
13th Nordic Workshop on Bibliometrics and Research Policy

11-12 September 2008 in University of Tampere, Finland

Abstracts

Thursday, 11 September

Session 1

The "Norwegian model" in practice in a Swedish university.

Eriksson, Leif (Uppsala university, Sweden)

The efforts on how to find a new way to distribute research funding is just as intense in Sweden as elsewhere in the world. With the shift to let research output play a bigger role in the process, focus on scientific publishing has increased. The need to find a proper model that can deal with the differences in publishing behaviour has been a major task for decision makers on a national level as well as for university managements.

At Uppsala university, the Faculty of Social Sciences has decided to try a new model to distribute faculty resources. The research funding (50 % of the total funding) is going to be distributed according to three variables of which scientific publishing is one.

The field of social sciences shows a wide range of publishing traditions both in language and form and in an attempt to take into consideration these different publishing patterns the so called Norwegian model has been applied as an evaluation tool.

This presentation shows how the model is adapted to the field and how the different institutions benefit or not from the model depending on their research output. As a comparison the presentation will also include a citation study based on the same material.

A Case Study for R&D Strategic Planning and Decision Making for Using the Patents and Articles Database in KIST.

Dae Shin Kang, In Wook Na, Yong Su Shin, Dae Hee Lee, Yun Chul Cheong (Korea Institute of Science and Technology, Techno-Economic Analysis Center, Korea)

The Korean governmental budget for research and development (R&D) in 2007 exceeded US\$10 billion, as one of seven countries in the world. The point in time when other countries reach an R&D budget of US\$10 billion is essentially when the paradigm for social and economic development changes and, accordingly, the overall demand for new technological development to meet the paradigm. In other words, innovative and value-creating technologies are highly demanded.

Since 2004, Korea has strengthened its R&D planning to satisfy the need for technology development; it is extensively applying this policy to government supported research institutes.

One of the representative government supported research institutes, KIST, has begun emphasizing preliminary R&D planning. It includes the analysis of world-wide technological trends, the identification of emerging technologies and latent competitors, and the establishment of strategies for global R&D cooperative networks. To obtain analysis results which are more objective, KIST is applying bibliometric methodologies, employing the patents and articles database, rather than the expert peer review method.

As a result, researchers can now submit R&D proposals based on the analysis result, and top management can utilize the data to verify the reasonability of the proposed research projects.

This study introduces concrete cases for the analysis of trends, networking, technology maturity, and citation analysis, based on the patents and articles analysis process for strategic R&D planning at KIST. Particular analytical methodologies, including patent and articles knowledge extraction, patent and article map analysis, technology clustering, technology networking, S&T database application, text mining with Vantagepoints, and ThemeScape productions of patents and articles, will be described. It will also analyze how researchers and top management are utilizing the analysis results for practical applications and significance of R&D planning and paradigm shift.

Session 2

Connections between university research funding, publication performance and impact of research. Comparison of five countries.

Auranen, Otto, Himanen, Laura, Puuska Hanna-Mari (University of Tampere, Finland) and Nieminen, Mika (VTT Technical Research Centre of Finland)

We look for connections between competitiveness of university research funding and research performance by comparing five OECD countries (Australia, Finland, the Netherlands, Norway, the UK) and asking:

1. How has university research funding developed in these countries?
2. How competitive are the funding environments of university research and what is the development of competitiveness of funding?
3. Has the university sector become more efficient in producing scientific publications and gaining citations in countries with competitive funding environments?

Development in universities' research funding is described longitudinally with statistical and document data from OECD databases and national sources. Funding environments' competitiveness is analysed using two indicators: the input-output orientation of government direct research funding and the shares of internal and external research funding. The more output-oriented the government direct funding and the larger the share of external research funding is, the more competitive the universities' funding environment is.

Development in research funding is compared with developments in the countries' research performance. The output, impact, and efficiency of the five countries during 1987-2006 is analysed by using bibliometric data from ISI Web of Knowledge and higher education sector R&D expenditure data from the OECD's science and technology database.

