

Bibliometrics and the Changing Role of the University Libraries

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Abstract

Purpose: The purpose of this paper is to discuss the background and potential consequences of bibliometrics being incorporated as a part of librarianship tasks and competencies.

Approach: The discussion is based on previous literature as well as a questionnaire sent out to Swedish libraries with organized bibliometric activities.

Findings: Incorporating bibliometrics into academic librarianship is part of a redefinition and widening of the professional role. This is motivated by ambitions to provide more complete services in the scholarly communication process, as well as to increase the visibility and status of libraries, not the least in relation to central university management. Underlying reasons are professional competencies such as metadata and bibliographic database management; and bibliometrics being strong within library and information science.

Implications: Incorporating bibliometrics is a widening of the professional profile of librarianship, and may well increase the visibility of the libraries in relation to their wider academic environment, not the least in times when bibliometrics is getting increasingly important in terms of research evaluation. The new role should, however, also be considered from the viewpoint of potential changes in how libraries are perceived when incorporating a monitoring function through bibliometric analyses of research performance to the previous service oriented functions.

Originality/value of the paper: Bibliometrics as a complementary path for librarianship has been discussed previously; however, not in terms how the role may be changed and how libraries are perceived. There are limitations to be considered: the questionnaire is limited to Swedish libraries; and no efforts are made into investigating how this change is viewed upon by scholars and university management.

Conceptual paper

Keywords: Profession; Role of libraries/librarianship; Academic libraries; Bibliometrics; Research evaluation

Introduction

Scope

The role and nature of librarianship and information management has been discussed for decades, both as a field of professional practice and as a field of scientific inquiry, and on many occasions in terms of a field in crisis (e.g. Nolin & Åström, 2010; Schreiber & Elbeshhausen, 2006). One recent example of this is how, since the expansion of the Internet over the last two decades, searching for information has increasingly become something done by the individuals needing information themselves, rather than by information professionals. At the same time, development and evaluation of tools for searching, to a larger extent, has become an activity of, for example, computer scientists rather than information retrieval scholars in the field of library and information science (LIS). This has led to a perceived need for the LIS professionals to redefine their professional roles.

Meanwhile, there have also been significant changes in systems of research management and policy, where evaluation of research outcomes are increasingly linked to the allocation of research funds on various levels - from individual scholars, to institutions and national systems for academic research, such as the national level distribution of government funds between publically funded universities. At an increasing rate, bibliometric methods have been utilized to identify quantitative indicators for academic productivity and quality (Whitley & Gläser, 2007).

In LIS, bibliometrics has been an important field of research for decades (e.g. White & Griffith, 1981; White & McCain, 1998) and its presence in the wider LIS field seems to be expanding at an increasing rate (Åström, 2007). During the 2000s, bibliometrics also became of increasing interest not only in the LIS field of research but also to the professional practitioners in libraries in the field of research and higher education (Ball & Tunger, 2006; Brennan, 2008). This perhaps came as a response to the perceived need for librarianship to redefine its role and expand its competencies. Over the last few years, university libraries in Sweden, as well as in e.g. Germany and the Netherlands, have started offering bibliometric analyses to provide background material for the evaluation of research performance, and the distribution of funds, either at the university as a whole or within individual faculties and departments (Carlsson & Hällgren, 2008; Gerritsma et al, 2010).

The question addressed here is if this new practice has an effect on the role of librarianship as a profession and its relationship to the wider context of academia.

Aim and Research Questions

The aim of this paper is to discuss how an expansion of the professional activities of librarianship can have a potential effect on the role of the profession of academic librarians and its relation to the wider organizational context of the university. More specifically, these issues will be discussed from the viewpoint of the following questions:

- What is the background of libraries and librarians deciding to develop competencies on bibliometrics and to take on responsibilities for performing bibliometric analyses?
- What are the potential effects of these changes on the professional role and identity of librarianship, and how does this new role relate to other functions of the librarians and the libraries?
- What are the potential effects of these tendencies on the relation between the library and the wider university organization and in relation to the scholars as well as to university administrators and policy makers?

