The "Sound of Bibliometrics": an analysis of its level of awareness and acceptance in Austria

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Abstract

This paper gives an overview of the history of bibliometrics in Austria and reports on its level of awareness and its acceptance. For this purpose an online survey addressed to Austrian scientists was conducted and its results analyzed. In spite of emergent and increasing activities in this field, the uptake of bibliometric knowledge is slow and has much room for improvement in the Austrian scientific community. The majority of responders agree on the need for a more sophisticated bibliometric education and also indicate a willingness to use existent bibliometric services.

Background and Purpose of the study

This study was done within the scope of a master thesis for the university course "Library and Information Studies", which is still work in progress and is supervised by the Bibliometrics Department of the Vienna University Library.

In 2013 Vienna will host the ISSI conference. In light of this occasion the authors give a short overview of the history of bibliometrics in Austria and try to find out about its level of awareness and its acceptance by conducting an online survey addressed to Austrian scientists.

History

Bibliometrics in Austrian scientific literature

Bibliometrics "per se" was getting more important in the 90s of the last century.

An early paper on citation analysis - "The unbearable importance of citations" (Gorraiz, 1992) - can be considered as a pioneer contribution. The author offered a German definition of bibliometrics which is still used in the scientific discourse of German speaking countries (Ball, 2006).

Austrian authors focused their attention mainly on the impact factor (e.g. Feigl, 1990), on performance resp. output indicators in general (Rauch, 1999; Fröhlich, 1999) or on bibliometric analyses (Reiter, 1993; Reiter, 1995). Furthermore a new iteration model for representing multidimensional relationships was introduced by Kopsca & Schiebel (1998).

Within the last decade the number of bibliometric publications as well as the discussed topics has gradually increased. The impact factor remains to be an important issue (e.g. Fröhlich, 2003;); Fröhlich, 2008; Ortner, 2010) amongst research evaluation (e.g. Schlögl et al., 2003; Wallner et al., 2003), peer review (e.g. Fröhlich, 2003a; Fröhlich, 2008; Fröhlich, 2009), emergent research issues and mapping (e.g. Widhalm et al., 2001; Noll et al., 2002; Hörlesberger & Schiebel, 2006; Schiebel, 2010), citation versus usage (e.g. Schlögl & Gorraiz, 2010; Gorraiz & Gumpenberger, 2010; Schlögl & Gorraiz; 2011), rankings (e.g. Bookstein et al., 2010), output and impact of Social Sciences (e.g. Resch & Schlögl, 2004; Schlögl and Stock, 2006); Gorraiz et al., 2009), bibliometric analyses in clinical trials and diagnostics (Petermann et al., 2008; Vavken et al., 2008; comparison of the bibliometric data

sources Scopus and Web of Science (Gorraiz, 2006; Gorraiz & Schlögl, 2007) and applied bibliometrics in library management (e.g. Gorraiz & Schlögl, 2003) .

Austrians have also been contributing as reviewers and editors to bibliometric journals, like e.g. Gorraiz and Schiebel for "Research Evaluation", "Scientometrics" and "Science and Public Policy".

Analogous to the bibliometric papers the number of Austrian bibliometric master and doctoral theses has been continuously increasing since the early 90s. Apart from the already mentioned topics they also deal with reference analysis, scientometric analysis of journals and conference proceedings, bibliometric analysis software, field specific citation behaviour, co-link analysis, bibliometric research monitoring and visualization.
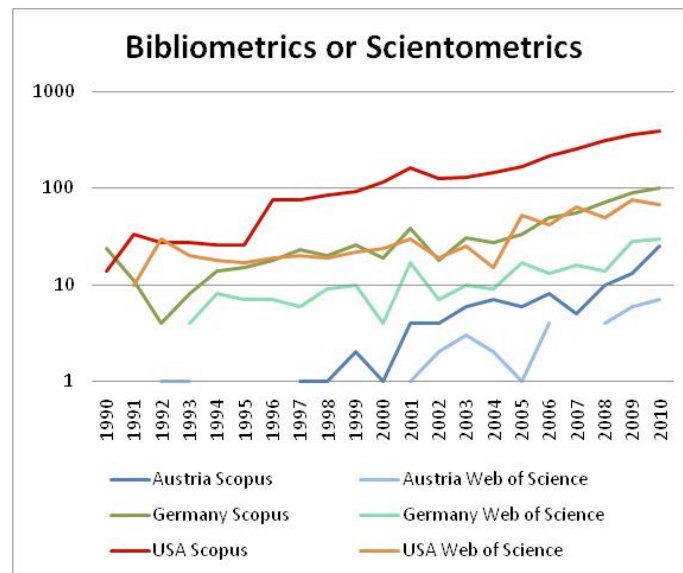
Bibliometrics at events

