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Inequalities in the growth of *Web of Science*

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Abstract:

The databases of *Web of Science* (WoS) have rapidly expanded their coverage of scientific journal during the past few decades. For the providers of WoS, this growth strategy has been a way to reduce existing biases in the coverage of these databases, especially in geographical regard. We look into the consequences of this strategy at the level of disciplines, and discuss its underlying rationales. Our analyses particularly focus on the SSCI. We first highlight interdisciplinary inequalities in the coverage of this database, and discuss why disciplines, such as Economics and Management, which are hierarchically-structured and whose journals have high impact factors in WoS, have benefited most from the growth of WoS. Their relative weight in the SSCI has grown at the expense of other disciplines. We also argue that changes in the coverage of this database have performative effects. There are winners and losers of the editorial expansion strategy of WoS in the real academic world. In the concluding section, we suggest that the providers of WoS reconsider the coverage of their databases in order to reflect and protect the interdisciplinary diversity in the world of science.

Key words:

Web of Science, SSCI, inequality, coverage, disciplines

Inequalities in the growth of *Web of Science*

1. Introduction

Web of Science (WoS) is arguably one of the most influential set of databases in the world of science. These databases are explicitly selective, although WoS claims to be increasingly covering the world's scientific literature comprehensively. Inheriting a perspective, which was elaborated and defended by its founder Eugene Garfield (1979), WoS still aims, more particularly, at covering the most influential or "core journals" in different fields of research. To achieve this aim, and to update its databases, its providers have during the past decades relied on in-house editorial teams, which evaluate possible new source items according to a set of publicly available criteria and with the help of citation analyses. Consequently, inclusion in one of these databases is presented as an important indication of scientific quality, and of visibility and impact in the world of science.

Occasionally journals are deleted from WoS's "Master Journal List," because they no longer fulfil the criteria for inclusion. Overall, however, these databases have been characterized by rapid growth.¹ This rapid growth does not only reflect the expansion of the world of science. The providers of WoS have also tried to correct some historical biases, highlighted by critics of these databases. Expansion has in particular been a way to reduce the biases that favor the Natural Sciences to the detriment of the Social Sciences and the Arts and Humanities, and to counter the overrepresentation of English-language journals vis-à-vis publication venues in other languages (see Mongeon & Paul-Hus, 2016; Aksnes & Sivertsen, 2019; Vera-Baceta, Thelwall & Kousha, 2019; Birkle et al., 2020).

Despite the efforts made by Clarivate Analytics and the providers of WoS, there is at the same time little doubt that a range of problems persist. Not only are books and book chapters hardly covered, which particularly affects the representation of the Social Sciences and the Arts and Humanities in the databases (e.g., Giménez-Toledo et al., 2016, 2019), but the expansion of the past decades itself also seems to be only partially successful in correcting the underlying biases. Despite the choice for regional expansion, for example, analyses of (changes in) the visibility of the research output of (semi-)peripheral countries still point to remarkable deficiencies and blind spots (e.g., Leydesdorff & Wagner, 2009; Gingras & Khelifaoui, 2018). Similarly, WoS's coverage of the Social Sciences and the Arts and Humanities continues to attract much criticism (e.g., Sile et al., 2017).

An important question, which has hitherto remained unaddressed, concerns the consequences of changes in the composition of WoS's Master Journal List at the level of disciplines and disciplinary relations. The rapid growth of the WoS databases may be useful in addressing certain biases, but it is also important to analyze how changes in the databases produce winners and losers. In this paper, our aim is to analyze and discuss imbalances in the expansion of the WoS databases at the level of their disciplinary units and representations, particularly for the Social Sciences and the Social Science Citation Index (SSCI). Because inclusion in WoS can make an important difference, we here address shifts in the relative visibility of and support for different disciplinary categories, which ensue from the growth of WoS's Master Journal List and the SSCI during the last decades.

WoS departs from a distinction between some broad areas of research, such as arts and humanities, physical sciences, and social sciences. These broad areas are divided into WoS-categories, which by and large correspond with disciplines or university departments. For this purpose, the providers of

¹ For details about the composition of the Master Journal List, see <https://mjl.clarivate.com/home>. Inclusion in the Master Journal List is a precursor to calculating the journal impact factor and rank order.

WoS make use of an a priori classification system in combination with citation analyses. The SSCI currently includes 58 subject categories and nearly 3,500 journals. All these journals are assigned to these categories (and many journals to more than one category). The items (articles, reviews, letters, etc.), published in these journals, are also assigned to particular categories. The following analyses make use of data at the level of journals and publications (or “citable items”). The bibliometric searches, used in this paper, were all performed between August 2020 and January 2021.

In the following, we first provide a broad overview of the expansion of WoS and of inequalities in this expansion process. Afterwards we discuss in more detail the findings of our analyses for a select number of subject categories. We also explore why particular research traditions have been gaining more visibility than others in the SSCI. In the concluding section, we draw attention to the fact that evaluation and reward systems, which are based on WoS-indexed publications, are likely to reinforce its biases. Imbalances in the WoS databases may thus elicit considerable consequences.

