

How the Existence of a Regional Bibliographic Information System can Help Evaluators to Conform to the Principles of the Leiden Manifesto

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Abstract

It is shown that the use of Flanders' regional bibliographic information system in a performance-based research funding system corresponds to a large extent with the principles of the Leiden Manifesto. Yet, it is argued that there is still room for improvement. We offer this Flemish perspective on the Leiden Manifesto as a suggestion to colleagues worldwide to compare their local bibliographic information systems with the principles set forth in the Leiden Manifesto.

Keywords: *Leiden manifesto, Regional bibliographic information system, Flanders, Research evaluation, Performance-based research funding*

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Introduction

In April 2015 *Nature* published a comment by Diana Hicks, Paul Wouters, Ludo Waltman, Sarah de Rijcke and Ismael Rafols entitled: *The Leiden Manifesto for research metrics*. The authors express their concern about current research evaluations in academia “led by the data rather than by judgement” and a proliferation of metrics in evaluation contexts that are “usually well intentioned, not always well informed, often ill applied” (Hicks, Wouters, Waltman, de Rijcke, & Rafols, 2015). They then present a guideline consisting of ten principles on the proper use of research metrics for evaluation.

The contents of the Leiden Manifesto (LM) are not entirely new. Some of the principles have been proposed before, by bibliometricians (Glänzel & Wouters, 2013) or by academic research communities themselves, e.g., in the San Francisco Declaration On Research Assessment (DORA, 2012; <http://www.ascb.org/dora/>). First and foremost, according to the LM, evaluations in academia should take into account the many idiosyncrasies of academic research. This means that metrics should only be used if they can accurately measure fulfillment of the specific research goals of institutions, groups or individuals. From this it follows that indicators should be scrutinized and improved on a regular basis, and that their use by evaluators should steer clear of false precision. Qualitative peer assessment should take up a central position in research evaluation, with research metrics only used in a supportive role. Finally, policy makers and evaluators should explicitly acknowledge the systemic, possibly behavior-altering effect of assessments and indicators (Hicks et al., 2015).

Though the Leiden Manifesto has been extensively discussed in the bibliometric research community, see e.g., (Bornmann & Haunschild, 2016; David & Frangopol, 2015), it remains unclear how extensive its impact has been on evaluators and evaluation practices worldwide. In the present paper we aim to contribute to the discussion by reflecting on current research evaluation practices and main research funding mechanism in Flanders, the Northern Dutch-language part of Belgium. For this we use as a guideline the ten principles outlined in the LM (in a rearranged order). We hope that a discussion of the Flemish case can further encourage researchers and evaluators in other countries to reflect on their own situation and systems.

In our discussion, we do not limit ourselves to ex-post research evaluations (Section 2) as explicitly mentioned in the LM, but will also focus on the performance-based research funding system (PRFS) for the five universities in Flanders. The motivation for doing this is inspired by the Leiden Manifesto itself, when it states:

Principle 9: Recognize the systemic effects of assessment and indicators

The systemic effect of assessments and indicators goes beyond explicit evaluations of researchers' performance in formal evaluation exercises. "Implicit evaluations" can also be present in the trickle-down incentives created by indicator-reliant PRFS's at the national or regional level (Hicks, 2012). For this reason, we believe that the Flemish funding system for universities, which makes use of publication metrics in its calculations, merits the same critical discussion from the perspective of the Leiden Manifesto. We discuss the Flemish funding system for universities and its use of research metrics mainly in Section 3.

Research evaluation in Flanders

In Flanders, the ex-post type of research evaluation is not conducted region-wide in the form of an evaluative research assessment exercise coupled to research funding, along the lines of the well-known model of the United Kingdom's Research Excellence Framework (REF) and its precursor the Research Assessment Exercise (RAE; Broadbent, 2010; Martin, 2011). Instead, calculation of research funding for the five Flemish universities is achieved without formal evaluation, but by the yearly application of an indicator combining input and output factors, the latter containing a bibliometric component. Section 3 below discusses the Flemish funding model more in detail.