In Austria the most important national conferences for information specialists are the "ODOK" (Österreichisches Online-Informationstreffen und Österreichischer DOKumentartag) and "Österreichischer Bibliothekartag". Within the last decade all 5 ODOKs (2001, 2003, 2005, 2007, 2010) and the last "Österreichischer Bibliothekartag" (2009) featured many bibliometric topics with an increasing trend. Moreover the last two years saw several bibliometric workshops, discussion meetings and information events for scientists, research managers and information specialists hosted by institutions like the University of Vienna, the University of Graz and the "Österreichische Forschungsgemeinschaft".

Austrian bibliometricians have also become more engaged in the international arena within the last years and held talks at conferences like ISSI (Gorraiz & Schlögl, 2009; Gorraiz & Schiebel, 2009), INFORUM (Gorraiz & Gumpenberger, 2010), LIBER (Gorraiz & Gumpenberger, 2010) and STI (Leitner & Schartinger, 2008; Schlögl & Gorraiz, 2008; Schiebel et al., 2008; Gumpenberger et al., 2010; Gorraiz et al., 2010) about topics such as new download metrics, scientometric analysis of negative results, or the role of bibliometrics in modern librarianship

The University of Vienna and the Austrian Institute of Technology (AIT) furthermore jointly organized and hosted the STI conference 2008 in Vienna, supported by Juan Gorraiz and Edgar Schiebel as reviewers and editors, who also contributed to the STI conference 2010 in Leiden as reviewers.

Bibliometrics in the media

Despite the increasing number of bibliometric publications and events, the coverage in the Austrian media is still very low. The terms "bibliometrics" or "scientometrics" have been increasingly indexed in the databases Web of Science and Scopus (see Fig. 1), however, they are hardly mentioned in the Austrian media. Even a popular topic like the "impact factor" does not show up too often. Contributions by Gerhard Fröhlich (e.g. 1999a) as well as news on "Rankings" are the only exceptions that are at least perceived as somehow interesting for a broader audience. Overall the general awareness of bibliometrics in Austria is still low.

Figure 1. The terms Bibliometrics and Scientometrics in WoS and Scopus

Bibliometric services

Few Austrian institutions offer professional bibliometric services so far. The Austrian Institute of Technology (AIT) has implemented "Bibliometrics and Scientometrics" as a research service and is engaged in several international initiatives. The Medical University of Innsbruck takes care of bibliometric analyses for professorial search procedures through their service center for "Evaluation and Quality Assurance". Furthermore the University of Graz pursues bibliometrics in their department for "Performance - and Quality Management".

However, the University of Vienna leads the way in Austria. A dedicated Bibliometrics Department has been implemented at the Vienna University Library in 2009 providing a portfolio of services for the university's research and administrative staff. The team in charge is actively engaged in national and international initiatives, partnerships and projects and has even launched a promotional website (http://bibliometrie.univie.ac.at/). Representatives of the Bibliometrics Department are also members of the inter-institutional working group "Scientometrics", joining forces with the Quality Assurance Department and the Rectorate and bundling existent competencies.

Bibliometric education

It is a matter of common knowledge that there is a lack of bibliometric expertise and education on the one hand, and an increasing demand on the other.

Bibliometric online course material has been offered in German language since the late 90s (http://www.zbp.univie.ac.at/gj/citation/bibliometrie.htm) .

Responding to the lack on the national level, "Bibliometrics and Scientometrics" have been added in 2008 as an optional module to the university course "Library and Information Studies", which is regularly held at the universities of Vienna, Graz, Innsbruck and Salzburg. Furthermore representatives of the Bibliometrics Department of the Vienna University teach bibliometrics in post-graduate courses of the Vienna University.

On an international level the University of Vienna joined forces with the Humboldt University in Berlin (Germany), with the Institute for Research Information and Quality Assurance (iFQ, Germany) and the Katholieke Universiteit Leuven (Belgium) and launched the European Summer School for Scientometrics (esss) in 2010. esss provides a sound overview of state-of-the-art scientometric indicators and methods as well as annually selected hot topics (http://www.scientometrics-school.eu/).

