320
	2002	19,140	0	1	10,263	213	490	541
	2003	15,716	2	261	12,199	186	133	811
	2004	14,029	1	28	10,389	111	144	569
	2005	13,198	15	610	23,399	108	249	695
	2006	13,969	20	791	27,033	168	210	502
	2007	15,018	15	603	30,659	170	218	302
	2008	16,798	34	780	27,486	182	248	191
	2009	18,785	65	1,365	29,727	142	396	162
	2010	18,055	73	1,242	31,516	176	379	235
	2011	20,413	125	1,244	32,970	182	452	407
	2012	20,874	107	1,320	28,490	175	532	479

	2013	23,140	94	1,517	30,539	174	478	354
	2014	25,841	93	1,558	30,225	247	517	413
	2015	30,985	122	2,283	33,628	212	515	461
	Total	**370,059**	**823**	**13,751**	**400,547**	**3,145**	**5,904**	**7,320**
Social sciences	1996	10,723	2	-	440	271	500	1,410
	1997	10,515	1	6	286	296	470	1,287
	1998	10,112	3	136	734	240	787	1,401
	1999	10,272	1	13	186	306	511	1,372
	2000	10,170	2	8	1,922	298	614	1,207
	2001	11,516	1	152	538	307	1,366	1,347
	2002	12,577	2	75	843	704	1,389	3,441
	2003	11,094	92	1,997	1,947	719	1,004	4,146
	2004	11,453	106	2,143	1,448	541	1,287	4,295
	2005	11,861	156	3,258	2,308	709	1,539	4,995
	2006	12,931	149	3,355	4,849	1,660	1,530	5,329
	2007	16,802	197	4,058	7,415	1,897	1,855	4,529
	2008	18,764	270	5,601	9,218	1,940	2,189	3,624
	2009	20,925	438	8,730	9,759	1,653	2,757	4,981
	2010	22,007	668	9,425	11,544	1,777	2,966	5,917
	2011	26,931	1,103	13,138	13,654	1,714	4,053	6,138
	2012	32,874	1,695	19,845	7,324	1,357	4,205	5,591
	2013	39,171	2,521	21,110	6,031	1,467	4,126	5,472
	2014	42,978	1,722	19,639	6,706	1,387	4,708	7,685
	2015	49,658	1,916	28,036	8,252	1,195	4,539	10,081
	Total	**393,334**	**11,045**	**140,725**	**95,404**	**20,438**	**42,395**	**84,248**