The basis for the discussion of these questions will primarily be the literature on the subject. However, to get a tentative idea on how this development is look upon by the professionals, information has been gathered through a questionnaire (see Appendix 1) distributed to members of the Bibliometrics group (a forum for librarians working with or being interested in bibliometrics at Swedish university libraries within the Forum for Head/University Librarians in the Association of Swedish Higher Education).

Background

Since the second half of the 2000s, Swedish university libraries have to an increasing extent started building institutional competencies in bibliometrics (Carlsson and Hällgren, 2008). Within the Forum for Head/University Librarians in the Association of Swedish Higher Education there is a working group for bibliometric issues, established in the spring of 2007. Courses on bibliometric methods and applications are offered for librarians, organized both locally and on a national level, e.g. by the aforementioned bibliometrics group, and lead by experts from the Swedish Research Council, the LIS research community and library faculty with long experience of bibliometric analyses. Perhaps the most manifest expression of the bibliometric activity trend is that many university and university college libraries have created positions explicitly titled 'bibliometrician', as exemplified in a position announcement in Appendix 2. This development has not been limited to Sweden, since similar trends can be found internationally, for example in Germany and the Netherlands (Gerritsma et al, 2010). This new role of the libraries has been discussed by e.g. Rafael Ball and Dirk Tunger (2006) as well as Patricia Brennan (2008). And, as part of this development, university libraries have started offering bibliometric analyses to provide background material for the evaluation of research and the distribution of funds at the local universities as a whole, as well as faculties and departments within the university. An important question relating to this is what inspired this development?

The Changing Role of Librarianship

One factor behind the development of bibliometric activities at libraries is the felt need for a redefinition and widening of the professional roles of academic librarians within the wider university organization. Traditionally, librarianship has to a large extent been focused on issues concerning the acquisition and organization of its collections, as well as searching and retrieving information for the users of the library. However, with online access to both search tools as well as the information *per se* it is easier for users to do many of the search and retrieval related tasks themselves. At least to some extent, it could seem as some of the services related to one of the core competencies of librarianship are no longer in high demand by users of the library and as one important task of librarians being 'lost'. Combined with new practices of publications of research results, user behavior and competencies created a need for redefinition of librarianship towards an increasing emphasis in the professional role on issues such as information literacy and other pedagogical aspects related to searching information. A stronger integration of the librarian in the academic process was called for (Hansson, 2010). This development is parallel with the development in LIS research, in which systems oriented information retrieval research has decreased and behavioral and social aspects of information seeking and usage has increased (Åström, 2007).

University libraries, at least in Europe, have also to an increasingly focused on development of knowledge and services related to scholarly communication other than the searching and retrieving of scholarly information. One important part of this is an increased activity in the dissemination of research. University libraries in Europe have become strong proponents of Open Access (OA) publishing and work actively to support OA initiatives such

as hosting OA publishing tools and developing directories of OA journals. Related to this is how university libraries increasingly have become responsible for the development and maintenance of local repositories and publication databases.

These local repositories can be seen from two different perspectives. On one hand, they can be seen as being related to OA issues, in which a system like SBCAT – an underlying software for institutional repositories – is being developed at Lund University Libraries in Sweden, together with University of Bielefeld in Germany and Ghent University in Belgium. This system is designed to work not only as a publication database but also as a tool for parallel publication of research. On the other hand, the repositories can be and are being used as data-sources for quantitative analyses of research output in the form of publications.

Growing Interest in Bibliometrics

Bibliometrics is a well established part of library and information science research (e.g. Narin & Moll, 1977; White & McCain, 1989; Wilson, 1999), and the use of bibliometrics at libraries for e.g. collection development and management is also a well-known practice, not the least in relation to digital library development (Dikeman, 1975; Jimenez-Contreras, De La Moneda, de Osma, Bailon-Moreno, & Ruiz-Banos, 2006; Kishida, 1995; Nicholson, 2003). Academic libraries applying bibliometric methods and techniques for research evaluation purposes, however, is a more recent phenomenon (Ball & Tunger, 2006; Brennan, 2008; Carlsson & Hällgren, 2008; Gerritsma, 2010).