Explicit ex-post evaluation of Flemish university departments closely follows the Dutch model of the Standard Evaluation Protocol (SEP) focusing on formative goals, such as encouraging organizational learning and identifying research potential (Hansson, 2010; Rons, De Bruyn, & Cornelis, 2008; Westerheijden, 1997). The benefits of such a system over one focusing on evaluative goals have been described as leaving more room for remediation and improvement because the implications of assessments are not prefixed in monetary terms and because the actual units of assessment are small, namely research groups or centers rather than departments; (Engels, Goos, Dexters, & Spruyt, 2013; Westerheijden, 1997). In practice, all research at Flemish universities (groups or centers constituting departments) is assessed in a cycle of eight years. The evaluation is conducted by panels composed of experts mainly affiliated to foreign universities. Typically, the expert panel is provided with all relevant documentation regarding the research groups by the university administration in close collaboration with the research groups themselves. This includes a description of the research agenda, the composition of the group, a profile of the tenured academic staff in the group, an overview of the funding acquired, publications and bibliometric indicators, supervised PhDs, invited lectures, and other scientific activities illustrating the performance of each of the groups (Engels et al., 2013). Clearly, quantitative information including bibliometrics serves to inform expert panel opinion, as prescribed by the Leiden Manifesto:

Principle 1: Quantitative evaluation should support qualitative, expert assessment

In short, in research evaluations of Flemish university departments the use of metrics does not stand alone, and certainly does not take the place of qualitative expert assessment. Furthermore, to the best of our knowledge, there exist no plans at Flemish universities to

replace qualitative assessment by a sole reliance on research metrics. At the international level as well, the debate about bibliometric indicators being able to replace expert opinion is focused on the other type of evaluation, that of the nation-wide evaluative assessment exercise (Abramo & D'Angelo, 2011; Butler & McAllister, 2011). By contrast, there exists little appetite for questioning the added value of expert peer opinion used by the summative evaluation type.

Finally, as far as evaluating the individuals composing research groups or centers goes, peer evaluations in Flanders (and the Netherlands) also seem largely congruent with another, closely related principle of the Leiden Manifesto:

Principle 7: Base assessment of individual researchers on a qualitative judgement of their portfolios.

To summarize Section 2, the explicit evaluation of academic research performance in Flanders seems well in line with the principles of the Leiden Manifesto on the proper use of research metrics. Qualitative expert opinion takes center stage; metrics are used only in a supportive role.

Performance-based research funding in Flanders

The situation regarding performance-based research funding (PRFS) in Flanders and its congruence with the Leiden Manifesto is more complex. Already in the introduction we have argued that PRFS's and the incentive structures they create can be seen as an implicit form of research evaluation: if translated to institutional policies regarding for instance promotions, PRFS's seem likely to have systemic effects on research and publication preferences. Several recent papers have analyzed and discussed the possible impacts of PRFS on researchers' behavior in various countries (Aagaard, Bloch, & Schneider, 2015; Bloch & Schneider, 2016; Butler, 2003a, 2003b; Hammarfelt & de Rijcke, 2015; Guns & Engels, 2016; Ossenblok, Engels, & Sivertsen, 2012).

In this section, we summarize the main traits of the Flemish funding model for the universities and its use of research output metrics, and discuss them in the light of the caveats formulated by the Leiden Manifesto.

1. Congruence with the Leiden Manifesto

The current Flemish funding model for academic research originated in the near complete devolution of science and educational policy by the federal government in Belgium to the Flemish and Walloon regions, starting in 1988. During this process, which continues to this day, Flanders has opted to largely redesign the previous federal funding model for universities, which was traditionally mainly built on input variables. Instead, Flanders has shifted its own competitive funding model more and more towards the inclusion of research output metrics (Debackere & Glänzel, 2004; Spruyt & Engels, 2013; Verleysen, Ghesquière, & Engels, 2014).

Funding for the universities currently consist of four components: (1) a block grant for academic education, research, and the provision of services to society, (2) parallel government financing for basic research (amongst which is included the University Research Fund (*Bijzonder Onderzoeksfonds* or *BOF*), (3) other financing sources for research (e.g., the European Union), and (4) third party financing of university contract research. For the development of the five universities' respective research policies for basic research, the BOF in particular has been an important asset. In 2016 the BOF accounted for some 150 million euro, distributed over the five universities (Antwerp, Brussels, Ghent, Hasselt and Leuven). Over the years, the BOF key has also become the standard distribution key for additional funding mechanisms for university research, making its overall leverage significantly larger (Verleysen et al., 2014).