Another aspect of the scientific profiles of eastern & western European EU countries: peculiarities of journal usage.

Schlemmer, Balázs (Policy Research Centre for R&D Indicators (SOOI)
Katholieke University Leuven, Belgium)

In 2004, when the current project began, 22 out of – then – 25 EU member countries were selected for a thorough, multifaceted scientometric analysis. In the recent years many aspects (national sectoral profiles, strengths and directions of co-publication activities, national publication profiles by subject fields, patterns of outstanding citation impact etc.) have been investigated and presented, amongst others, at previous Nordic Workshops.

Once again, the current study continues this tradition in terms of dealing with another aspect of comparing the scientometric features of Central & Eastern European Countries vs. Western European Countries during the last two decades. This time the focus will be put on national peculiarities of journal usage in these EU countries.

In accordance with the previous studies, the current paper also covers 20 years represented by 3 snapshots from 1983, 1993 and 2003. The analysis reveals what has changed in national publication strategies in terms of publication preferences regarding publication language, national/international orientation of journals, journal impact, document type and other characteristics. The presentation will also shed light on methodological difficulties of journal categorisation as well as on journal usage related tendencies in a more general context.

The impact of Latvian exile literature on research in Latvia: issues in data

collection.

Rozenberga, Dace (Department of Information Science, Loughborough University, UK)

Approximately 11,250 titles were published by Latvian authors outside Latvia from 1945 to 1991. Because of Soviet control and censorship, this literature was generally unavailable in Latvia until Latvia regained its independence in 1991.

The use of exile literature by Latvian researchers and its impact on Latvian research are examined in this research. Citation analyses of research literature and surveys of Latvian researchers and libraries were carried out.

The focus of this presentation will be on issues to do with the data collection for citation analysis. In order to study the impact of exile literature, research literature from different subject fields over a fifteen-year period (1992-2006) was examined. Data were collected manually. Many decisions regarding literature selection had to be made (e.g., choice of material, language, origin, year of publication). All selected subject fields were from social sciences or the arts and humanities; therefore, issues related to the citation practices in these areas were also considered.

The main challenges in literature selection and data collection will be presented, as well as the solutions and principles adopted.

Session 3

Polar research in the Nordic countries – a publication-based approach.

Aksnes, Dag W. (NIFU STEP - Norwegian Institute for Studies in Innovation, Research and Education, Oslo, Norway)

Polar research is a field of growing interest to the scientific community and the public alike. There is a broadening awareness of the importance of the polar regions in relation to climate change, natural resources and geopolitical issues. The Nordic countries have long traditions of doing research in the Arctic and the Antarctic. The presentation explores the structure of and recent developments in the polar research activities in the Nordic countries. Based on a bibliographic study of published papers indexed in the ISI Web of Science during the period 1981-2007, we have analyzed trends in publication, scientific disciplines and subdisciplines, coauthorship, and international collaboration within the field of polar research.

Paradigm Shifts in Industrial Relations Research: A Bibliometric Approach.

McMillan, G. Steven and Casey, Debra L. (Penn State Abington, USA)

1. Introduction

Recent research has argued that the paradigms of industrial relations throughout the international community have dramatically shifted (Kaufman, 2008). The primary reason given is that industrial relations has suffered losses in both number of researchers and, more importantly, relevance. The purpose of this research effort is to empirically examine --- through a bibliometric approach --- how the academic research regarding industrial relations has morphed over the last thirty years.

2. Current research effort

In previous work, we have utilized bibliometrics to uncover the invisible colleges within the *Industrial and Labor Relations Review* and the *British Journal of Industrial Relations* (Casey & McMillan, in press; McMillan & Casey 2007). Our current research effort expands this type of approach to include all of the top ten ranked industrial relations journals based on the ISI citation rankings. By extending our approach beyond a specific journal into a broader set, we hope to better understand how industrial relations has shifted, which journals have shown the most shift, and whether the field as a whole has embraced the notion of employment relations versus industrial. We will explore the citation patterns for journals, authors, articles, and geographic region of scholarship.