2. Overview

2.1. WoS's policy

As already indicated, WoS presents itself as a (highly) selective database. Only a selection of scientific publications are included in its databases. On top of the editorial policies of scientific journals, the providers of WoS add another form of ‘quality check.’ They intend to identify and cover the ‘core journals’ in different fields of research. The ‘high quality’ journals, which are identified and covered by the providers of WoS, are assumed to publish ‘excellent’ research. According to the information shared on Clarivate’s website, the acceptance rates are relatively low.²

According to WoS, the selection of journals is based on editorial standards and criteria of scientific impact. According to information provided on their website, the providers of WoS use 24 “quality criteria” and 4 “impact criteria” to evaluate all journals submitted for inclusion.³ Building upon a perspective, elaborated by Eugene Garfield and scholars such as Robert K. Merton (Zuckerman, 2018), these criteria are presented as universalistic ones, implying that they can be applied objectively to any journal regardless of its place of publication, language, or discipline. On this basis, the providers of WoS claim to provide the most reputable global citation databases.

At times, commercial imperatives are also mentioned as selection criteria. To be successful, it is acknowledged, WoS’s products not only depend on the quality and relevance of the contents covered, but also on the production costs. “The Thomson Reuters journal coverage balances the requirement for capturing the most influential publications across all fields against economic considerations” (Pendlebury & Adams, 2012, p. 398; see also Zhu & Liu, 2020).

² See <https://clarivate.com/webofsciencegroup/journal-evaluation-process-and-selection-criteria/>. A similar point of view has driven the development of WoS under its successive owners, viz. the Institute for Scientific Information, Thomson Reuters and now Clarivate Analytics.

³ Journals are required to consist of peer-reviewed content, to be published without delays or interruptions in the schedule, to have English abstracts and titles and provide references in Roman script, to make the full journal content available online, to have ethical guidelines and publication malpractice statements, and so on. Online submission systems, such as ScholarOne Manuscripts, are promoted by Clarivate, because they are able to automatically generate much of the required information about the “quality criteria.” The “impact criteria” build upon citation analyses conducted at the journal, author, and editorial board level. For recent overviews of the selectivity of WoS, see Aksnes & Sivertsen (2019) and Singh et al. (2021).

Not much details are provided about WoS's selection policy, but its expansion strategy seems at least in part to have been triggered by demands to improve the coverage of 'regional journals.' "High quality research is now produced and published all over the world in both international and regional journals and in many languages. A growing proportion of cited references from Web of Science journals target work published at a national or regional level and this has led to a corresponding shift in journal selection policy for Web of Science. A policy of regional expansion was developed for the Web of Science database with the aim of identifying and evaluating journals that can be defined as having a regional scope in terms of editorial content and readership" (Testa, 2011, n.p.). According to James Testa, attempts to improve the coverage of WoS have made the early-twenty-first century "a time of unprecedented growth for *Web of Science*" (ibid.).

As already mentioned, the providers of WoS have not been insensitive to criticisms levelled at its selective coverage of the world of science. No doubt, commercial considerations have also played a role. It may be added that WoS has in recent decades lost its monopoly. It is no longer the only database that offers citation indexing of the sciences. During the last years, Scopus, CSA Illumina and Google Scholar have become important players in this market. Also, the criticism of Anglo-Saxon bias in the WoS has led to the development of repositories and indexes that focus on scholarly work produced in the (semi-)periphery of the world of science. For the Latin American literature, for example, indexes such as Latindex, RedALyC and SciELO have seen the light of day.

In this light, it should not come as a surprise that the expansion of WoS has continued throughout the 2010s. The effects of this strategy have been criticized, however. It is questioned, for example, whether the WoS databases now cover (nearly) all journals with adequate editorial standards and scientific merit, which belong to the semi-periphery of the world of science (e.g., Liu 2017; Chavarro, Rafols, & Tang, 2018). Building on arguments and conclusions from earlier research about historical biases and blind spots in WoS, we particularly look at the effects of the rapid growth of the SSCI at the level of disciplines. We ask whether and why the criteria, which WoS has been applying in recent decades, favour particular fields of research and particular kinds of scientific work. We also discuss the grounds for and implications of the choices made by the providers of WoS.

2.2. Disciplinary differences

Let us first present a broad overview of the expansion of WoS at the level of journals and disciplines. Because online data about the WoS and SSCI Master Journal List is available since 1997, we are able to cover a period of over two decades. During this period of time, the structure of WoS and its SSCI is characterized by continuity and change. Although some changes took place at the level of the subject categories, their number remained relatively stable (56 in 1997 vs. 58 in 2019, some 50 of them kept the same name). At the same time, the number of journals covered by the SSCI and assigned to these categories more or less doubled: from 1672 in 1997 to 3485 in 2019. Table 1 provides an overview of the WoS categories and the changes in the number of journals covered. The categories are ordered on the basis of their size, measured in terms of included journals, in 2019.

Insert Table 1 about here

As Table 1 shows, the expansion of the SSCI is visible in nearly all SSCI categories. The differences are considerable, however. In absolute terms, 'Economics' was the largest SSCI category in 1997 with a

total of 161 journals and it still occupied this place in 2019, but now contains 371 journals (+130%). 'Psychology, Psychoanalysis,' at the bottom of the table, included the same, relatively small number of journals (13) in 1997 and 2019. In relative terms, the massive growth of 'History' (+488%) stands out, but this growth is first of all the result of the decision to incorporate this category in the SSCI (and not only in the AHCI). 'Psychology, Biological' is the only category that shrunk in size (from 16 journals in 1997 to 13 in 2019). As Table 1 shows, some categories have benefited more than others from the expansion of WoS. There are several big and many small winners. In terms of their relative weight in the SSCI, however, the small winners are losers. Their visibility in the SSCI has diminished. Because, for example, 'Management' could expand by nearly 300%, it upgraded from rank 10 in 1997 to rank 3 in 2019, thereby overtaking categories such as Psychiatry, Law and Sociology.