Especially from 2003 onwards, the Flemish government has opted to give the allocation of research funding by means of the BOF a strongly competitive character. Consequently, the distribution of funding over universities has henceforth been increasingly determined by their respective share in the total of publications and citations (Debackere & Glänzel, 2004).

The growing orientation towards performance-based funding in Flanders intended to reward the quality of the research performed. In this early stage of the funding model (2003-2008) “quality” was conceptualized by the government as the publication of articles, letters, notes, or reviews in high-level outlets indexed in the Science Citation Index Expanded (SCIE) of the Web of Science (WoS). This specific output per university was used as a proxy for their total share in “quality publishing.”

In evaluating the adequateness of this first crude indicator in Flanders, the Leiden Manifesto provides guidance:

Principle 2: Measure performance against the research mission of the institution, group or researcher.

An obvious problem with the earliest incarnation of the BOF-key was its neglect of the specificity of the research and publication traditions of a large range of fields, especially in the social sciences and humanities (SSH), which are poorly represented in the SCIE database. Unsurprisingly, this way of counting for the BOF without taking SSH publications into account was met with strong criticism by various communities of SSH scholars in Flanders. As a consequence, in 2008, the Flemish government amended the BOF-regulation, and decided to henceforth also include in the funding model all publications by Flemish affiliated researchers indexed in the Social Science Citation Index (SSCI), the Arts and Humanities Citation Index (AHCI) and the Conference Proceedings Citation Indexes (CPCI-S and CPCI-SSH). Mainly due to the still relatively poor coverage by these WoS-databases for the SSH in non-Anglophone countries or regions like Flanders, it was also decided to initiate the construction of a separate bibliographic database for the comprehensive registration and inclusion in the funding model of all other peer reviewed publications in the SSH authored by researchers affiliated with a Flemish university. This is the *Flemish Academic Bibliographic Database for the Social Sciences and Humanities* (or VABB-SHW), which became operational in 2010.

Seen from the perspective of the Leiden Manifesto, these changes to the funding model were definitely good practice. Apart from better satisfying the requirements of the abovementioned Principle 2 regarding the measurement of performance against the research missions of institutions, groups or individuals, the amendments to the BOF-regulation of 2008 also complied with

Principle 10: Scrutinize indicators regularly and update them.

Indeed, the primary goal of restructuring the BOF-key and building the VABB-SHW was to henceforth include in the funding model an SSH-specific publication parameter. By setting up a legal framework for the VABB-SHW, the Flemish government explicitly recognized that publication cultures in the SSH differ greatly from those in the natural, technical and biomedical sciences. In its latest revision of the parameters of the BOF-key (21/12/2012) the government decided to increase the weight of the VABB-SHW to 6.80% as of 2016 (Spruyt & Engels, 2013).

In practice, the VABB-SHW has retrospectively and comprehensively collected bibliographic references dating back to the year 2000 of peer reviewed publications by SSH scholars affiliated with one or more of the five Flemish universities. In accordance with the stipulations of the BOF-regulation, the following five publication types are eligible for inclusion in the VABB-SHW: (1) articles in journals, (2) monographs, (3) edited books, (4) chapters (articles) in books, and (5) proceedings papers not part of special issues of journals or of edited books. In Flanders, as elsewhere, in many SSH fields of research the publication of monographs, edited books or book chapters is ubiquitous (Giménez-Toledo et al., 2016; Verleysen, 2016). Their inclusion in the funding model through the VABB-SHW therefore was a seminal step towards compliance with another central Leiden principle:

Principle 6: Account for variations by field in publication and citation practices

Equally important from this perspective was the inclusion of publications in the VABB-SHW irrespective of their publication language. In Flemish SSH research as a whole, publications in other languages than English (mostly Dutch, the main language in Flanders) still account for about 25% of total output. Especially in disciplines belonging to the humanities, this share easily reaches 40% or more (Ossenblok, 2016). Language use in publications is evidently related to the targeting of specific, also non-academic readerships by SSH scholars, who frequently study topics with local societal or cultural relevance, and therefore publish a sizeable share of their output in the local language (Verleysen & Engels, 2014). By including publications of all standard types and in all languages, the VABB-SHW again rates well seen from the perspective of the LM.