3. References

- Casey, D.L. & McMillan, G.S. (In Press) "Identifying the Invisible Colleges of *Industrial & Labor Relations Review*: A bibliometric approach", *Industrial & Labor Relations Review*.
- Kaufman, B. (2008) Paradigms in Industrial Relations: Original, Modern and Versions In-Between, *British Journal of Industrial Relations*, 46, 2, pp. 314-339.
- McMillan, G.S. & Casey, D.L. (December, 2007) "Identifying the invisible colleges of the *British Journal of Industrial Relations*: A bibliometric and social network approach", *British Journal of Industrial Relations* 45:4 pp. 815-828.

Do we need a qualitative approach in bibliometric studies?

Maria Forsman (Social Science Library, University of Helsinki)

The interpretation of bibliometric studies needs often background information about the object of the study. The background information can be acquired from different sources, like milestone publications, web pages, media, as well as interviews of gatekeepers. This paper deals with those sources, and especially thematic interviews as a way to know more about the research subject, its roots and history. The paper is based on experiences that have been got during the research process when studying the concept of Social Capital and its diffusion in science, politics and everyday life. The focus is on the co-word analysis and interpretation of its results.

Friday, 12 September

Session 4

Cultural shaping of scholarly communication in research institutes.

Late, Elina (Department of information studies, University of Tampere, Finland)

Scholarly communication has established to its modern form to contain for example journals, monographs, conferences, and reports. Communication practices vary between disciplines and even between neighbour fields. Different specialist fields have developed their own cultures with distinct ways to communicate. Studies about scholarly communication have usually focused on researchers who work at universities. However, there is some evidence that work organization, disciplinary cultures and funding patterns have impact on scholarly communication. For instance researchers working in research institutes read and publish less articles than researchers in universities. Research institutes conduct research differently and usually for different reasons from universities. Research is mostly applied and questions arise from common problems. Great part of the research is done for different companies who have made a contract with the research institute for conducting the study. In consequence funding may come from variety of sources. Especially in case of contract studies researchers don't always have the ability, motivation or time to write research articles in scientific journals. Sometimes the results of the studies are also confidential so writing an article is not even possible.

The aim of my research is to study scholarly communication in two major Finnish research institutes.

Research questions concern cultural shaping of scholarly communication in research institutes. Both qualitative and quantitative methods will be exploited. Expected outcomes will offer formative aspects of scholarly communication in specialists fields in research institutes. Topic is interesting from universities point of view as well when universities dependence of the government's budget funds will to some extend decrease. Because of that research culture in universities is likely to become more similar with culture in research institutes (see Hakala & al. 2003).

Reference

Hakala, J., Kaukonen, E., Nieminen, M., Ylijoki, OH. (2003). *Yliopisto – Tieteen kehdestä projektimyllyksi?* Helsinki: Gaudeamus.

Scholarly publishing orientations and patterns of print and electronic research literature use.

Talja, Sanna and Vakkari, Pertti (Department of information studies, University of Tampere, Finland)

Scholarly communication practices, including publishing practices, target audiences, major types of publications used and produced, vary across research fields. Our study explores differences in publication preferences and habits, and their relation to scholars' use of and preferences for different types of electronic and print publications. The data for the study were gathered through Web-based questionnaire sent to all Finnish universities in spring 2007 by the Finnish Electronic Library FinElib (n=738).

Researchers and faculty in humanities and social sciences esteem monograph publishing more highly than journal article publishing or practical publishing in the form of textbooks, manuals, or technical reports. The monograph orientation was associated with a heavier use of electronic book resources, a lower use of e-journals, and lower willingness to give up printed journals, but a higher willingness to move to electronic versions of reference works and dictionaries. The higher valuation of journal article publishing, in turn, was associated with a higher readiness to give up printed journals, but not printed books or reference works. The more scholars publish internationally, the more prepared they are to give up printed journals if electronic ones are available. The more scholars publish nationally, the more they value monograph publishing, the less they value practical and journal article publishing, and the less prepared they are to give up printed journals, and the more they wish a greater availability of national journals in electronic format.