Methodology

Sample

Scientists of ten Austrian universities (University of Vienna, University of Graz, University of Innsbruck, University of Salzburg, Johannes Kepler University Linz, Alpen-Adria-Universität Klagenfurt, Vienna University of Technology, Vienna University of Economics and Business, Medical University of Graz, Medical University of Innsbruck), of the Austrian Academy of Sciences as well as of the FWF Austrian Science Fund participated in the study. Participants were randomly chosen and were either contacted directly or via the responsible IT services or rectorates.

Online survey

The online survey was designed by the authors and programmed by staff of the Central Library of Physics, Vienna. The survey comprised 6 main topics with corresponding subitems, being a mix of open and closed questions, which could be answered in 15 minutes on average. The survey was conducted from May to October 2010. An online invitation letter as well as a reminder was sent to 13024 potential participants. 1451 responded to the online survey, for an 11 percent response rate.

Findings

The background of the responders

What are the responders' main disciplines (multiple choices possible)?

Responders could choose from Natural Sciences, Arts & Humanities, Social Sciences, Medicine, Technology and Law, and "Others". Fig. 2 shows the according absolute figures and percentages. Note: multiple choices were possible, and the overall less than 2 percent of either "Others" responses (6 responders) or no selections (18 responders) were considered insignificant and therefore not included in the chart.
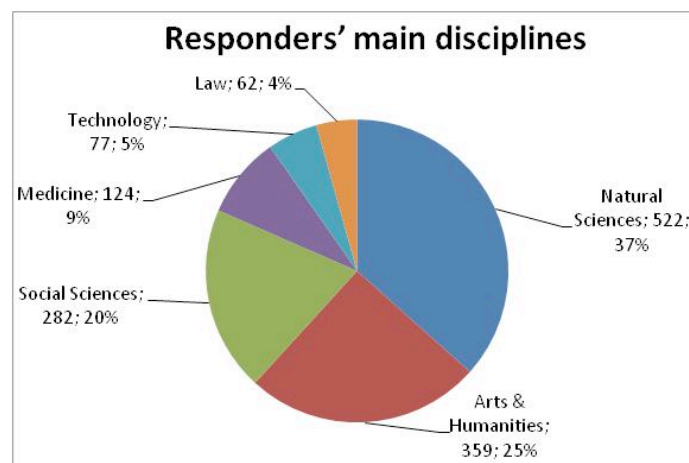

Figure 2. Main disciplines of the responders

What are the responders' primary areas of responsibility?

The majority of responders are mainly concerned with research (58 percent), followed by 10 percent teaching and 6 percent administration. The remaining 26 percent are combinations of the three areas.

Bibliometric indicators

What bibliometric indicators are the responders familiar with (multiple choices possible)?

Responders could choose from the following indicators: Journal Impact Factor, Citations per paper, h-Index, Cited and Citing Half Life, Immediacy Index, g-Index, Field Citation Score, Crown Indicator and "Others". Unsurprisingly the Journal Impact Factor is the best known indicator (79 percent), followed by Citations per Paper (67 percent), h-Index (31 percent), and Cited and Citing Half Life (16 percent). The less than 2 percent responses indicating a non-familiarity with any bibliometric indicator were considered insignificant. The distribution by percentage is shown in Fig. 3.
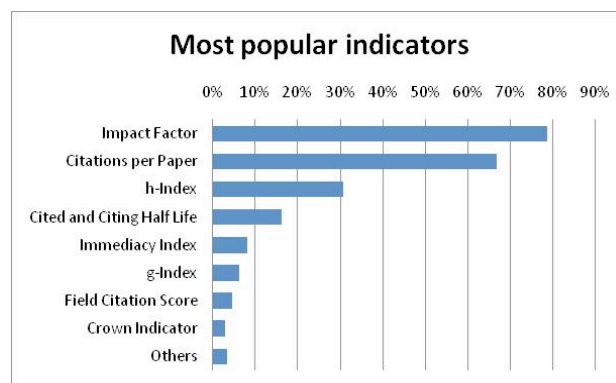
Figure 3. Familiarity with bibliometric indicators