Of course, it can be questioned whether such different growth rates are problematic.⁴ There are *no* good reasons to assume that the subject categories ideally have to have about the same size, even if some threshold values seem to determine the viability of disciplines. Disciplinary networks might be both too small or too big to survive. They might fall apart without sufficient input, but also become too big to handle. Scholars need to be able to command substantial parts of the ongoing research in their field in order to be able to make meaningful contributions to it. Despite the existence of such limits, however, some variation in the size of disciplines seems almost 'natural' (Abbott, 2011).

Different dynamics of change have also been described in the literature (e.g., Adams, 2012). For a variety of reasons, disciplines may be more or less successful at any given time (if size is considered to be an indicator of success). Particular discoveries, for example, may lead to the rapid expansion of particular lines of research; an awareness of new social problems may similarly trigger new lines of research. The question is, however, whether the changes in the SSCI are the result of a regular or natural dynamic – or of specific choices and decisions made by the editors of WoS. Does it make sense to argue that the fluctuations in the coverage of the SSCI reflect the natural dynamics of science, or constitute a necessary correction of existing biases within this database? Or should we look in more detail at the ways in which editorial interventions in the WoS Master Journal List are affecting the visibility of different categories or disciplines in the field of science?

3. Results

3.1. Journals

In order to approach these questions in more detail, the following figures display how a selection of subject categories were represented in the SSCI between 1997 and 2019. Figure 1 shows how the number of journals in each of these subject categories has changed over the past quarter of a century, while Figure 2 presents the same journal counts as a proportion of the total number of journals included in the SSCI. To cover some of the diversity in the area of the Social Sciences and to avoid data overload in both figures, the following categories were here selected: Anthropology, Economics, Education & Educational Research, Management, Social Work, and Sociology. Although these categories diverge in size, they all stand for relatively well-established fields of research. Of

⁴ To look at annual changes in the distribution of journals across SSCI categories, we also calculated Gini coefficients. This coefficient is often used to measure income inequality (e.g., Milanovic, 2016). It examines how (un)equal the cumulative proportion of incomes is distributed over the cumulative proportion of households. Its value may range from 0 (total equality) to 1 (total inequality). For the purpose of this study, we equated journals with incomes and subject categories with households. Our results show that, despite WoS's ambition to correct historical biases and imbalances, the inequality between disciplines or categories has not been reduced. The Gini coefficients range from 0.34 to 0.39 between 1997 and 2019.

course, almost all categories have their own trajectory. On the whole, however, analyses of this selection are in our view able to shed light on the effects of WoS's new editorial policy on different fields of research, as well as on its underlying and unarticulated premises. The selection we present here is based on detailed analyses of all the subject categories distinguished by WoS.

All in all, quite some divergences become visible in both figures.⁵ Compared with the situation in the late 1990s, as Figure 1 shows, all selected SSCI categories have expanded, especially between 2006 and 2010. As Figure 2 shows, however, there are nevertheless clear winners and clear losers. 'Social Work,' for example, was a relatively small category in 1997. Its growth rate has been rather low, too. It contained 32 journals in 1997, 29 in 2008, 39 in 2010, and 44 in 2019, while its share in the Master Journal List shrank from 1,9% to 1,3%. 'Sociology' was a relatively large subject category in 1997, but did not maintain this position. It grew less than many other SSCI categories. It contained 95 journals in 1997, 100 in 2008, 132 in 2010, and 150 in 2019. Its rank order in the SSCI fell from 5 to 9, and its share in the Master Journal List shrank from 5,7% in 1997 to 4,3% in 2019.

Other subject categories benefited more from the decisions made by WoS's editors. The three largest SSCI categories in 2019 (Economics, Education & Educational Research, and Management) have been beneficiaries of WoS's expansion, although their trajectories also diverge. 'Education & Educational Research' first lost territory, but expanded rapidly after 2008. Both 'Economics' and 'Management' have grown considerably, but while the share of 'Economics' increased from 9,6% to 10,7%, 'Management' almost doubled its presence in the SSCI (from 3,5% to 6,5%). The number of journals included in 'Management' increased from 59 in 1997 to 226 in 2019.

Insert Figures 1 and 2 about here

As Figure 2 displays, 'Sociology' and 'Education & Educational Research' were about the same size in the period between 1997 and 2004 or 2005, but divergent evolutions took place afterwards. In relative terms, the proportion of Sociology journals in the SSCI has almost continuously decreased since 1998. By contrast, the share of journals in 'Education & Educational Research' decreased until 2004, after which it started to increase: 6,10% in 1997, 5,32% in 2004, and 7,55% in 2019.

Anthropology is a discipline one would assume to benefit from the regional expansion of WoS. A local or regional focus indeed seems typical of much anthropological research. The evolution shown in Figures 1 and 2 does not support this assumption, however. The number of Anthropology journals in the SSCI almost doubled between 1997 and 2019 (from 48 to 92), but, with some fluctuations, the share of this SSCI category decreased from 3,1% in the early 2000s to 2,6% in 2019.

Altogether, it is hard to imagine that the substantial changes in the visibility of particular subject categories in the Master Journal List match changes in the departmental structure of universities and other research institutions. As standard careers in scientific research typically last 30 to 40 years, and as established academic institutions are notoriously slow to change, one would rather expect little variation in the growth patterns of different disciplines or subject categories. The question then is

⁵ The numbers provided by Testa (2011) slightly differ from the ones WoS nowadays provides. WoS adapts its databases all the time, and also makes changes to historical records, even of its Master Journal List (Birkle et al., 2020). Despite such adaptations, however, the dominant historical trends remain the same.

why the Master Journal List of WoS expanded in the way that it did. Before answering this question, it is important to have a second look at the expansion of the SSCI.