Publishing practices and target audiences for research outcomes are major factors to consider when decisions are made on financial investments in print and electronic document collections. When both the provision of and demand for scholarly literature in electronic format keeps growing, it may become difficult to support all publication orientations equally, and higher resources fields may be in a better position to co-finance the acquisition of research literature.

Access, Usage and Citation Metrics: What Function for Digital Libraries and Repositories in Research Evaluation?

Armbruster, Chris (Research Network 1989, Berlin, Germany & Max Planck Society, Berlin, Germany)

The growth and increasing complexity of global science poses a grand challenge to scientists: How to organise the worldwide evaluation of research programmes and peers? For the 21st century we need not just information on science, but also meta-level scientific information that is delivered to the digital workbench of every researcher. Access, usage and citation metrics will be one major information service that researchers will need on an everyday basis to handle the complexity of science.

Scientometrics has been built on centralised commercial databases of high functionality but restricted scope, mainly providing information that may be used for research assessment. Enter digital libraries and repositories: Can they collect reliable metadata at source, ensure universal metric coverage and defray costs?

This systematic appraisal of the future role of digital libraries and repositories for metric research evaluation proceeds by investigating the practical inadequacies of current metric evaluation before defining the scope for libraries and repositories as new players. Subsequently the notion of metrics as research information services is developed. Finally, the future relationship between a) libraries and repositories and b) metrics databases, commercial or non-commercial, is addressed.

Service reviewed include: Leiden Ranking, Webometrics Ranking of World Universities, COUNTER, MESUR, Harzing POP, CiteSeer, Citebase, RePEc LogEc and CitEc, Scopus, Web of Science and Google Scholar.

Session 5

The Growth Rate of Science and the Coverage of Databases.

Larsen, Peder Olesen (Hellerup, Denmark) and von Ins, Markus (Institut für Forschungsinformation und Qualitätssicherung, iFQ, Bonn, Germany)

We have compared the number of records in SCI for 1955-2005 with the number of records in Chemical Abstracts (1907-2007), Medline (1959-2007), Physics Abstracts (1909-1969), INSPEC Section A, Physics 1969-2007), and the Sections in INSPEC (1969-2007).

In 1963 Derek de Solla Price determined the growth rate of science based on data from Chemical Abstracts, Biological Abstracts, Physics Abstracts and Mathematical Review. Price found a doubling time of 15 years corresponding to an annual growth rate of 4.7 per cent.

Our data show that the growth rate from 1970 to 2005 has been between 3.0% and 3.8%, corresponding to a doubling time between 19 and 23 years. Possible reasons for this decline are discussed and the question whether publication numbers are representative for the output of science is addressed.

The records in Science Citation Index (SCI) are often assumed to represent the scientific literature and the output of science. However, the growth rate in SCI is lower than in all the other databases studied, indicating that SCI is covering a decreasing part of the scientific literature. Therefore, the universal use of SCI-data in output and growth studies is unjustified.

However, no other and more reliable output indicators are available at the macro level. Also the mostly used input indicators for scientific research, manpower and expenses are unreliable for measurement of quantities or size.

Subject classification of publications in the ISI database based on references and citations.

Gunnarsson, Magnus, Fröberg, Johan, Jacobsson, Carl and Karlsson, Staffan (Swedish Research Council, Stockholm, Sweden)

The ISI database of scientific publications includes a subject classification of the journal issues. One of the subject classes is Multidisciplinary Sciences, which includes such prestigious journals as Nature and Science. This means that comparisons based on the ISI subject classes treat Nature and Science papers separately. For example, a medicine article that is published in Nature is not compared to other medicine articles, but rather to other articles published in multidisciplinary journals.

This paper describes a method for reclassifying papers in multidisciplinary journals based on the papers' references and citations. The method manages to reclassify more than 50% of the papers in multidisciplinary journals. Most of the papers that the method fails to classify are lowly cited.

Reference and citation errors - a study three law journals.