Principle 3: Protect excellence in locally relevant research

The protection of locally meaningful research was further advanced by the creation of a quality label for individual peer-reviewed books in 2012, the GPRC-label (*Guaranteed Peer Reviewed Content*). During the first few years of the VABB-SHW's existence, book publications were only eligible for inclusion in the VABB-SHW and the funding model if their publishers were included in a selective list of academic publishers conducting credible peer review for their whole portfolio. With the creation of the GPRC-label, all locally published and peer reviewed books of a high academic standard are now eligible for inclusion in the database and funding model (Giménez-Toledo et al., 2016; Verleysen & Engels, 2013). Of course, SSH scholars in Flanders also continue to publish non-peer reviewed material not included in the VABB-SHW with a local societal and cultural relevance.

Principle 4: Keep data collection and analytical processes open, transparent and simple.

Another sound element of the Flemish system is its relative simplicity of data collection and the transparency of procedures involved in calculation of the BOF-key.

The publicly available BOF-regulation (<http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=14492>) lists a number of basic criteria which outputs eligible for inclusion in the VABB-SHW need to meet: (1) to be publicly accessible, (2) to be unambiguously identifiable by an ISBN or an ISSN number, (3) to make a contribution to the development of new insights or to applications resulting from these insights, (4) to have been subjected - prior to publication - to a demonstrable independent peer review process by scholars who are experts in the (sub)field of the publication. Peer review must be carried out by an editorial board, a permanent reading committee, external referees or by a combination of these (Verleysen et al., 2014).

Through the BOF-regulation, the Flemish government also decided to entrust the data collection, coordination and technical construction of the VABB-SHW to the Antwerp branch of the interuniversity Centre for Research and Development Monitoring (*Expertisecentrum Onderzoek en Ontwikkelingsmonitoring* or ECOOM). Yearly, the five Flemish universities provide ECOOM-Antwerp with bibliographic information of the SSH publications by their researchers that appeared in the previous two years. Simultaneously it was decided to establish an Authoritative Panel (*Gezaghebbend Panel* or GP), which is composed of 18 professors affiliated with Flemish universities, whose expertise covers the main SSH disciplines. It is the task of the GP, assisted by disciplinary panels, to evaluate which of the journals and book publishers, with whom researchers affiliated with a Flemish university have published at least once in the retrospective 10-year sliding time window used for the BOF-key, meet the four aforementioned criteria. The work of the GP results in a selection of approved and non-approved publication channels (journals and publishers), thereafter used by ECOOM-Antwerp to filter the complete publication lists submitted by the universities. As is the case for publications in scientific, technical and biomedical fields, and in accordance with the BOF-regulation all WoS-indexed articles, letters, proceedings papers and reviews as well as their citations automatically contribute to the calculation of the BOF-key. In a final stage of the yearly cycle, the update of the database as well as the calculation of the BOF-key for the new funding year is thoroughly checked and validated by each university (Verleysen et al., 2014).

Principle 8: Avoid misplaced concreteness and false precision

Making use of a bibliometric indicator, the Flemish funding model decides on (a share of) research funding at the level of the universities. This implies that only aggregated data are used; the government does not calculate the productivity or general performance of separate departments, let alone research groups or individual researchers. As such, the Flemish model largely avoids the false precision of some evaluation and funding systems directed at lower levels, rightly criticized both by the LM and other guidelines for the proper use of bibliometrics (Glänzel & Wouters, 2013).

Principle 5: Allow those evaluated to verify data and analysis

Urging for transparency is an important focus throughout the LM. This also relates to giving institutions and individuals the means to check the correctness of output metrics and their subsequent use in the calculation of funding. Here as well, the Flemish funding model and its implementation in the VABB-SHW score well. As mentioned, the VABB-SHW data is yearly checked by the research administrations of the five universities, which are free to request additions or corrections. A standardized and transparent appeal procedure is also in place, minimizing the chance of erroneous omissions of publications from the VABB-SHW (Technopolis, 2012). The database can also be searched online (<https://www.ecoom.be/en/services/vabb>).