One important aspect of the increasing interest in bibliometrics, at the libraries as well as in academia in general is the growth in use of bibliometrics to evaluate research performance, “especially in university and government labs, and also by policymakers, research directors and administrators, information specialists and librarians and researchers themselves” (Pendlebury, 2009). Conferences, workshops and courses in bibliometrics and science and technology indicators are increasing both in number and in size, and the fact that a new journal, the *Journal of Informetrics*, was launched in 2007 is further testimony to broadening interest in this field. The allocation of research funds in the academic community and research policy in general is increasingly guided by bibliometric analyses. This is a development that occur on both local and national levels in many countries such as Sweden, Norway and Australia to name a few (e.g. Vanclay, 2011).

This, in turn, has a background in a shift in how publically funded academic research is perceived and managed by national governments, a shift including more focus on e.g. strategically oriented research policies and accountability. One aspect of this is the increasing importance of possibilities of systematic evaluations of research, both in terms of strategic decisions for the future as well as accounting for past research spending. This has lead to the development of national large scale systems for research evaluation in many countries (Whitley & Gläser, 2007).

It is also becoming a common practice by which to evaluate university faculties and departments. Thus university libraries come into play. There are a number of reasons that have been mentioned for having university libraries being the organizational locale for bibliometric activities. One is that bibliometrics is an important part of LIS research, which makes it quite natural to apply it in the professional practice. Another important reason is that professional competencies of librarians include having long term experience in developing and handling bibliographic data, and systematically dealing with large document sets. A third reason mentioned is how, in many cases, libraries have been in charge of developing and hosting institutional repositories, thus having immediate access to an important data source for measuring productivity through analyses of publication frequencies.

Bibliometrics at Higher Education and Research Libraries in Sweden

In Sweden, there are 48 institutions for higher education and research. Out of these, 18 institutions have some form of organized bibliometric activity and in many cases, at the local university libraries (Carlsson and Hällgren, 2008). To get a sense of the state of bibliometric activities at university libraries, a questionnaire (see Appendix 1) was posted to the *Metrics*¹ mailing list, an online listserv serving as a discussion forum for Swedish university libraries staff members, as well as other people in Swedish academia, with an interest in bibliometrics. The list is managed by the bibliometrics group within the Forum for Head/University Librarians in the Association of Swedish Higher Education and in September 2009, the number of members of the mailing list was 71. The purpose of the questionnaire was to:

- investigate the nature and width of bibliometric activities at Swedish university libraries
- collect information on whose initiative and/or mandate bibliometric analyses done at university libraries are performed
- gain insight about the positive and negative consequences for the libraries, getting involved in bibliometric activities.

The questionnaire was posted on the mailing list in February 23, 2010 and received ten replies up until March 17, 2010, of which one was not used in the analysis since it reported bibliometric activities performed by central university management, and not at the university library.

Replies from nine out of the 48 institutions for higher education in Sweden were an acceptable rate, considering that there are 18 universities with organized bibliographic activities, of which 14 are located at the local university library (Carlsson & Hällgren, 2008). Out of the five largest universities, three replies were received, as well as from the two leading medical and technological universities, of which all have their bibliometric analyses located at the library; and at the two non-replying large universities, the bibliometric activities are located at other institutions within the university. Still, the limited number of replies, and the focus solely on Swedish libraries, means that the findings can be used primarily as illustrations of bibliometric activities at university libraries rather than as something which can be generalized.

The Organization of Bibliometric Activities

The first set of questions dealt with how bibliometric activities at university libraries are organized in terms of the scale of the activities and under whose initiative and mandate they are carried out. The answers, in terms of scale, ranged, from one person dealing with bibliometric issues either on a 'when there is time to spare' or 'as needed' basis, to one or two full time positions. The latter included one or two people or it was divided amongst a larger group of positions that also, to some extent, included time for basic research. This range of scale impacted the nature and importance of the range of activities as well. In some instances it meant having someone simply monitor bibliometric developments and its relationship to research policy, to large scale analyses of the university as a whole, including undertaking basic bibliometric research, methodological development and teaching. At five out of the nine universities there is at least one full time staff member working with bibliometrics; and the ones with less time allocated for bibliometric issues were primarily smaller institutions.