3.2. Citable Items

We might indeed ask whether we not need to look beyond the number of journals as such. To obtain a full view of relevant changes at the level of the SSCI and its subject categories, it seems important to also look at decisions made by publishers and take into consideration that journals can expand. Because journals may publish more issues per year and/or more items per issue, it seems useful to complement analyses of the patterns of inclusion of new titles in the WoS Master Journal List with analyses of the numbers of items published in indexed journals. There might be more than one way to react to the expansion of the academic system, the rise of the number of potential authors, and the institutionalization of the (in-)famous publication imperative ‘publish or perish’ (Moosa, 2018), and these ways might have a different impact on the position and the prospects of specific subject categories or disciplines within WoS and the SSCI.

WoS distinguishes between a range of document types published in journals. Of special importance for its providers are the articles or reviews, or what are considered to be the “citable items.” Among the *other* document types, distinguished within WoS, are editorial materials, book reviews, meeting abstracts, letters, and so on. We will discuss some of the complexities, which ensue from the way in which “citable items” are used in WoS in the following subsection, but first present a brief overview of changes in the average number of citable items per journal between 1997 and 2019.

In line with the preceding discussion, Figure 3 presents an historical overview of the average number of citable items per journal for a selection of SSCI categories. Although some broad trends can be identified, no clear picture emerges. The average numbers of citable items increase for most subject categories until 2008, fall down afterwards and then increase again. The decrease after 2008 probably is in part the result of the fast growth of the Master Journal List and the inclusion of new ‘thin’ journals in this period of time.⁶ At the moment that more journals are added to the WoS Master Journal List, pressures to expand the volume of the indexed journals may have been reduced, too. Some of the categories, which expanded most in terms of journals, did also fall back considerably in terms of average numbers of citable items.⁷ These trends do not persist, however. For their part, recent increases in the average number of citable items per journal may be a consequence of the rise of online journals, for which the space limitations of traditional, printed copies have lost much of their relevance. They may, moreover, be a consequence of the recent rise of open access journals, which are free to readers, but which charge publication fees to authors. In this business model, publishers directly benefit from each extra article that is being published.⁸

⁶ Changes in the delineation of “citable items” (articles and reviews) might perhaps also account for the spike in the years 2007-2009, but we were unable to find evidence for such (temporary) changes in WoS’s policy in the documentation provided by Clarivate Analytics.

⁷ For journals in Management, for example, the average number of citable items reached a peak of 71 in 2008, but fell back by one third to 47 in 2012. For journals in Economics, this average fell back by one quarter, from 73 in 2008 to 55 in 2010 and 2011. Journals in Sociology and Anthropology have changed less throughout this period, while those in Social Work gradually expanded their average number of articles and reviews.

⁸ The journal *Sustainability*, which is an online, open-access journal, whose publisher (MDPI) requires that authors pay so-called article processing charges, holds the record: 7184 of its articles and reviews are included

Insert Figure 3 about here

All the categories depicted here include in 2019 on average more citable items per journal than in the ten-year period between 1997 and 2006. The expansion of WoS thus takes place at (at least) two levels: that of journals and of number of citable items per journal. As a result, the total number of articles and reviews has multiplied by a factor of 4 between 1997 and 2019 (from 77.222 in 1997 to 323.537 in 2019).⁹ Although patterns of change may diverge at both levels, and although a few mega journals, which are online and open access, are nowadays changing the broader picture, Spearman's correlation between the rank orders of the categories for journals and those for citable items is still relatively high ($\rho=0.8$). In 2019, the biggest SSCI category in terms of citable items has become 'Public, Environmental and Occupational Health,' followed by 'Economics' (in terms of number of indexed journals, 'Public, Environmental and Occupational Health' is ranked 6th, while 'Economics' is ranked 1st). At the other side of the spectrum is 'Psychology, Psychoanalysis,' which includes only a small number of indexed journals (13) and whose publication output in terms of citable items has even decreased by some 10% in the time period covered here (1997 to 2019).

3.3. Impact Factors

Against this background, we need to ask again how the changes in the coverage of WoS and its SSCI can be accounted for. Arguably, changes in the number of citable items per journal per publication year primarily depend on editorial decisions made at the journal level – and not on editorial policies of WoS. Confronted with fluctuations in the number and the quality of submitted manuscripts (and related pressures, such as those to ensure timely publication and to manage publication queues), editors may be more or less prone to increase the number of items included in their journals. Income generated by article processing charges may also tempt editors and publishers to expand the volume or the number of pages of their journals (Koch et al., 2020). At the same time, however, it should be taken into account that journals may have an interest in controlling the number of citable times, because this number is used for the calculation of their impact factor (JIF).

The journal impact factor has become a highly visible indicator, although it can be manipulated.¹⁰ As is now well known, various forms of 'impact factor engineering' have seen the light of day in the recent past (see Larivière & Sugimoto, 2019). This indicator has nevertheless remained one of the key

in the SSCI for 2019. To put this into perspective: this journal now publishes on its own almost as many articles and reviews as, for example, all the 150 journals included in 'Sociology' together.

⁹ The total number of all items indexed in the SSCI ('citable' and 'non-citable') has multiplied by a factor of 3 in this period of time (from 144.937 in 1997 to 411.843 in 2019).