Hildebrandt, Ann-Sofie & Larsen Birger (Royal School of Library and Information Science, Copenhagen, Denmark)

The ISI citation indexes (now owned by ThomsonReuters) have frequently been criticised for containing numerous errors in the references parsed for the citation index. We perform a detailed investigation of the source and amount of errors in three law journals: First, the references in the Web of Science were compared to the original references as published in the journals, to investigate any errors made by ISI. Next, the original references as published in the journals were compared to the original cited documents, to investigate the errors made by article authors. A total of 1567 references from 90 articles were analysed covering three time periods: 1985/86, 1995/96 and 2005/06. Results show that the error rate has dropped over time by 14% from 1985/86 to 2005/06 for the errors made by authors, and by 13% for the errors made by ISI.

Session 6**Journal Cross-citation Analysis: Tracing the Role of Individual Journals in the Communication Network and Validation & Improvement of Journal-Based Subject Classification in Bibliometric Research.**

Lin, Zhang (K.U. Leuven, Steunpunt O&O Indicatoren and Dept. MSI, Leuven, Belgium & WISE Lab, Dalian University of Technology, Dalian, China) and Glänzel, Wolfgang (K.U. Leuven, Steunpunt O&O Indicatoren and Dept. MSI, Leuven Belgium & Hungarian Academy of Sciences, Institute for Research Policy Studies, Budapest, Hungary)

The first objective of this study is uncovering structural patterns of information flow among scientific journals. The study is based on the Web of Science for the period 2002-2006. Cross-citation links are determined on a item-by-item procedure for individual papers published in the corresponding journal. Beyond measuring the individual journals position in the communication network, we shed light on their cognitive background as well. Centrality, isolation and entropy are influenced by many factors such as the subject area, document types, number of publications, specialisation, inter-disciplinarily, language barrier, national or international orientation, visibility, 'quality' and other related issues.

The second objective is to use journal-network analysis for validation and improvement of existing journal-based subject classification schemes. This part of the analysis is based on cross-citation link clustering. We have found 15 an appropriate number of journal clusters and the 15-field subject classification scheme of the Steunpunt O&O Indicatoren is used as the "control structure". First the cognitive structure of cross-citation clusters is studied then the subject classification is evaluated according on the basis of the cluster analysis. Finally, a direct field-to-cluster comparison is applied and the "migration" of journal is studied in order to adjust and improve the existing "intellectual" classification scheme.

Analyzing asymmetric proximity relations in transaction matrices: The case of journal cross-reference matrices.

Schneider, Jesper W. (Royal School of Library and Information Science, Aalborg South, Denmark)

In science mapping, the common methodological approach is to treat relations between bibliometric entities as symmetric proximities. Usually, this entails the calculation of co-occurrences between entities, and a subsequent transformation of the co-occurrences into a similarity matrix used for mapping.

Recently, the application of transaction matrices has become the focus in mapping studies. A transaction matrix contains asymmetric relations between its entities. Especially, the utilization of the citing-cited journal relations available from the Journal Citation Reports® has been in focus in recent science mapping studies. For a set of journals, it is possible to construct a matrix of cross-referencing activity, where the rows represent journals giving references to the other journals, and the columns represent the same journals receiving citations from the other journals.

Interestingly, analyses of the essentially asymmetrical relations between journals in the transaction matrices are done by use of the symmetric cosine similarity measure. However, the cosine measure is only capable of capturing one relational aspect in the matrix at a time, either the citing or the cited profiles of the journals. Several matrices and maps are therefore needed to investigate the multidimensional aspects that reside within transaction matrices. Such an approach fails to simultaneously model the cross-referencing activity in the matrix, diminishing the information eventually projected into the science maps.

The aim of the present research is to investigate the ability to simultaneously capture the asymmetric relations residing within transaction matrices by use of a proposed alternative proximity measure, and an unfolding scaling technique, respectively. Hence, our aim is to simultaneously model citing, cited and self-citing relations, in order to enhance science mapping based on transaction matrices. The eventual goal is one map expressing several of these relations.

Confidence intervals and error margins for the field normalised citation rate.