On the question about initiating bibliometric activities at the library, the variations were not as large as in terms of the scale and range of bibliometric activities. In most cases, the bibliometric activities were originally initiated by the libraries themselves, but to an increasing extent, and especially at the larger libraries, there is also an official mandate

¹ <http://listserv.lub.lu.se/mailman/listinfo/metrics>

from university management to perform bibliometric analyses to evaluate research in different faculties and departments. The variations increase, depending on who the libraries see as 'customers' for their bibliometric activities. At the larger universities, with an official mandate for the libraries to do bibliometrics, the university and faculty management were to a large extent the commissioning authorities. Smaller institutions tended to emphasize disseminating information on bibliometrics and bibliometric indicators to individual scholars research groups and faculty administration, as well as to e.g. other librarians.

The Nature of the Bibliometric Activities

The second set of questions in the questionnaire dealt more specifically with the nature of the bibliometric activities and to the extent that libraries offer services such as performing bibliometric analyses. All but two of the nine libraries offer some form of bibliometric analyses as a service to other units within the local university, such as management, departments or branches of the university library. Although there are differences in scale of the analyses, all performed analyses for the purpose of research evaluation and providing background information for the distribution of funds on a local level, i.e. between faculties and/or departments at the universities. When comparing the answers on who the libraries perceive as target 'audience' for the analyses, to who the library actually performs analyses for, it is interesting to note a much larger presence of university and faculty management among actual 'customers' than smaller groups or individual scholars. Also notable was that one library that did not perform bibliometric raised the question whether the library should be participating in evaluating the scholars at the local university.

Although bibliometric analyses for research evaluation is by far the most frequent type of bibliometric analysis, examples were given of other types of analyses. Three of the libraries reported doing -analyses for the purpose of mapping research fields, -research collaboration by investigating co-authorships, and analyses performed as a service to individual scholars or research groups. Three libraries reported the use of bibliometrics for collection management purposes, where the analyses are primarily for in-house use.

An important part of the bibliometric activities – aside from doing the analyses – is providing information on bibliometrics to individuals and groups within the university through e.g. seminars and lectures. The purpose of this is to raise awareness of different bibliometrics based methods for research evaluation and how they are linked to systems for resource allocation; and through that, for scholars to be able to develop strategies to deal with these systems and evaluation methods.

Motivations for, and Opinions on Bibliometric Activities

The third set of questions addressed two different aspects of bibliometric activities at the libraries: one is the motivations for the libraries specifically being responsible for performing bibliometric analyses; and the second, what potential consequences the libraries see in them being the organization within the university doing the bibliometric analyses.

Answers on the more general issue of why the library should be responsible for organizing bibliometric activities revealed two main lines of reasoning. One relates to the competencies of librarianship and LIS concerned with publication databases, documents and metadata and experience with bibliographic tools in general, the strong presence of bibliometrics in LIS research, and finally, the library being responsible for the institutional repositories of the university. The second reason brought up was the position of the library within the wider university organization. It was reported as a stable entity within the organization, and is an institution within the university that itself is not affected by the outcome of the bibliometric analyses. For this reason it could take a neutral or objective

position relative to the faculties or departments being evaluated. One line of reasoning that can be seen both as a general motivation for libraries doing bibliometrics, and for individual libraries developing bibliometrics as part of their agenda, is that bibliometrics is part of a wider role of the library in the process of scholarly communication. In addition the library's role includes development and management of institutional repositories as well as having an active role in Open Access publishing issues. New patterns of publications, with the library as an active part, seem to open up for a new and even stronger position in the university's organizational structure.

The reason underlying libraries taking on responsibility of developing bibliometric activities within the wider academic institution was reported to be the need for universities to develop these competencies, which due to the competencies in librarianship, in turn fell to the libraries. Less frequently stated by respondents were that bibliometric analyses brings libraries not only a new role in the academic context, but also more attention. As one respondent said "library management [is] considering these activities prestigious."

Opportunities, Benefits and Risks.