¹⁰ In WoS the impact factor of a given journal for the year 2020, for example, is obtained by the following calculation: the number of citations received in 2020 by items published in this journal in 2018-2019 divided by the number of citable items published in the journal in 2018-2019. The asymmetry in this calculation has been noted by a number of scholars, including Hubbard & McVeigh (2011) and Kiesslich, Weineck & Koelblinger (2016). Citations received by all document types – whether considered citable or not – are counted in the numerator, but only the citable items appear in the denominator. WoS thus counts citations for documents which are not taken into account in the denominator. For some editors, including a high number of 'non-citable items' might be an easy way to raise the impact factor of their journals. Prompting authors to include citations to recent articles in the same journal is another, well-known strategy (Larivière & Sugimoto, 2019).

assets of WoS and Clarivate. To protect their instruments against the ensuing distortions, the providers of WoS have developed a number of strategies. “Inappropriate citation activity,” as it is called, is actively searched for. Journals, for which “anomalous citation patterns” are found, know that they face the risk of suppression.¹¹ In this regard, the providers of WoS are still driven by a belief in the objectivity and universal applicability of their measures. As they emphasize, the Master Journal List and the “impact criteria” remain of central importance in all their attempts to provide “accurate” and “objective” coverage of all the scientific work conducted throughout the world.

Variations in impact factors for different subject categories provide a key towards understanding variations in the expansion of the Master Journal List. Although not much details about the selection policies are made explicit, the WoS editors state on their website that “the four impact criteria [which are used next to the “quality criteria”] are designed to select for the most impactful journals in a given field of research, using citation activity as a primary indicator.” Citation analyses and impact factors also allow us to understand the editorial policy that is driving the expansion of WoS. To obtain an impression of this relationship, Figure 4 presents an overview of the evolution of the aggregate impact factor for our selection of categories for the entire period for which such data are available (2003-2019). The aggregate impact factor for a subject category in WoS is calculated the same way as the impact factor for a journal.

On the one hand, Figure 4 shows that the values for these impact factors have increased over time. Between 2008 and 2014 (or 2015), i.e. the period of rapid expansion of the Master Journal List, the curve flattened somewhat, but in recent years the rise is substantial. A variety of factors may account for this general trend, including the increasing length of reference lists in journal items and the rise of citations to other recent WoS-indexed items. On the other hand, differences between the citation practices in our selection of categories deserve closer attention. Management and Economics now have the highest aggregate impact factor. The differences between Sociology, Social Work and Education & Educational Research are relatively small; Anthropology currently also has a relatively low aggregate impact factor (compared with Management and Economics).

Insert Figure 4 about here

We have asked which categories have in the past been better off than others and why. Our analyses show that disciplinary traditions, which have relatively high impact factors and thus provide evidence of embodying the criteria applied by WoS, are rewarded when decisions about the incorporation of new titles in the Master Journal List have to be made. Disciplinary fields, which do not (yet) yield high impact factors, do not in the same way contribute to and benefit from the expansion of the Master Journal List. Although the providers of WoS intend to evaluate all journals objectively, regardless of disciplinary background, their impact criteria reward certain categories more than others. The WoS databases are thus not only characterized by expansion; the selection and evaluation criteria, which the WoS providers apply to journals in all areas of research, are also biased towards particular areas of research and their journals. In other words, the so-called universalistic criteria of WoS have

¹¹ The resulting ‘black lists’ are published on Clarivate’s website, see <https://help.incites.clarivate.com/incitesLiveJCR/JCRGroup/titleSuppressions.html>. The providers of WoS hitherto seem to have directed most of their attention to ‘unexplainable’ increases of self-citations at the journal level (see also Chorus & Waltman, 2016; Szomszor, Pendlebury, & Adams, 2020).

particularistic effects at the level of the subject categories or disciplines; these criteria incentivize particular traditions of research and of publishing more than others.

The flagship indexes of WoS are adapted to certain “epistemic cultures,” to use the terminology of Knorr Cetina (1999). In comparison with other social sciences, Management and Economics are not only strongly hierarchized but also strongly globalized fields of research. “Scholars of science have repeatedly found modern economics to be the most coherent and well-bounded scholarly enterprise in the social scientific field” (Fourcade, 2009, p. 3). The existence of a ‘Nobel’ Prize in Economics, and of distinguished international awards, such as a fellowship of the Econometric Society, for example, suggests that international consensus on excellence is routinely and easily achieved within this large field. High impact factors equally indicate that researchers tend to orient themselves to the authority of specific authors and publication venues. As the steady increase of these impact factors show, such tendencies have moreover been strengthened in recent decades. To achieve success (in terms of publication output), researchers increasingly have to orient themselves towards lines of research, as they are covered by WoS. Success thus depends on adherence to the rationales upon which the WoS indexes are based. Although the range of differences within these “epistemic cultures” should not be underestimated, the criteria for success seem clear (Fourcade, Ollion, & Algan, 2015).¹²

A final comment, which concerns the short time frame of the two-year JIF, needs to be added. Unlike modern economists, philosophers and sociologists, for example, tend to regard the ‘great books’ and ‘classic papers’ of their field as living documents, to be read and used as if they were written by our own contemporaries. They still build on the work of scholars, such as Aristotle, Kant, or Durkheim. Characteristics of such epistemic cultures are not measured by the WoS indexes. The flagship indexes of WoS incorporate specific epistemic assumptions about what knowledge is valid – and what kind of impact deserves to be calculated. As the preceding analyses show, the expansion of WoS’s Master Journal List is heavily affected by these epistemic assumptions. The expansion of WoS particularly benefits categories, which strongly incorporate the epistemic assumptions of WoS.