2. Incongruence with the Leiden Manifesto

Although the current Flemish funding model for the universities and its use of the VABB-SHW database seems largely compliant with a number of principles outlined in the Leiden manifesto, there is still room for improvement.

Historically, as we have outlined in the preceding section, the early version of the Flemish PRFS was at least partially incongruent with *Principle 2 (Measure performance against the research mission of the institution, group or researcher)*, as no specific publication parameter for research in the SSH was included at the time. This points to the more general problem of the need for thorough consultation of the research communities to be evaluated or funded by such models. In contrast to for instance Norway, in the case of Flanders the implementation of the PRFS from 2003 onwards, as well as its changes thereafter, were not preceded by a broad consultation of the academic research communities. Undoubtedly, this contributed to a disputed legitimacy of the system in its early years. However, although no broad consultation

took place, the government has in fact left the discussion for managing and changing the funding model to the five universities, which are free to suggest changes to the system or to organize their own consultations of researchers.

In 2008 the problem of legitimacy was further addressed by the revision of the BOF-key (Verleysen et al., 2014). However, elements of the current system to this day reflect to some degree the historical top-down decision making in shaping the Flemish PRFS. One example is the weighting of publication types used in the VABB-SHW and the calculation of the BOF-key. The government, advised by an ad hoc working group installed by the universities' presidents conference, may have made an informed decision on these weights (1 for articles, edited books and book chapters; 4 for monographs; 0.5 for conference proceedings), but no prior broad consultation of researchers was held to corroborate their validity, e.g., across fields of research (*Principle 6: Account for variations by field in publication and citation practices*). The impact of using these weights is probably mitigated by the official sole use of the bibliometric indicator at the institutional level. However, the possible trickle-down effect such incentives could have at lower aggregation levels of Flemish university research should be, if acting upon the LM guidelines, more thoroughly studied, and taken into account for future policy making (see also below, Section 4).

A similar problem of the further weighting of journal articles exists in the use in the Flemish funding model of the Journal Impact Factor (JIF). Articles in journals with a high JIF account for more points (i.e., funding) than ones with a low or without JIF. The use of the JIF as a bibliometric indicator has been widely criticized by both research communities and bibliometricians, not in the least because of its underlying highly skewed article citation distributions (Seglen, 1992). An improvement to the Flemish model was implemented in 2013, when JIF's were henceforth binned per field of research into twentieths.

A more serious and still not remedied issue is the undifferentiated counting of citations (that is, citations of the WoS-indexed publications taken into account for the BOF-key by WoS-indexed publications (any of them)). At the moment no weighting of citations is used to account for variations in citation patterns across fields of research. Given that citations account for 16.6 % of the BOF-key, the impact of this way of counting on funding is probably considerable.

Notwithstanding the official sole use of the BOF-key at the institutional level, the use of the JIF in the bibliometric indicator, and even more so the undifferentiated counting of citations,

do not seem compliant with *Principle 8: Avoid misplaced concreteness and false precision*, as well as *Principle 2 (Measure performance against the research mission of the institution, group or researcher)* and *Principle 6 (Account for variations by field in publication and citation practices)*.

Both the relatively limited consultation of academic stakeholders in the creation of the Flemish funding model, as well as specific elements of its bibliometric indicator, point to what is probably one of the most fundamental principles of the Leiden Manifesto:

Principle 9: recognize the systemic effects of assessment and indicators

Although the debate on whether PRFS's actually have an impact on publication behavior continues to this day (see introduction to Section 3), and no concluding evidence has been presented yet, the mere fact that such systems could possibly have a deep impact on academic research and publication cultures, should, according to the LM guidelines, be sufficient reason for caution in policy making on academic assessments.

Conclusion

Using as a guideline the ten principles of the *Leiden Manifesto for research metrics* (bibliometrics) we have discussed both ex-post research evaluation practices as well as performance-based research funding for the universities in Flanders, Belgium.