Those surveyed were asked what opportunities and benefits these activities bring to the library. Among the answers, three threads were identified. The first related to how bibliometrics become an addition to responsibilities and widens the competencies of libraries and librarians. This is important at a time when tasks and competencies traditionally associated with librarianship increasingly moves into the realm of e.g. the users of the libraries. The second line of responses was about how this expanded role has increased visibility of university libraries in the wider academic context. This, said respondents, came from developing an increased cooperation with scholars at the university, from libraries taking a more active role in different aspects of research processes and scholarly communication, as well as from providing university management with statistics on academic performance as reflected in publications and citations for research evaluation. Thirdly, increased cooperation with university management lead to becoming more involved in central university management processes, which was felt to increase the influence and prestige of libraries within their parent institutions.

Might there be any risks in the increase of bibliometric activities in university libraries? Well, only one library responded that it saw no risks what so ever associated to doing bibliometrics. The remaining replies pointed out a number of risks. One is related to the competencies in the field of librarianship. While competencies concerning bibliographic data, as well as the management of large document collections, have been brought up as reasons for libraries taking on the task of performing bibliometric analyses; some respondents raised concerns about competencies concerning advanced statistical methods in general and statistics concerning bibliometric indicators in particular. Other concerns were raised about relations between libraries and scholars if libraries did bibliometric analyses for research evaluation. Questions were raised about whether the competencies of the librarians made them legitimate evaluators of scholars in different fields at the university. Another risk raised was the danger of the library being associated with 'bad' results of departments not performing well according to the bibliometric indicators. Overall most responses discussed the danger of the libraries being seen as an active participant in research policy issues such as the allocation of research funds and also in terms of a shift in the library's role as a service or support function at the university to an one with an auditing or monitoring function, and passing judgment on scholars. Some respondents noted that the issue of the use of bibliometrics for research evaluation is something quite controversial in the research community in general, perhaps especially in a country like Sweden, where these kinds of assessments are relatively new.

Conclusion

Over the last few decades, both librarianship and LIS as a field of practice and of research, has gone through a redefinition of its role and its tasks. One background to this development is what some have perceived as a crisis in librarianship and LIS research, where many activities that traditionally have been part of the core of the field and the profession, to an increasing extent have come to be performed by others. This has led to the question on how to maintain professional and organizational legitimacy. This has to be done by finding alternative ways of using existing competencies, and at the same time developing new ones. As the academic community has seen an increase in systematic evaluations of research systems and institutions, not the least in relation to allocation of research funds, new possibilities and expectations has been attributed academic libraries. To meet those, the profession has developed different strategies. One has been to take on a more active role in a range of different aspects of scholarly communication. Another, to some extent as a part of the scholarly communication activities, has been to start doing bibliometric analyses.

The aim of this paper has been to analyze and discuss this latter development, by investigating why libraries have chosen this particular path, and to explore its potential effects. It also examines the effects of libraries doing bibliometrics can have on their role in relation to the wider university organization. The analysis draws on examples from Swedish university libraries, where many libraries have developed some form of organized bibliometric activity over the last decade. Although Sweden is not the only country in which this occurred, it is one of the countries where the concrete impact of this development is the most evident in form of library positions explicitly oriented towards bibliometrics. A brief survey of academic libraries with organized bibliometric activities provided the paper with rich examples of benefits and concerns about undertaking bibliometric analyses.

The expansion of the role of the university libraries and the professional competencies of the librarians can be seen as quite concurrent with the general development in higher education:

- bibliometrics as a field of enquiry has to a large extent been developed by scholars in library and information science;
- evaluations of universities are to a large extent based on institutional repositories largely developed at, and maintained by, university libraries;
- drawing on professional competencies such as bibliographic control, knowledge about metadata and the experience of dealing with large document collections; and
- it fits well with libraries taking on more active roles in scholarly communication processes.

The benefits of this widening scope of activities for libraries has both been discussed in previous texts on the same topic, as well as in the answers on the questionnaire sent out to the Swedish libraries. The role of LIS professionals and the role of libraries become stronger by developing a new set of competencies, in itself and also in relation to the wider university context. It increases the visibility of the library and the competencies of the librarians in relation to the wider university organization. One aspect of this is visibility in terms of servicing the user in shape of scholars and administration by being the ones informing about bibliometric analyses and their use for research evaluation and the allocation of funds, thus helping the users to develop strategies for dealing with a new situation. Another aspect of the visibility is in relation to university management, where the link becomes stronger by doing bibliometric analyses as background material for evaluations; and thus becoming part of the funding policy process. This, of course, means that it is not only the visibility of the library increasing, but also, the influence of the library within the academic environment.