Regarding the 3 percent of responses for "Others" following indicators were quoted:
Journal Citation Score, 5-Year Impact Factor, Quotation Index, Article Influence Score, Eigenfactor, Number of Publications, Download Indicators. For the sake of completeness the also mentioned "related citations" and "peer-review" are listed here, despite being aware both are no indicators per se.
Fig. 4 gives an overview of the level of familiarity of the four best-known indicators according to the disciplines mentioned before.
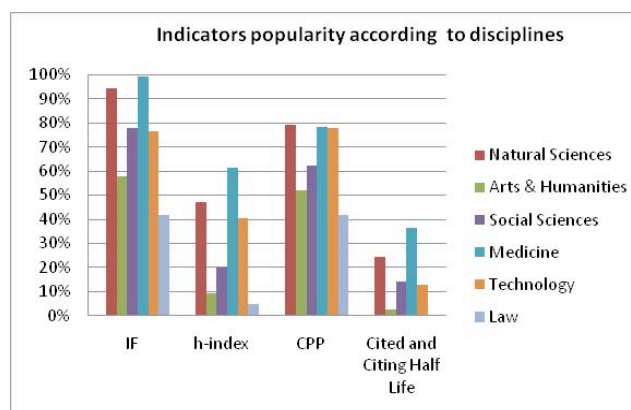

Figure 4. Best-known indicators among disciplines

Bibliometric databases and analytical tools

What bibliometric databases and analytical tools are the responders familiar with (multiple choices possible)?

Google Scholar is the best-known bibliometric database (67 percent), followed by Web of Science/Science Citation Index (59 percent) and Scopus (36 percent). The 11 percent "Others" comprised of many different listed databases, however, only a few ones with bibliometric features shall be considered here: PubMed (2,16 percent), SciFinder (1,05 percent), arXiv (0,70 percent), ScienceDirect (0,70 percent), CiteSeer (0,63 percent), Mathematical Reviews (0,49 percent) and MathSciNet (0,49 percent).

Regarding the analytical tools the Journal Citation Reports (JCR) are best-known (34 percent), whereas the Essential Science Indicators (ESI) and SCImago seem to have a very low level of familiarity among the responders. Details for all databases and analytical tools are shown in Fig. 5.
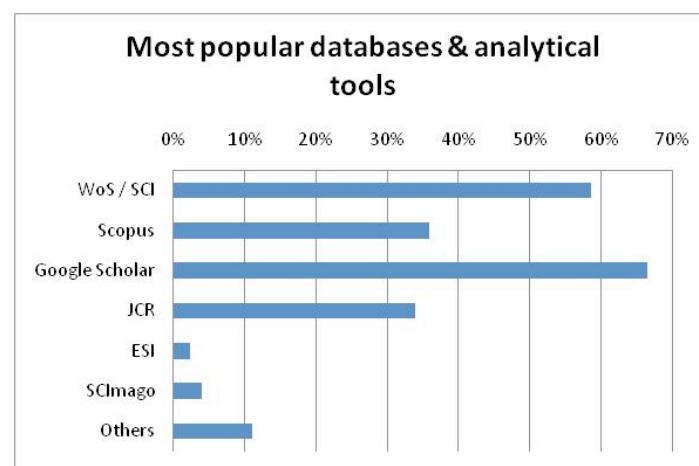
Figure 5. Best-known databases and analytical tools

Fig. 6 gives an overview of the level of familiarity of the three databases and the best-known analytical tool according to the disciplines mentioned before.
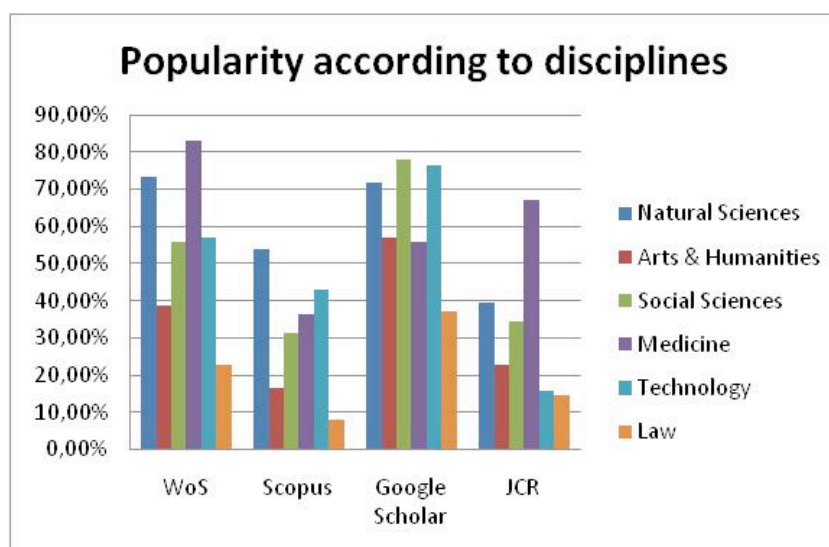
**Figure 6. Databases and analytical tools among disciplines**

The Journal Impact Factor

Is the Journal Impact Factor relevant for scientists where to publish their findings? Is it more difficult for scientists to publish in high-impact journals?