Appendix 4. Uncitedness ratios

Subject area	Year	Articles	Books	Book chapters	Conference papers	Letters	Notes	Reviews
Arts & Humanities	1996	0.21	0.25	1.00	-	0.60	0.47	0.30
	1997	0.21	0.50	-	-	0.75	0.48	0.26
	1998	0.19	0.50	0.19	0.59	0.51	0.46	0.26
	1999	0.19	0.33	0.11	-	0.55	0.44	0.29
	2000	0.18	0.00	-	0.29	0.49	0.47	0.27
	2001	0.19	0.17	0.09	0.35	0.43	0.46	0.27
	2002	0.33	0.40	0.73	0.18	0.53	0.60	0.35
	2003	0.32	0.07	0.30	0.53	0.61	0.65	0.33
	2004	0.33	0.06	0.27	0.25	0.56	0.64	0.32
	2005	0.32	0.07	0.31	0.38	0.59	0.63	0.31
	2006	0.32	0.07	0.36	0.38	0.58	0.64	0.33
	2007	0.32	0.07	0.33	0.29	0.56	0.61	0.36
	2008	0.31	0.09	0.36	0.24	0.81	0.65	0.38
	2009	0.28	0.10	0.45	0.25	0.85	0.71	0.43
	2010	0.26	0.15	0.43	0.21	0.86	0.70	0.46
	2011	0.33	0.16	0.51	0.28	0.85	0.72	0.50
	2012	0.38	0.20	0.55	0.30	0.87	0.75	0.48
	2013	0.42	0.30	0.60	0.32	0.86	0.83	0.55
	2014	0.44	0.25	0.63	0.33	0.85	0.84	0.61
	2015	0.46	0.31	0.70	0.34	0.88	0.88	0.66
	Total	**0.33**	**0.18**	**0.50**	**0.29**	**0.79**	**0.72**	**0.44**
Computer science	1996	0.22	0.38	0.65	0.35	0.70	0.73	0.26
	1997	0.20	0.00	0.72	0.31	0.75	0.60	0.27
	1998	0.20	0.55	0.84	0.33	0.75	0.61	0.24
	1999	0.17	0.18	0.97	0.33	0.64	0.63	0.29
	2000	0.17	0.10	0.76	0.30	0.65	0.79	0.29
	2001	0.20	0.13	0.90	0.26	0.33	0.94	0.35
	2002	0.17	0.21	0.73	0.28	0.45	0.90	0.30
	2003	0.15	0.10	0.52	0.26	0.40	0.78	0.25
	2004	0.15	0.09	0.57	0.24	0.28	0.69	0.26
	2005	0.15	0.10	0.51	0.33	0.88	0.79	0.25
	2006	0.15	0.10	0.44	0.32	0.91	0.68	0.26
	2007	0.13	0.09	0.57	0.31	0.86	0.75	0.26
	2008	0.12	0.12	0.55	0.31	0.85	0.65	0.15
	2009	0.13	0.14	0.51	0.33	0.65	0.58	0.19
	2010	0.12	0.18	0.48	0.34	0.72	0.50	0.16
	2011	0.14	0.27	0.53	0.35	0.70	0.55	0.14
	2012	0.17	0.22	0.54	0.32	0.65	0.59	0.13
	2013	0.17	0.22	0.53	0.34	0.66	0.60	0.12
	2014	0.17	0.18	0.59	0.36	0.55	0.51	0.16
	2015	0.19	0.26	0.58	0.38	0.53	0.52	0.16
	Total	**0.16**	**0.19**	**0.55**	**0.33**	**0.57**	**0.70**	**0.22**
Engineering	1996	0.28	0.61	0.84	0.42	0.73	0.55	0.22
	1997	0.27	0.53	0.85	0.38	0.73	0.59	0.21
	1998	0.27	0.38	0.88	0.38	0.60	0.69	0.23
	1999	0.23	0.25	0.57	0.35	0.59	0.79	0.27
	2000	0.23	0.27	0.43	0.35	0.67	0.84	0.30
	2001	0.28	0.04	0.45	0.37	0.43	0.97	0.48
	2002	0.25	0.24	0.51	0.37	0.55	0.96	0.52
	2003	0.23	0.10	0.59	0.38	0.47	0.89	0.49
	2004	0.22	0.06	0.38	0.36	0.45	0.85	0.44
	2005	0.21	0.08	0.52	0.41	0.85	0.87	0.42
	2006	0.18	0.06	0.46	0.41	0.84	0.75	0.40
	2007	0.18	0.07	0.49	0.38	0.83	0.81	0.37
	2008	0.18	0.10	0.49	0.38	0.75	0.81	0.26
	2009	0.17	0.13	0.49	0.38	0.66	0.82	0.25
	2010	0.17	0.12	0.53	0.40	0.69	0.81	0.21
	2011	0.17	0.18	0.56	0.41	0.77	0.82	0.20
	2012	0.17	0.16	0.54	0.39	0.65	0.82	0.18