4. Conclusion

Despite the fact that it presents itself as a highly selective set of databases, WoS has grown rapidly in the past decades. This growth has many dimensions: the number of journal included in the Master Journal List, the number of (citable) items included in the databases, the aggregate impact factor of individual subject categories, and so on. The growth of their databases allowed the providers of WoS to address and correct existing and much criticized coverage biases. But the patterns of growth have blinded us for inequalities and divergent evolutions in WoS. In the broad area of the social sciences, the growth of WoS and the SSCI has benefited hierarchically-structured categories or disciplines. In the recent past, these epistemic cultures have benefited most from the growth of WoS.

The providers of WoS may have good reasons to pursue particular expansion strategies. They may also have good reasons to give more attention and resources to the coverage of disciplines where citation impact (as measured by the JIF) is taken seriously by researchers, promotion committees, funding agencies, etc. But it should be seen that the growth of WoS benefits first of all disciplines

¹² As an anonymous reviewer of this paper added, researchers in some disciplines or subdisciplines may be inclined to reject the assumptions underlying indicators, such as the JIF. They may not only be opposed to any hierarchy of journals, for example, but they may also feel that other types of impact (on teaching or practice, for instance) are more important than research impact. It may hence perhaps not come as a surprise that the providers of WoS have difficulty adequately covering such epistemic cultures.

where peers generally 'care about' the principles upon which the WoS databases are built. It might look as if WoS is giving more attention and credit to a wide variety (and in principle to all) of the SSCI subject categories, but the growth of WoS benefits especially those disciplines or subject categories, which are predominantly structured in terms of the specific criteria WoS uses and applies. Recent changes in the coverage of WoS are particularly favoring those areas of research, which grant much value to WoS coverage and to bibliometric indicators and rankings.¹³

These inequalities in the growth of WoS not only affect the potential usefulness of its bibliographic databases. The way in which research output is being monitored also has consequences for how research is carried out. Because of its use and authority in a wide range of contexts, and especially research evaluation contexts, WoS has been able to export its rationales and measures (see also Larivière & Sugimoto, 2019). As a consequence, biases and imbalances in the coverage of WoS may have far-reaching consequences within the world of science itself. They are not just an indication of an inaccurate coverage of the world of science, but also have performative effects. They change the opportunities available to researchers and research traditions. The way in which the providers of WoS have adapted their representation of the world of science has real consequences. Within the existing evaluation contexts, the inequalities in the growth of WoS have considerable effect on the kind of research that is (or is not) carried out. The big and small winners of the editorial expansion strategy of WoS are the winners and losers in the real academic world.

In an article dedicated to the memory of E. Garfield, Harriet Zuckerman wrote: "Some might think that his main contributions were the creation of citation indexes along with the analytic techniques he and his colleagues devised for their use. But this is not the case. Such achievements are significant but Gene had far larger ideas – about the nature of science, about the significance of the scientific record and about the transmission of ideas ... Gene was a student of intellectual influence in science who exercised intellectual influence on science" (2018, p. 17). The findings and analyses presented above, however, allow us to conclude that WoS (and the way in which it is often used) incentivizes particular types of scientific research, based on particular ideas about the nature of science. For the current providers of WoS, it might thus be useful to pay attention to the epistemic biases at work in their indexes and to reconsider the coverage of their Master Journal List. And it might be advisable to reconsider the ways in which their products are positioned in the world of science.

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¹³ It might be added that we are here *not* speaking of a zero-sum situation. There might be limits to the growth of WoS, but the patterns of growth indicate that the expanded coverage of particular subject categories does not (have to) go at the cost of the coverage of other disciplines. The providers of WoS make choices that have consequences. But these consequences deserve more attention than they hitherto receive.

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Table 1: SSCI subject categories ordered on the basis of their size (number of journals) in 2019

SSCI subject categories	1997	2019	Percent growth
ECONOMICS	161	371	130
EDUCATION & EDUCATIONAL RESEARCH	102	263	158
MANAGEMENT	59	226	283
LINGUISTICS		187	
POLITICAL SCIENCE	73	180	147
PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	52	170	227
LAW	106	154	45
BUSINESS	51	152	198
SOCIOLOGY	95	150	58
PSYCHIATRY	80	141	76
PSYCHOLOGY, MULTIDISCIPLINARY	108	138	28
PSYCHOLOGY, CLINICAL	85	131	54
ENVIRONMENTAL STUDIES	42	123	193
NURSING	41	121	195
BUSINESS, FINANCE	33	108	227
SOCIAL SCIENCES, INTERDISCIPLINARY	56	108	93
HISTORY	17	100	488
INTERNATIONAL RELATIONS	50	95	90
COMMUNICATION	36	92	156
ANTHROPOLOGY	48	90	88
HEALTH POLICY & SERVICES	39	87	123
INFORMATION SCIENCE & LIBRARY SCIENCE	56	87	55
PSYCHOLOGY, EXPERIMENTAL	64	87	36
GEOGRAPHY	31	84	171
PSYCHOLOGY, APPLIED	50	84	68
AREA STUDIES	35	77	120
PSYCHOLOGY, DEVELOPMENTAL	49	77	57
REHABILITATION	47	71	51
CRIMINOLOGY & PENOLOGY	19	69	263
PSYCHOLOGY, SOCIAL	40	64	60
PSYCHOLOGY, EDUCATIONAL	39	60	54
HOSPITALITY, LEISURE, SPORT & TOURISM		56	
ETHICS	21	55	162
SOCIAL SCIENCES, MATHEMATICAL METHODS	25	51	104
HISTORY & PHILOSOPHY OF SCIENCE	26	48	85
PUBLIC ADMINISTRATION	24	48	100
FAMILY STUDIES	33	47	42
CULTURAL STUDIES		45	
SOCIAL SCIENCES, BIOMEDICAL		45	
WOMENS STUDIES	20	45	125
SOCIAL ISSUES	33	44	33
SOCIAL WORK	32	44	38
EDUCATION, SPECIAL	21	42	100
URBAN STUDIES	26	42	62
DEVELOPMENT STUDIES	37	41	11