Almost 70 percent of the responders agreed that the Impact Factor has to be taken into account for their publication strategy, which is more important in the Natural Sciences, Medicine and Technology as expected. Details are given in Figure 7.

Overall the majority of respondents (74 percent) agree that it is more difficult to publish in high-impact journals.
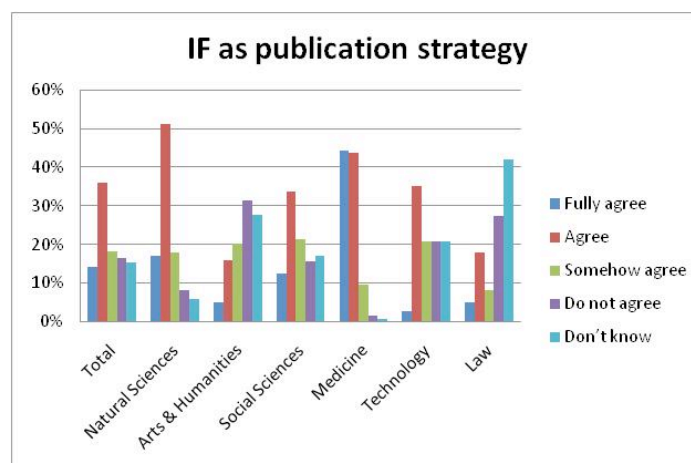

Figure 7. The importance of the IF for the publication strategy

What other criteria would scientists take into account?

Survey participants were asked to indicate further criteria apart from the Impact Factor which they personally think to be important for their publication strategies. Since this was a completely open question without any response options to choose from, only 44 percent of the responders provided analyzable input. Responses were consolidated into eight well-defined and two rather heterogeneous* categories, and the results are shown according to the disciplines in Fig. 8.

*Note: "Specific Journal Features" include e.g. language, print quality, permitted length of contributions, etc. "Further criteria" include personal experience with the journal, the who's who of editorial boards, explicit invitation to publish in a journal, etc.
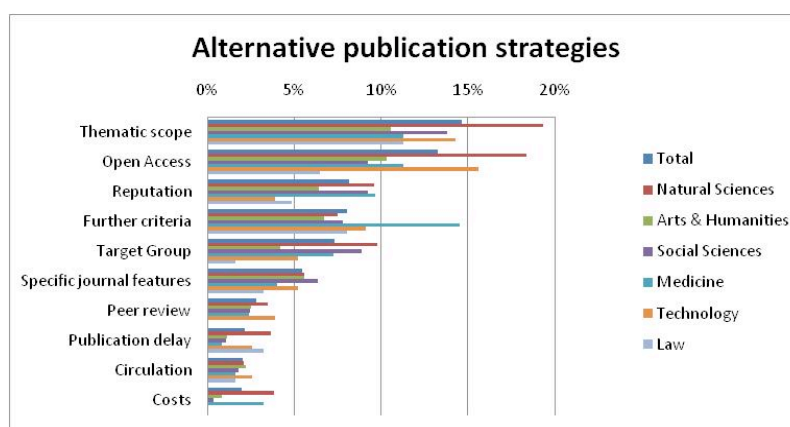
**Figure 8. Alternative criteria for publication strategies**

Research evaluation

Would scientists consider bibliometrics as an appropriate tool for research evaluation? Should bibliometric indicators be used as comparative parameters in the management by objectives of institutes or faculties?

The majority of respondents from all disciplines (37 percent) report that bibliometrics is only a somehow appropriate tool for research evaluation, whereas 25 percent disagree and 15 percent have not made up their minds yet. The picture is very similar regarding the use of bibliometric indicators in performance management systems with equal percentages of respondents who either somehow agree or disagree (each with 33 percent).

Is the measuring of quantitative aspects with bibliometrics perceived as a meaningful complement for the qualitative peer-review?