The increased visibility can be related to the issue of status. From the professional perspective, the widened competencies can be seen as something with a potential to increase the status of librarianship, not the least by being associated with statistical methods, since quantitative analysis traditionally have been held in high esteem in academia. This is of course something that can be 'put to use' when assisting scholars in developing strategies for dealing with new criteria for the evaluation of their research. From an organizational perspective, the status issue can also be seen in an increased influence on policy processes; where the influence and visibility is more in relation to university management rather than the scholars.

This can be seen from the perspective of a shift in the role of the library itself and its relation to the wider university organization on several different levels. A fundamental shift is how the libraries are going from a service function of supplying the scholars with the information to one of monitoring them by producing statistics on their productivity and impact through analyses of their publications and how they are cited. This introduces a controlling function in relation to the university researchers, as opposed to providing services to the scholars. Related to this is a change of 'consumer,' where libraries go from servicing scholars at the university, to what we might like to call the 'production end' of the organization -- supplying information to the university administration, or the 'management end' of the organization and thereby becoming part of the policy process governing research. It in turn raises questions of the legitimacy of these new role of the libraries, namely in terms of whether competencies concerning statistical methods are of a high enough level, and also of the balance between being an 'objective provider of background material for an evaluation' and being an active participant in research policy processes.

The results of this small study indicate an increased complexity for academic libraries and librarianship. If handled right, this will for sure strengthen the positions of libraries within the context of the university organization, as well as in relation to their traditional users, the scholars and the students. By showing the benefits of bibliometrics to both university administration and to the research community, academic libraries will take on a position more central in the development of the very universities within which they function, and thus put themselves in the very centre of higher learning – on the strong foundation of a confident profession.

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References

- Åström, F. (2007). Changes in the LIS research front: Time-sliced co-citation analyses of LIS journal articles, 1990-2004. *Journal of the American Society for Information Science and Technology*, 58(7), 947-957.
- Ball, R. & Tunger, D. (2006). Bibliometric analysis: A new business area for information professionals in libraries? *Scientometrics*, 66(3), 561-577.
- Brennan, P. (2008, August). Library assesement: Changing roles for the academic library in support of academic research evaluation. Unpublished presentation at the 2008 Library

Assessment Conference. Seattle, WA. Retrieved from <http://libraryassessment.org/bm~doc/brennan.pdf>

Carlsson, H. & Hällgren, M. (2008). *Inventering av bibliometrisk verksamhet vid svenska lärosäten* [Inventory of bibliometric activities at Swedish institutions for higher education]. Report: Arbetsgruppen för bibliometri: SUHF/Forum för bibliotekschefer. Retrieved from http://gupea.ub.gu.se/dspace/bitstream/2077/18182/1/gupea_2077_18182_1.pdf

Dikeman, R.K. (1975). Use of bibliometric techniques in serials management for libraries. *Proceedings of the American Society for Information Science*, 12, 55-56.

Gerritsma, W., Van Veller, M., Van Zeist C., Van der Togt, P., & Leon, C. (2010, September). Bibliometrics in the library: Putting science into practice [Abstract]. *Book of abstracts: STI Conference*. Leiden, Netherlands: Universiteit.

Hansson, J. (2010). *Libraries and Identity: the role of institutional self-image and identity in the emergence of new types of libraries*. Cambridge: Chandos Publishing.

Jimenez-Contreras, E., De La Moneda, M., de Osma, E.R., Bailon-Moreno, R. & Ruiz-Banos, R. (2006). A bibliometric model for journal discarding policy at academic libraries. *Journal of the American Society for Information Science and Technology*, 57(2), 198-207.

Kishida, K. (1995), Quantitative approaches to library management: A critical review. *Library and Information Science*, (33), 39-69.

Narin, F. and Moll, J.K. (1977). Bibliometrics. *Annual Review of Information Science and Technology*, 12, 35-58.