REGIONAL & URBAN PLANNING		39	
TRANSPORTATION	11	37	236
GERONTOLOGY	26	36	38
SUBSTANCE ABUSE	19	36	89
HISTORY OF SOCIAL SCIENCES	19	34	79
INDUSTRIAL RELATIONS & LABOR	17	30	76
DEMOGRAPHY	18	29	61
ETHNIC STUDIES	6	20	233
ERGONOMICS	14	16	14
PSYCHOLOGY, BIOLOGICAL	16	13	-19
PSYCHOLOGY, MATHEMATICAL	11	13	18
PSYCHOLOGY, PSYCHOANALYSIS	13	13	0
GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY		8	

Note: We could not calculate the growth rate for a few categories, which did not yet exist in 1997, but were created afterwards (such as 'Green & Sustainable Science & Technology'). WoS changed the name of a few categories, but, as far as we were able to evaluate, did not substantially change their content and coverage ('Development Studies,' for example, was 'Planning & Development' in 1997).

Figure 1: Number of journals included in selected SSCI subject categories, as a percentage of the number included in 1997

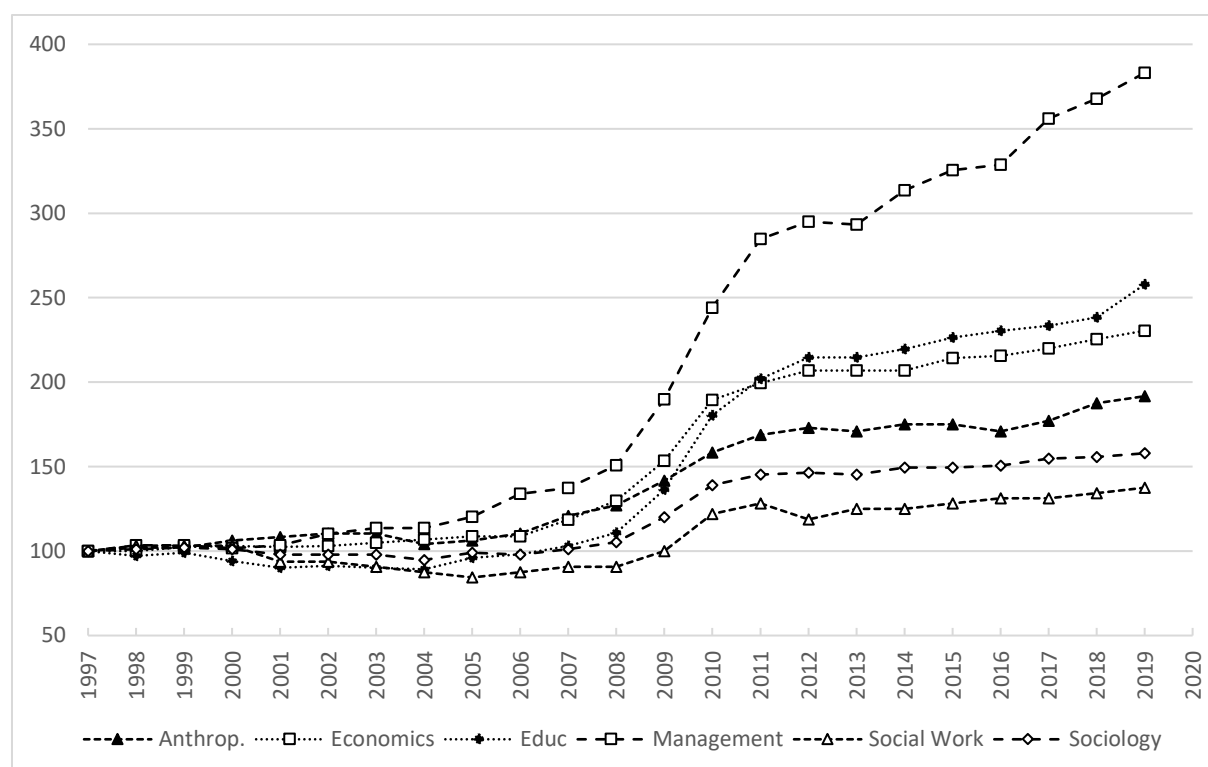


Figure 2: Number of journals included in selected SSCI subject categories, as a percentage of the SSCI total journal count