Peer-review is essential to cover the qualitative aspects; however, it is generally known to be highly subjective. The participating scientists were asked to weigh in on the question whether bibliometrics was able to complement the peer-review process in a meaningful way or not. About 56 percent of the responders agree on the useful role of bibliometrics in this regard. Discipline-specific results are shown in Fig. 9.
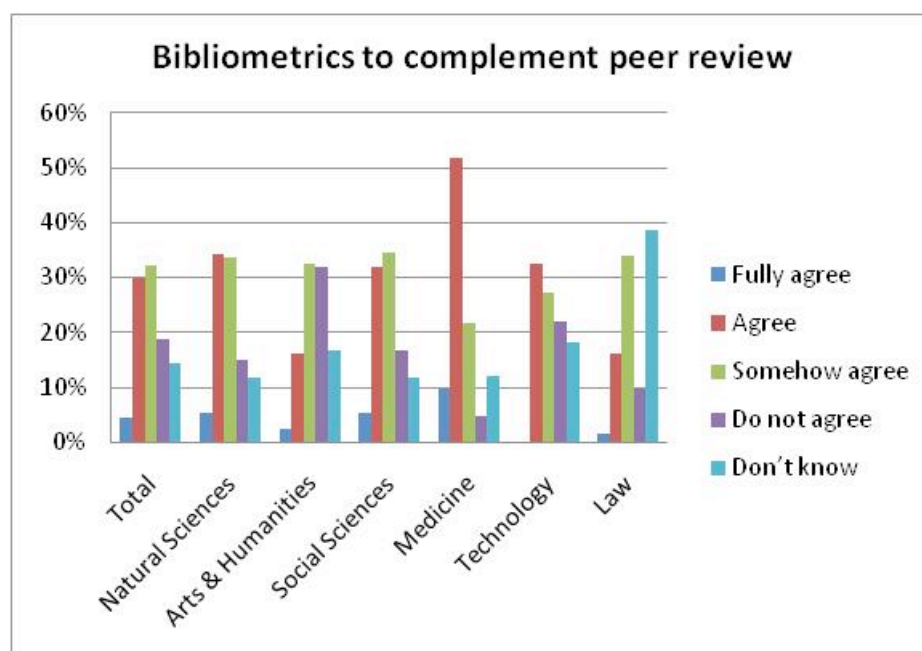
Figure 9. Bibliometrics as an added-value for peer review

Would citations be considered to reflect the importance of individual and institutional research output?

An overwhelming majority of responders (82 percent) share the opinion that the importance of research output is certainly reflected by citations. In spite of the fact that citation behavior is discipline-specific, the overall picture is rather consistent (see Fig. 10).
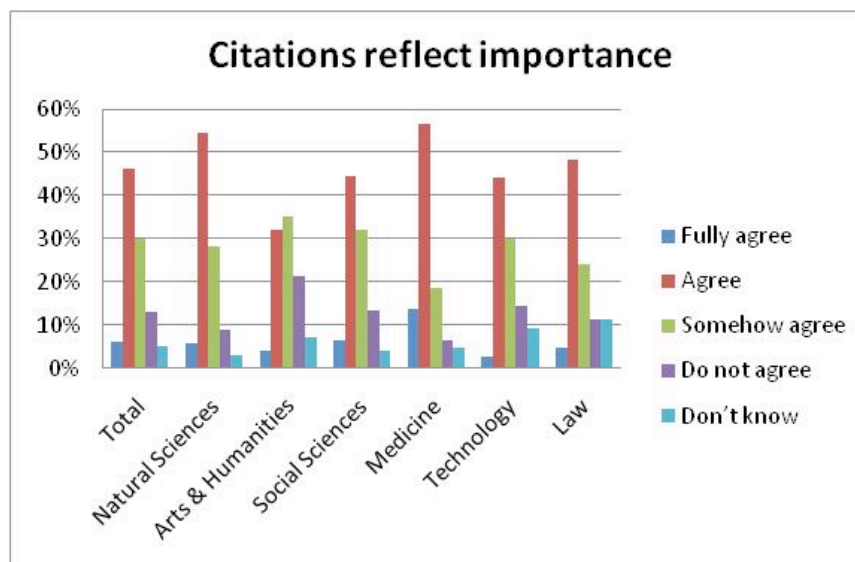
Figure 10. Significance of citations for research impact

University Rankings

Is it appropriate to determine the quality of universities according to rankings?

