The project 

Visualizations of Research Areas

started in July of 2007 at Lund University Libraries and ended in June 2012. The project has been conducted within the program for Postdoctoral Fellowships in the Archives, Libraries and Museum sector, financed by The Bank of Sweden Tercentenary Foundation and The Royal Swedish Academy of Letters, History and Antiquities.

The purpose of the project

Initially, the aim of the project was: “[...] to investigate how different research fields can be mapped, through the use of quantitative analyses of the research literature, and techniques for visualizing the results of such analyses; how methods, material and the social and intellectual organization of the fields have an effect on the representation of the fields; and to develop statistical measures for comparing different kinds of analyses.” Overall, the aim has remained unchanged, albeit the extent to which research fields differs has been so great that the measures for comparing fields has been less relevant, leading to an increased focus on issues concerning methodology – such as how the selection of data affect the representation of the research fields – and how differences between fields can be related to communication structures as well as general organizational issues.

Results

The importance of the results achieved during the project can be seen from three different perspectives: the significance for bibliometric research per se, the impact of the results in relation to our understanding of scholarly communication and scientific research, and the significance of the results in relation to methods for evaluation of scientific research and its implications in terms of research policy processes.

From the perspective of bibliometric research, the most important analyses are those investigating how the selection of data affects how a research field is represented and perceived. This has been analyzed empirically through studies on e.g. library and information science (Åström, 2010) and entrepreneurship research (Åström, 2011). The issue of data selection is of great methodological importance both in terms of from which sources data is collected; and, if the selection of data for analyzing a research field is based on e.g. the journals within a field – and in relation to this, what criteria are used for categorizing the journals – or if other strategies are employed to identify the data that is supposed to represent the field. These issues have been further investigated by e.g. Klavans & Boyack (2011) and Schneider (2010).

The basis for addressing issues on the understanding of the organization and communication of scientific research within this project can be found in the abovementioned analyses of differences in
the representation of research fields and how this relates to what material is being analyzed, but also in empirical investigations into other fields in the humanities and the social sciences (e.g. Åström, forthcoming and Hammarfelt & Åström, 2011). Building on these, as well as similar studies by other scholars, and what they reveal in terms of e.g. citation structures in research publications in the humanities and the social sciences, a model for understanding different forms of scholarly communication has been discussed (Åström & Sandor, 2009). These analyses and discussions challenge previous models for understanding scientific research and communication, building on a notion that all scholarly research essentially can be understood on the basis of one model, where the natural sciences and medical research forms the norm. This discussion has been carried on by e.g. Hammarfelt (2012).

The notion of the one model for understanding scientific research and communication based on the natural sciences also forms the basic assumption in the development of models for evaluating research during the last few decades; models that to an increasing extent has been used in science policy processes for the allocation of research funds on local as well as national levels. Within the project, both the discussions on theoretical issues related to different types of scholarly communication (Åström & Sandor, 2009) and the analyses of differences in publication and citation structures within as well as in-between different research fields (e.g. Åström, forthcoming; 2010; 2011 and Hammarfelt & Åström, 2011), are of great importance for addressing problems related to systems for research evaluation, and the science policy processes where the systems are utilized.

**Further research questions**

An important issue related to the investigations into the differences in citation structures in different research fields, is the use of bibliometrics – and in particular citation based indicators – in research evaluation and the allocation of research funds. From this perspective, the results of the project leads to further questions related to quantitative measures of impact and productivity in research, and how to analyze research fields where the citation structure does not follow the norms behind the assumptions on which the use of bibliometrics in research evaluation often builds upon.

There are also developments in terms of systems for scientific publishing, with parallel and pre-print publication of articles in open repositories, as well as publishing research in open access journals with selection criteria that differs from traditional scientific journals. This entails challenges for current systems for research evaluation and academic merit. Based on the developments in scientific publication system, questions emerges on a dichotomization of the function of the scholarly publication system as being on one hand, a system for communication; and on the other, a system for acquiring academic merit.

The open access to scholarly publications and scientific data – and not the least, the development of structures for disseminating open access publications and data through e.g. web based social networks – provides new opportunities to analyze different kinds of networks in scientific research.

**Publications**

Ranking documents according to importance it not necessarily a task lacking in complexity, which is also one of the points of the project. If we look at scholarly impact measured in citations, we find
that Landström, Harirchi and Åström (2012) and Åström (2010) are the articles receiving the most attention in the scholarly community. However, if we direct our attention to the publications most clearly expressing the main points of the project, we will find that Åström and Sandor (2009) is instrumental in accounting for the theoretical aspects of the project, discussing important differences in the use of references in different research fields; and the consequences of this for: what references means in different contexts, for the meaning when references gets transformed into citations, and for the use of citations as in indicator on scholarly impact. In terms of empirical and methodological aspects, it is hard to identify one specific article being more important than the others. As separate entities, Åström (forthcoming) analyze the educational sciences, Åström (2010) library and information science and Åström (2011) entrepreneurship research. Taken together, however, they provide important insights into the actual disparities in citation structures in different research fields, as well as differences in the representations of research fields depending on variations in choice of material.

**Building relationships: the university and the ALM sector**

The strengthening of relationships between academia and the ALM sector can be seen from different points of view. Institutionally, the project has been located at a library within academia; and the research has continuously been performed in close cooperation with research departments and institutions both at Lund University and at other universities as well as other types of organizations. Research within the project has also been closely connected to the development of bibliometrics oriented services at the library; where Lund University Libraries offers bibliometric analyses as well as information about bibliometrics and systems for research evaluation to everyone from individual scholars and research groups to university management. Research in collaboration with other LU scholars, together with commissioned analyses and information activities has contributed to an increase of the visibility of the library within the university community as a whole, as well as a widening of the scope of the role and function of the library.

Another important part has been informing on bibliometrics through teaching and seminars for libraries and librarians: locally, in the network of Lund University Libraries; nationally, e.g. thorough courses organized by the bibliometrics workgroup within the Association of Swedish Higher Education; and as lecturer at seminars organized by e.g. The Swedish Library Association and the Swedish Association for Information Specialists.

Aside from the collaborative activities, the question of bibliometrics oriented services and activities at libraries – and what it means for the role of the organization and the profession – has been discussed in a research article (Åström & Hansson, forthcoming).

**Other forms of mediation**

Aside from lectures and seminars oriented towards the library sector, there has also been speaking activities at companies oriented towards research evaluation as well as document analysis, such as Faugert & Co/Technopolis Group in Stockholm and Xerox European research centre (Xerox XRCE) in Grenoble, France. The project has also been presented at research seminars at universities both in Sweden (The Linnaeus University in Växjö) and abroad (University of New South Wales and University of Technology, Sydney in Australia, where Åström also spent a year as visiting scholar in 2008-2009).
References


Hammarfelt, B. (2012). *Following the Footnotes: A Bibliometric Analysis of Citation Patterns in Literary Studies*. Uppsala: Uppsala Universitet. (Diss.)