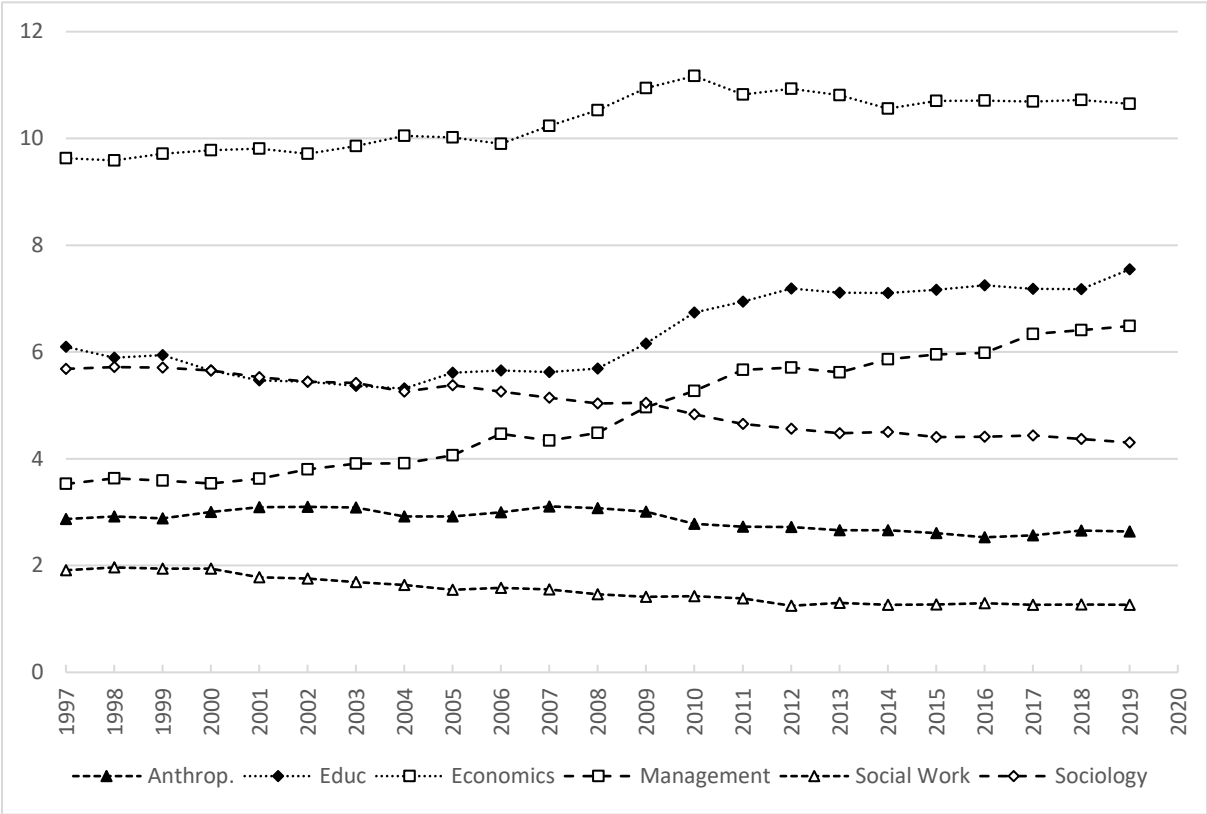


Figure 3: Average number of citable items per journal for selected SSCI subject categories

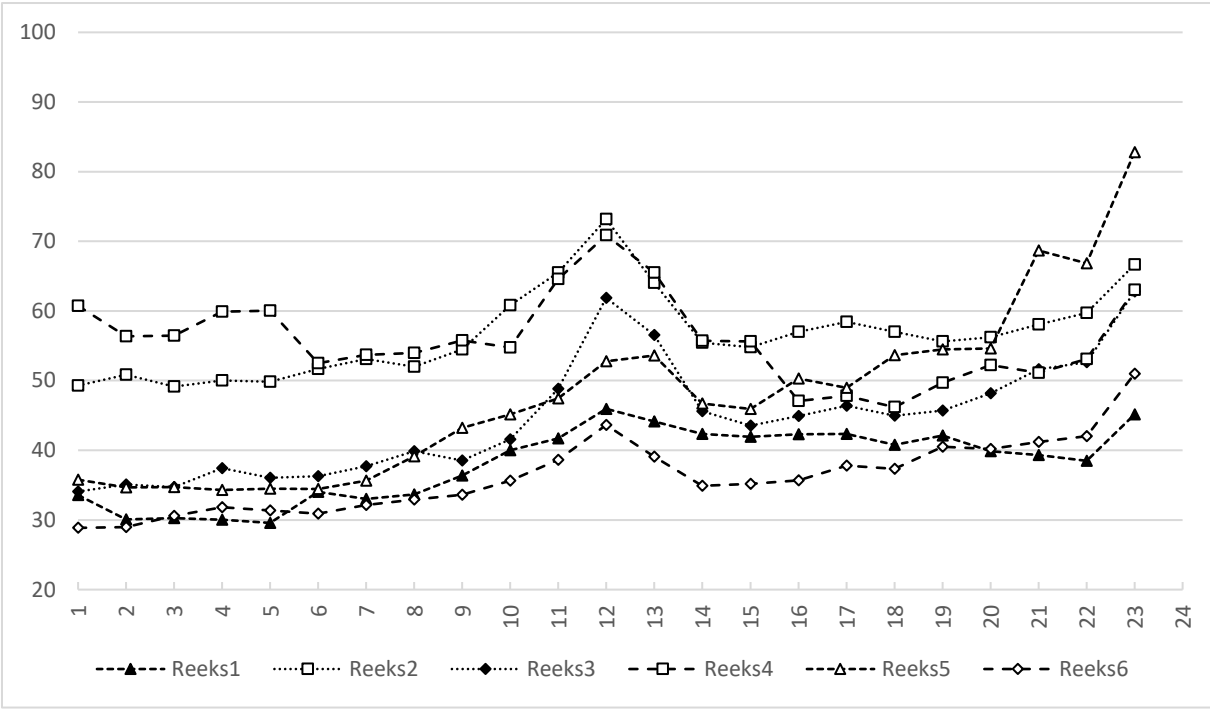


Figure 4: Aggregate impact factor for selected SSCI subject categories