Research evaluations of university departments in Flanders are based on the Dutch *Standard Evaluation Protocol* (SEP) and seem largely congruent with the ten principles of the Leiden Manifesto. Seen from the ten principles the use of bibliometrics in the Flemish funding model for the universities (BOF-key) and its regional bibliographic database for the social sciences and humanities (VABB-SHW) has clearly made progress during the past decade towards a greater compliance. Performance-based research funding in Flanders is organized at the aggregation level of universities, takes into account several of the variations in publication and citation practices between fields of research, and also seeks to protect excellence in local research. From an organizational point of view, the relative transparency of data collection and validation procedures are noteworthy as well.

Confronted with the *Leiden Manifesto* the use of bibliometrics in the current Flemish funding model for the universities still leaves room for improvement. We have pointed out how the Flemish funding model has evolved without much explicit or systematic consultation of the various academic research communities in Flanders. Some elements of the bibliometric

indicator can also be seen as arbitrary and/or problematic, e.g., the undifferentiated counting of citations.

For the future, a more thorough consultation of research communities and the continuing transparency of communication in the further development of the Flemish funding model and its use of bibliometrics would be in line with the Leiden Manifesto. As more evidence on the possible systemic effects of research evaluation practices and performance-based research funding systems will continue to accumulate in the coming years, the debate on the proper use of research metrics will also continue, both within academia and in society.

We offer this Flemish perspective on the Leiden Manifesto as a suggestion to colleagues worldwide to compare their local bibliographic information systems with the principles set forth in the Leiden Manifesto.

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References

- Aagaard, K., Bloch, C., & Schneider, J. W. (2015). Impacts of performance-based research funding systems: The case of the Norwegian publication indicator. *Research Evaluation*, 24(2), 106-117. doi:10.1093/reseval/rvv003
- Abramo, G., & D'Angelo, C. A. (2011). Evaluating research: From informed peer review to bibliometrics. *Scientometrics*, 87(3), 499-514. doi:10.1007/s11192-011-0352-7
- Bloch, C., & Schneider, J. W. (2016). Performance-based funding models and researcher behavior: An analysis of the influence of the Norwegian publication indicator at the individual level. *Research Evaluation*, 25(4), 371-382. doi:10.1093/reseval/rvv047
- Bornmann, L., & Haunschild, R. (2016). To what extent does the Leiden Manifesto also apply to altmetrics? A discussion of the Manifesto against the background of research into

- altmetrics. *Online Information Review*, 40(4), 529-543. doi:10.1108/OIR-09-2015-0314
- Broadbent, J. (2010). The UK Research Assessment Exercise: Performance measurement and resource allocation. *Australian Accounting Review*, 20(1), 14-23. doi:10.1111/j.1835-2561.2010.00076.x
- Butler, L. (2003a). Explaining Australia's increased share of ISI publications - The effects of a funding formula based on publication counts. *Research Policy*, 32(1), 143-155. doi:10.1016/S0048-7333(02)00007-0
- Butler, L. (2003b). Modifying publication practices in response to funding formulas. *Research Evaluation*, 12(1), 39-46. doi:10.3152/147154403781776780
- Butler, L., & McAllister, I. (2011). Evaluating university research performance metrics. *European Political Science*, 10(1), 44-58. doi:10.1057/eps.2010.13
- David, D., & Frangopol, P. (2015). The lost paradise, the original sin, and the Dodo bird: A scientometrics *Sapere Aude* manifesto as a reply to the Leiden manifesto on scientometrics. *Scientometrics*, 105(3), 2255-2257. doi:10.1007/s11192-015-1634-2
- Debackere, K., & Glänzel, W. (2004). Using a bibliometric approach to support research policy making: The case of the Flemish BOF-key. *Scientometrics*, 59(2), 253-276. doi:10.1023/B:SCIE.0000018532.70146.02
- DORA. (2012). San Francisco Declaration On Research Assessment (DORA). Retrieved from <http://www.ascb.org/dora/>
- Engels, T. C. E., Goos, P., Dexters, N., & Spruyt, E. H. J. (2013). Group size, h-index, and efficiency in publishing in top journals explain expert panel assessments of research group quality and productivity. *Research Evaluation*, 22(4), 224-236. doi:10.1093/reseval/rvt013
- Giménez-Toledo, E., Manana-Rodríguez, J., Engels, T. C. E., Ingwersen, P., Pölonen, J., Sivertsen, G., ... Zuccala, A. (2016). Taking scholarly books into account: Current developments in five European countries. *Scientometrics*, 107(2), 685-699. doi:10.1007/s11192-016-1886-5
- Glänzel, W., & Wouters, P. (2013). *The do's and don'ts in individual level bibliometrics*. Paper presented at the 14th International Society of Scientometrics and Informetrics Conference, Vienna, Austria. Retrieved from <http://www.slideshare.net/paulwouters1/issi2013-wg-pw>
- Hammarfelt, B., & de Rijcke, S. (2015). Accountability in context: Effects of research evaluation systems on publication practices, disciplinary norms and individual