	2013	0.17	0.18	0.56	0.43	0.63	0.83	0.17
	2014	0.18	0.16	0.58	0.46	0.54	0.82	0.17
	2015	0.22	0.20	0.58	0.47	0.54	0.83	0.21
	Total	**0.20**	**0.16**	**0.54**	**0.40**	**0.63**	**0.86**	**0.32**
Mathematics	1996	0.18	0.00	0.17	0.44	0.66	0.34	0.14
	1997	0.16	-	1.00	0.35	0.39	0.54	0.13
	1998	0.16	0.64	-	0.35	0.56	0.81	0.16
	1999	0.15	-	1.00	0.32	0.34	0.52	0.14
	2000	0.16	0.11	0.56	0.33	0.42	0.58	0.10
	2001	0.18	0.09	0.30	0.31	0.36	0.63	0.16
	2002	0.15	0.09	0.55	0.33	0.46	0.55	0.16
	2003	0.15	0.07	0.48	0.29	0.35	0.62	0.09
	2004	0.14	0.07	0.59	0.28	0.21	0.49	0.11
	2005	0.13	0.04	0.41	0.33	0.74	0.44	0.17
	2006	0.12	0.15	0.48	0.35	0.77	0.51	0.17
	2007	0.13	0.09	0.48	0.34	0.77	0.52	0.16
	2008	0.13	0.11	0.52	0.33	0.75	0.52	0.15
	2009	0.14	0.10	0.52	0.37	0.57	0.54	0.13
	2010	0.14	0.12	0.51	0.35	0.57	0.58	0.12
	2011	0.16	0.12	0.52	0.36	0.56	0.65	0.13
	2012	0.18	0.19	0.62	0.36	0.44	0.65	0.14
	2013	0.19	0.20	0.61	0.38	0.54	0.58	0.12
	2014	0.21	0.19	0.64	0.40	0.64	0.62	0.14
	2015	0.24	0.23	0.60	0.44	0.52	0.61	0.17
	Total	**0.16**	**0.16**	**0.56**	**0.35**	**0.57**	**0.58**	**0.14**
Medicine	1996	0.22	0.80	-	0.46	0.40	0.55	0.22
	1997	0.22	0.25	-	0.39	0.40	0.54	0.23
	1998	0.20	0.80	-	0.38	0.40	0.57	0.23
	1999	0.19	0.50	0.51	0.52	0.40	0.55	0.23
	2000	0.17	0.23	0.40	0.56	0.37	0.56	0.20
	2001	0.17	0.24	0.45	0.28	0.37	0.61	0.19
	2002	0.16	0.30	0.53	0.43	0.38	0.63	0.18
	2003	0.16	0.16	0.47	0.42	0.38	0.61	0.18
	2004	0.15	0.18	0.57	0.25	0.38	0.63	0.16
	2005	0.16	0.10	0.49	0.27	0.38	0.66	0.17
	2006	0.17	0.11	0.52	0.27	0.46	0.68	0.19
	2007	0.18	0.17	0.56	0.31	0.46	0.71	0.21
	2008	0.18	0.29	0.58	0.36	0.46	0.68	0.18
	2009	0.18	0.21	0.61	0.31	0.45	0.67	0.17
	2010	0.18	0.25	0.63	0.38	0.45	0.64	0.15
	2011	0.18	0.32	0.67	0.39	0.46	0.64	0.17
	2012	0.18	0.44	0.73	0.36	0.46	0.63	0.14
	2013	0.18	0.39	0.68	0.37	0.45	0.65	0.15
	2014	0.19	0.38	0.73	0.34	0.48	0.65	0.16
	2015	0.22	0.43	0.75	0.44	0.52	0.67	0.17
	Total	**0.18**	**0.33**	**0.66**	**0.36**	**0.44**	**0.64**	**0.18**
Physics & Astronomy	1996	0.13	0.37	-	0.45	0.49	0.32	0.11
	1997	0.13	0.26	0.86	0.38	0.53	0.37	0.13
	1998	0.12	0.57	1.00	0.42	0.43	0.33	0.11
	1999	0.12	0.00	0.68	0.41	0.54	0.39	0.10
	2000	0.13	0.33	-	0.41	0.47	0.42	0.15
	2001	0.15	0.00	0.00	0.45	0.18	0.74	0.18
	2002	0.14	0.00	0.04	0.42	0.24	0.72	0.22
	2003	0.12	0.10	0.64	0.42	0.15	0.52	0.16
	2004	0.10	0.08	0.55	0.35	0.30	0.46	0.14
	2005	0.09	0.08	0.59	0.50	0.36	0.54	0.14
	2006	0.08	0.10	0.65	0.54	0.40	0.41	0.12
	2007	0.09	0.07	0.63	0.56	0.39	0.37	0.12
	2008	0.09	0.13	0.58	0.53	0.35	0.45	0.09
	2009	0.10	0.19	0.72	0.55	0.26	0.53	0.08
	2010	0.09	0.17	0.62	0.52	0.30	0.48	0.09
	2011	0.10	0.29	0.70	0.56	0.40	0.49	0.10
	2012	0.10	0.28	0.67	0.50	0.34	0.54	0.08

	2013	0.10	0.25	0.53	0.56	0.34	0.48	0.09
	2014	0.11	0.28	0.69	0.55	0.39	0.50	0.10
	2015	0.14	0.22	0.64	0.57	0.35	0.50	0.12
	Total	**0.11**	**0.21**	**0.64**	**0.51**	**0.31**	**0.50**	**0.12**
Social sciences	1996	0.21	0.67	-	0.47	0.75	0.52	0.27
	1997	0.20	0.50	0.75	0.42	0.83	0.52	0.24
	1998	0.19	0.43	0.84	0.46	0.73	0.62	0.26
	1999	0.18	0.17	0.37	0.43	0.73	0.49	0.25
	2000	0.18	0.25	0.21	0.45	0.73	0.53	0.22
	2001	0.19	0.10	0.81	0.29	0.62	0.69	0.24
	2002	0.20	0.13	0.65	0.27	0.78	0.59	0.26
	2003	0.20	0.06	0.29	0.42	0.76	0.52	0.22
	2004	0.20	0.07	0.30	0.37	0.71	0.58	0.21
	2005	0.19	0.08	0.34	0.52	0.78	0.62	0.20
	2006	0.18	0.07	0.30	0.45	0.87	0.59	0.25
	2007	0.19	0.08	0.34	0.41	0.90	0.56	0.28
	2008	0.19	0.09	0.34	0.38	0.90	0.59	0.26
	2009	0.19	0.10	0.41	0.44	0.84	0.64	0.35
	2010	0.18	0.15	0.44	0.44	0.86	0.64	0.38
	2011	0.21	0.22	0.50	0.49	0.83	0.68	0.36
	2012	0.24	0.25	0.50	0.42	0.82	0.69	0.33
	2013	0.25	0.32	0.53	0.46	0.81	0.70	0.40
	2014	0.27	0.28	0.58	0.46	0.81	0.71	0.47
	2015	0.30	0.30	0.65	0.47	0.80	0.75	0.51
	Total	**0.22**	**0.21**	**0.49**	**0.44**	**0.82**	**0.65**	**0.31**