Most responders (44 percent) only somehow agree that rankings are appropriate to determine the quality of a university. However, overall agreement is still 64 percent. Details are given in Fig. 11.
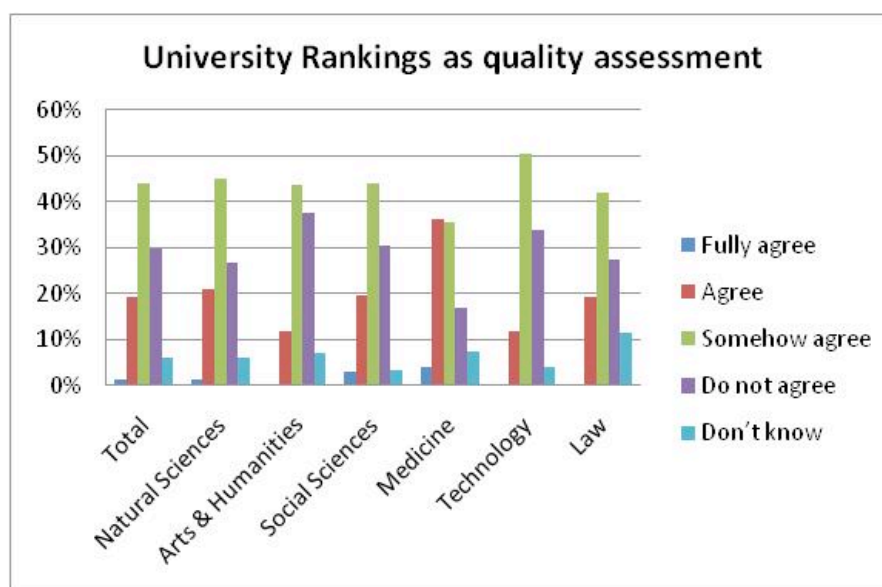

Figure 11. Rankings as an assessment tool

What rankings are scientists familiar with (multiple choice possible)?

The best-known ranking by far is the Shanghai Ranking with 45 percent. THE-QS, Leiden Ranking and Webometrics have similar degrees of familiarity (16 resp. 15 resp. 14 percent). Other mentioned rankings apart from these four only amounts to less than 2 percent of the

responses and is therefore negligible. Fig. 12 gives a discipline-specific overview and presents a quite consistent picture.
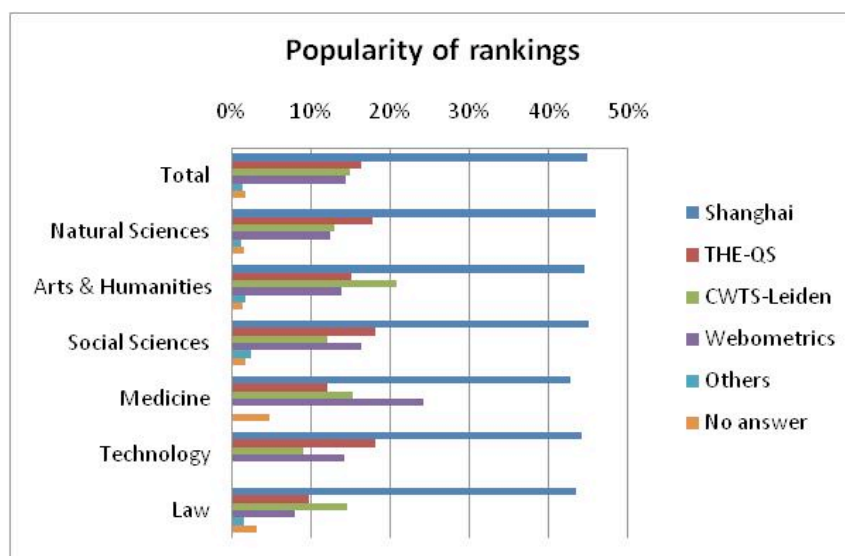

Figure 12. Familiarity with rankings

Bibliometrics expertise

Is there a need for more bibliometric education in Austria?

The majority of responders (65 percent) agree on the need for more bibliometric education in Austria. For details see Fig. 13.
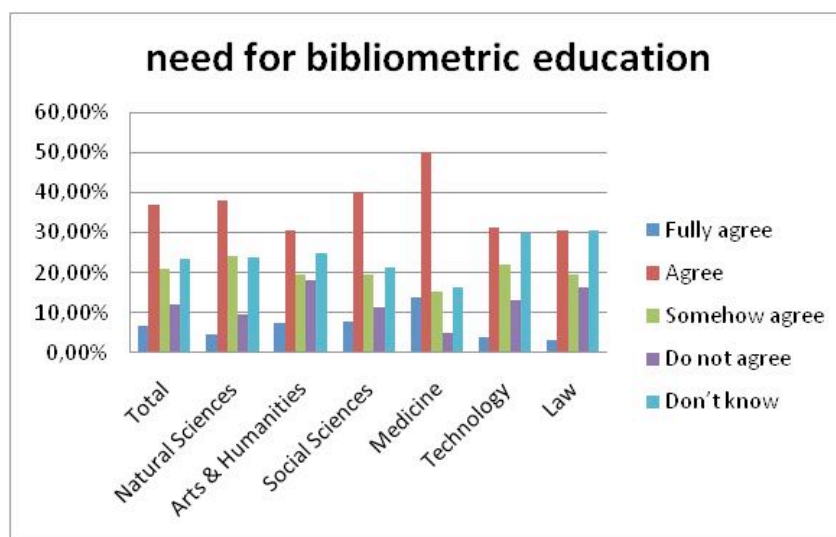

Figure 13. Need for bibliometric education

Which of the provided bibliometric services would Austrian scientists use (multiple choice possible)?