Nicholson, S. (2003). The bibliomining process: Data warehousing and data mining for library decision making. *Information Technology and Libraries*,. 22 (4), 146-151.

Nolin, J. & Åström, F. (2010) Turning weakness into strength: Strategies for future LIS. *Journal of Documentation*,. 66(1), 7-27.

Pendlebury, D.A. (2009). *Whitepaper: Using bibliometrics: A guide to evaluating research performance with citation data*. Philadelphia: Thomson Reuters.

Schreiber, T. & Elbeshausen, H. (Eds.). (2006). *Bibliotekarerne: En profession i et felt af viden, kommunikation og teknologi* [The librarians: A profession within a field of knowledge, communication and technology]. Frederiksberg, Denmark: Samfundslitteratur.

Vanclay, J.K. (2011). An evaluation of the Australian Research Council's journal ranking. *Journal of Informetrics*, 5 (2), 265-274.

White, H.D & Griffith, B.C. (1981). Author co-citation: A literature measure of intellectual structure. *Journal of the American Society for Information Science*, 32(3), 163-171.

White, H.D & McCain, K.W. (1989). Bibliometrics. *Annual Review of Information Science and Technology*, 24, 119-186.

White, H.D & McCain, K.W. (1998). "Visualizing a discipline: An author co-citation analysis of information science, 1972-1995. *Journal of the American Society for Information Science*,. 49 (4), 327-355.

Whitley, R. & Gläser, J. (Eds.). (2007). *The changing governance of the sciences: The advent of research evaluation systems*. Dordrecht, Germany: Springer.

Wilson, C.S. (1999). Informetrics. *Annual Review of Information Science and Technology*, 34, 107-247.

Appendix 1. Questionnaire for Swedish librarians working with bibliometrics

A. General information: bibliometric activities at the libraries

1. What kind of bibliometric activities do you have at your library? (Is it e.g. a matter of monitoring the development of bibliometric research/practice; of informing librarians, scholars and administrators in your local academic community; do you perform bibliometric analyses?)
2. What is the scale of your bibliometric activities?
3. On whose mandate are the activities performed? (Is it on your own initiative, or is commissioned by e.g. the university management?)
4. What is the target group for the activities? (Is it e.g. other librarians, scholars, university management?)

B. Bibliometric services at the libraries

1. Does your library offer services in the form of performing bibliometric analyses?
2. If so, what kind of bibliometric analyses do you perform, and for what purposes? (Is it e.g. for collection management purposes; for mapping research and publication structures; for research evaluation purposes?)
3. For whom do you perform these analyses? (Is it e.g. for in-house use; for the scholars; for university/faculty/department management?)

C. Background and consequences

1. What is your motive for developing bibliometric activities at your library?
2. What motives are there for developing bibliometric activities at academic libraries? (I.e. what is the reason for the libraries doing this, rather than other institutions/functions in the local academic context?)
3. What are the benefits/opportunities of libraries developing bibliometric activities?
4. What are the potential risks/detrimental effects of libraries developing bibliometric activities?

Appendix 2. Example of position vacancy announcement for bibliometrician (http://ledig-anstallning.adm.gu.se/detail.php?lt_id=6454) [my translation]

Bibliometric analyst

University of Gothenburg Library

[...]

The University of Gothenburg Library announces a full time permanent position as bibliometric analyst

[...]

Mandated by, and in cooperation with, the Vice Chancellor of the University of Gothenburg, the library has developed bibliometric activities since 2008, with a working group of two full time positions. The activities cover analytical work, teaching and spreading information, as well as, to a lesser extent research in bibliometrics. The activity is a support function for university management, as well as faculties, departments and individual scholars at the university, by providing bibliometric analyses.

Work description:

As bibliometrician at the University Library, you will support all units at the university by providing bibliometric analyses. The scientific scope of the university will require you to use both traditional citation databases as well as other data sources. The work description will also include continuous teaching on and informing about bibliometric methods, as well as following the development in the field by contributing to bibliometric development projects on a national as well as an international level.

Qualifications:

We are looking for someone with documented experience of bibliometric analyses, as well as extensive knowledge about general conditions of research and publication practices. We assume you have solid experience working with computers – preferably experienced in SQL and database management.

[...]