- working routines in the faculty of arts at Uppsala University. *Research Evaluation*, 24(1), 63-77. doi:10.1093/reseval/rvu029
- Hansson, F. (2010). Dialogue in or with peer review? Evaluating research organizations in order to promote organizational learning. *Science and Public Policy*, 37(4), 239-251. doi:10.3152/030234210X496600
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41(2), 251-261. doi:10.1016/j.respol.2011.09.007
- Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). The Leiden Manifesto for research metrics. *Nature*, 520(7548), 429-431. doi:10.1038/520429a
- Martin, B. R. (2011). The Research Excellence Framework and the 'impact agenda': Are we creating a Frankenstein monster? *Research Evaluation*, 20(3), 247-254. doi:10.3152/095820211X13118583635693
- Ochsner, M., & Hug, S. (2016). *Indicators for research performance in the humanities? The scholars' view on research quality and indicators*. Paper presented at the 21st International Conference on Science and Technology Indicators, September 14-16, 2016, València, Spain.
- Ossenblok, T. L. B. (2016). *Scientific communication in the social sciences and humanities. Analysis of publication and collaboration in Flanders* (Unpublished doctoral dissertation). University of Antwerp, Antwerp.
- Ossenblok, T. L. B., Engels, T. C. E., & Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-9). *Research Evaluation*, 21(4), 280-290. doi:10.1093/reseval/rvs019
- Rahman, A. I. M. J., Guns, R., Rousseau, R., & Engels, T. C. E. (2015). Is the expertise of evaluation panels congruent with the research interests of the research groups: A quantitative approach based on barycenters. *Journal of Informetrics*, 9(4), 704-721. doi:10.1016/j.joi.2015.07.009
- Rons, N., De Bruyn, A., & Cornelis, J. (2008). Research evaluation per discipline: A peer-review method and its outcomes. *Research Evaluation*, 17(1), 45-57. doi:10.3152/095820208X240208
- Seglen, P. O. (1992). The skewness of science. *Journal of the American Society for Information Science*, 43(9), 628-638. doi:10.1002/(SICI)1097-4571(199210)43:9<628::AID-ASI5>3E3.0.CO;2-0

- Spruyt, E., & Engels, T. (2013). Nieuwe sleutel verdeling van middelen Bijzonder Onderzoeksfonds. *Thema: Tijdschrift voor Hoger Onderwijs en Management*, 13(3), 56-61.
- Verleysen, F. T. (2016). *Books in the social sciences and humanities. Analyses of scholarly publication types based on the VABB-SHW* (Unpublished doctoral dissertation). University of Antwerp, Antwerp, Belgium.
- Verleysen, F. T., & Engels, T. C. E. (2013). A label for peer-reviewed books. *Journal of the American Society for Information Science and Technology*, 64(2), 428-430. doi:10.1002/asi.22836
- Verleysen, F. T., & Engels, T. C. E. (2014). Internationalization of peer reviewed and non-peer reviewed book publications in the social sciences and humanities. *Scientometrics*, 101(2), 1431-1444. doi:10.1007/s11192-014-1267-x
- Verleysen, F. T., Ghesquière, P., & Engels, T. C. E. (2014). The objectives, design and selection process of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (VABB-SHW). In . Blockmans, L. Engwall, & D. Weaire (Eds.), *Bibliometrics: Use and abuse in the review of research performance* (pp. 17-127). London, UK: Portland Press.
- Westerheijden, D. F. (1997). A solid base for decisions. Use of the VSNU research evaluations in Dutch universities. *Higher Education*, 33(4), 397-413. doi:10.1023/A:1002995623272