As already mentioned in the History part of this paper, a few Austrian institutions have implemented bibliometric services. Scientists were now asked which of the provided services

they would use. Offered options were "Training", "Data gathering & analysis", "Consulting", "Expert studies" and "none". Apart from "Expert studies" with 15 percent the percentages for all the remaining possible choices were balanced from 27-28 percent in the overall view. Discipline-specific views are represented in Fig. 14 with an emphasized demand for bibliometric services in Medicine.
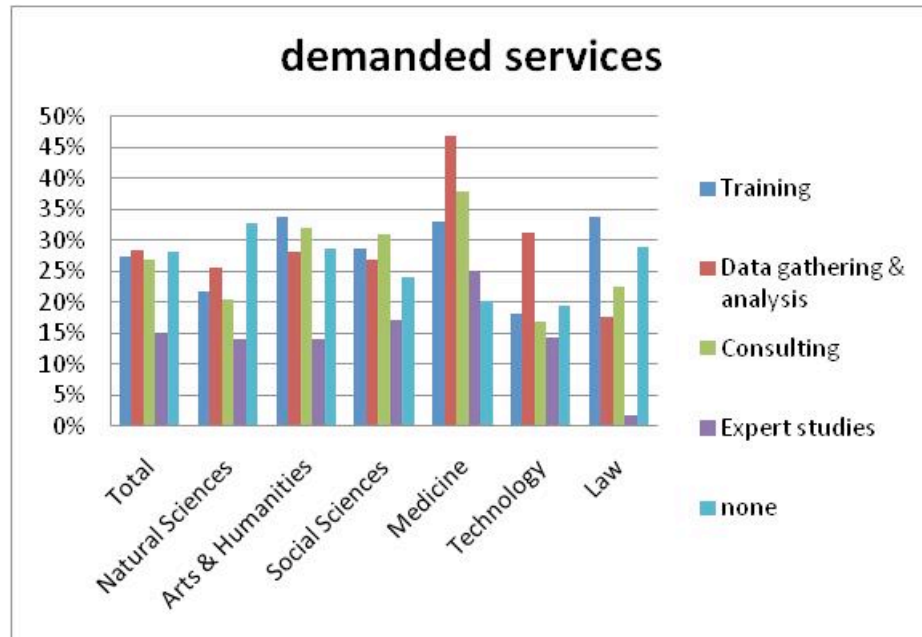

Figure 14. Bibliometric services in demand

Considerations and Conclusions

Results from the survey provide an insight into the awareness for bibliometrics in Austria. In spite of emergent and increasing activities in this field, the uptake of bibliometric knowledge is slow and has much room for improvement in the Austrian scientific community.

Citations are accepted as proof for research impact, and bibliometrics is perceived as a valuable complement for the peer-review process. Unsurprisingly the impact factor is the best known bibliometric indicator, driven by the fact that scientists are required to publish in high-impact journals if they want to succeed in a "publish or perish" world (at least true for the Sciences). Austrian scientists understand this requirement and are aware of the difficulty to publish in these prestigious journals; however, a more multi-dimensional thinking is only developing slowly. Knowledge of bibliometric indicators, databases and analytical tools needs to expand more quickly in the very own interest of the scientists. Whether they like it or not, bibliometrics is increasingly used in research evaluation globally, and the Austrian scientists' attitude can at least be described as hesitant.

Nevertheless most of the responders agree on the need for a more sophisticated bibliometric education and also indicate a willingness to use already provided bibliometric services. It is now important to further develop such bibliometric services and tailor them according to the scientists' discipline-specific needs. More bibliometric knowledge will not only improve Austria's publication strategies, but will also enable scientists to understand and challenge the existent rules at their institutions.

On the other hand the gained insight is invaluable for bibliometricians in order to learn about the scientists' concerns and expectations. Especially for the Viennese Bibliometrics

Department this is an incentive to further focus on a service-oriented way to practise bibliometrics and to overcome its negative connotation of only serving evaluation purposes.

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