Kronman, Ulf & Karlsson, Staffan (Swedish Research Council, Stockholm, Sweden)

In some instances it is considered as a rule of thumb that citation based indicators should not be calculated for samples smaller than fifty publications; averages based on smaller samples are considered unreliable. On the other hand, citation rates calculated for groups with more than fifty publications is usually presented without any indication of its confidence interval. We here postulate that it can not be possible that the interpretation of citation statistics evolves from being "too low" to "unproblematic" by adding a few publications, and try to calculate error margins valid for any number of publications analysed.

We used time series of annual mean citation rates for groups of different sizes and studied the distribution of the yearly variations. We found that the margin of error based on a 95 percent confidence level for the normalized citation rate is strongly correlated with the number of publications analysed. Our results indicate that an analysis of the field normalised citation rate for 1000 publications has an error margin of ± 0.06 and an analysis of 100 publications has an error margin of ± 0.15 .

Session 7

The meaning and function of the citation in the humanities: A theoretical analysis.

Hellqvist, Björn (Institution of ABM, Uppsala University, Sweden)

The citation is one of the key units of analyze in bibliometric research and the meaning and use of citations has been debated. Theories of citations have been proposed and the first part of this article gives an overview of these, and how they are expressed through metaphors. The second part focuses on how references are used in the humanities and it concentrates on two aspects of the references in the humanities; one, why are they given? And two, how are they given? And furthermore is there a connection between these two aspects. The motivation for citing is different in the humanities compared to science. A simplification would be that the humanist scholar cites to show his originality while a natural scientist cites to show his affiliation. Also the citation in the humanities is a descendant from the tradition of the footnote which emerged from the disciplines of history and religion. This article is a first attempt for a “citation theory/ reference theory” that includes the humanities.

Benchmarking Medical Research - Aggregating Publications using Medical Subject Headings (MeSH-terms).

Carlsson, Håkan (Sweden Gothenburg University Library and Head Office, Lund University Libraries, Sweden), Larsson, Christer (Department of Laboratory Medicine, Lund University, Malmö, Sweden) and Noyons, Ed (Centre for Science and Technology Studies (CWTS), Leiden University, the Netherlands)

As the interest in research performance analysis using bibliometrics increases, more specialised tools are developed. In cases when verified publication data is not available; data is normally collected and aggregated using subject or organisational criteria. The journal subject areas in Thomson Reuters/ISI are often used, but can be poor in their precision and granularity.

In an attempt to improve the data collection for a number of medical fields, MeSH-areas were created using Boolean combinations of MeSH-terms, the controlled vocabulary keywords of Medline. These areas were then used to benchmark medical research of a number of universities by using a database containing matched Thomson Reuters ISI/Medline data.

The presentation will focus on the creation of the MeSH areas and how a reasonable workflow can look. Pros and cons of the general method will also be discussed. The actual benchmark and a study of the nature of the data aggregation are underway and preliminary data will be shown and commented.

Are Creativity Indicators Related to Leadership in R&D? A Study Based on Bibliometric Data, Subjective Creativity Ratings and Leader-Membership Exchange (LMX) in Biomedical R&D Groups.

Hemlin, Sven and Olsson, Lisa (Gothenburg Research Institute, & Dept of Psychology, University of Gothenburg, Sweden)

If it would be possible to organize for increased creativity and innovations in R&D everyone would be happy. This issue has been given interest in creativity and innovation research for some time and interesting findings have been presented. A recurrent result is that group climates are related to creativity and innovative behaviours. Recently, the issue is raised in what way leaders could stimulate creativity in groups. We have designed a study to investigate how the creativity of R&D groups is dependent on group leaders in the biotech field. A number of indicators on creativity were used: publications, patents, h-index, and subjective creativity ratings. They were related to the leader-membership exchange scale (12 item version). Our two main hypotheses were supported: a) creativity is positively related to LMX, b) high LMX ratings by leaders and members are related to creativity. We are currently analyzing group leadership and creative phases, leadership style and knowledge management. In the presentation we will report findings and implications of this study.
