A Citation Based Ranking of Researchers in German Business Administration on the Basis of Google Scholar

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The quantitative evaluation of research performance in German Business Administration has recently gained attention. This holds especially for rankings of persons which are discussed controversially. Rankings of academics can be constructed in two different ways, either based on journal rankings or based on citations. Despite citation based rankings promise some fundamental advantages, they are still not common in German Business Administration. However, the choice of the underlying data base is crucial. This paper argues that for German professors in Business Administration (as an example for a non-English speaking scientific community in the social sciences) Google Scholar is an appropriate data base. Unfortunately it contains some structural errors that require diligent corrections. With that in mind, all 1,572 members of the German Academic Association for Business Research (VHB) were ranked according to the citations of their recent publications (2005-2008). The results are compared to those of the Handelsblatt-BWL-Ranking which is the most prominent journal based ranking of academics in this discipline. It becomes clear that differences in method lead to different results.

1 Citations as an indicator for research performance

1.1 Research performance and its measurability

The quantitative evaluation of research performance has gained more and more attention in the field of German Business Administration and thus is debated controversially. The field of Business Administration is representative for many sciences and humanities where performance in research and teaching is accessed to be measured by quantitative and interpersonal comparable means. Germany's excellence initiative to promote leading universities, management by objectives within the universities and the procedures of appointment of professors are all indications for that development (cf. Hennig-Thurau/Walsh/Schrader 2004).

From a managerial point of view the importance of output measurement is not surprising. Managing of scarce resources requires the assessment of output in one or another way since without it neither effectiveness nor efficiency could be strived for. The successful management of a chair, a department, the university or even the system of higher education in the whole country requires the setting of goals to reach and a method of controlling the results. Traditionally this was done by peer review or in a more or less implicit manner. Bibliometrics, however, can be an interpersonally comparable method to support decision making in academia by adding an additional and more objective dimension of measurement.

From an economist's perspective science is about competition for reputation within the scientific community. Scholars strive for knowledge and try to spread their findings into the community (cf. Klingemann 1988, Dyckhoff/Schmitz 2007). Excellence in science includes both, new findings and their publication. Even a genius thought does not imply academic progress until it reaches its audience. Within the scientific community reputation is earned by the acknowledgement of the findings by colleagues. The impact of a scholar's work therefore reflects his or her reputation. Publishing the scientific findings in an academic journal or book leads to positive externalities, since it enhances the progress of fellow researchers in the scientific community.

Rankings are a way to measure and compare the performance of individual scholars, departments, universities, academic journals or even whole sciences or countries to describe their position in the scientific community. They can be constructed for different means and try to quantify the impact of academic work (cf. Dilger 2010). Rankings of persons concentrate on the publications of individual scholars and bring them in an order according to a certain key performance indicator. However, in German Business Administration the adequacy of rankings as such is highly controversial (e.g. Albers 2009 for critique).

1.2 Journal based versus citation based rankings of academics

Journal based rankings evaluate and compare publications according to the journals they have been published in. Currently, journal based rankings of academics are the most common form in German Business Administration and Economics. Publications are weighted by the journals they are published in. The journal weights are in most cases derived from citation rates (impact factors), questionnaires (e.g. VHB JOURQUAL) or by a combination of different meth-

ods and journal lists (e.g. Handelsblatt journal list underlying the Handelsblatt-BWL-Ranking). Despite its popularity this approach has been criticised (e.g. Müller 2010):

First, this approach takes only journal publications into account and ignores monographs and edited volumes as well as articles on academic web portals (such as SSRN). Books are neglected due to the methodological structure of journal based rankings although they still form important contributions to academic progress in the social sciences (Adler/Harzing 2009, Griffith/Cavusgil/Xu 2008). This is in particular the case for German Business Administration.

Second, impact factors reflect only the number of citations of an average article within a specific journal (and within some years, normally two after the publications, which could be too short for the social sciences). In journal based rankings this average score is assigned to an individual paper despite the fact that the citations of the individual articles within one journal are highly heterogeneous. The impact factor of a certain journal is only weakly correlated to the impact of a specific article within it. The citations of an article have influence on the impact factor of the journal, but not the other way round (Seglen 1994, 1997). Even top tier journals contain a lot of articles that only gain very little or none attention (Frey/Rost 2008). Inversely, this means that the impact of really outstanding papers is underscored if valued with the average citations of the journal. This is not only true for journal weights based on bibliometrical measures. If the underlying journal list of a ranking of persons is produced via questionnaires (such as VHB-JOURQUAL which is the official journal ranking for German Business Administration) the problem stays the same: The overall prestige of the journal is attributed to every individual paper. However, papers do form the reputation of the journal but not the reverse.

Third, journal based rankings tend to produce results only for a very small group of top researchers. The research performance of the majority of professors who do not publish in top tier journals cannot be accessed properly by this way.

With regard to these objections against journal based rankings the alternative of citation based rankings might be a more comprehensive way to quantify research performance of German scholars in Business Administration. In citation based rankings the research performance of an academic is directly measured by the citations his or her work collects. This method matches very closely with the above mentioned concept of scientific competition since the citation of a paper means to acknowledge its content. Instead of looking in which medium a

finding is published, its reception gets the central characteristic of quality. In a citation based ranking the citations are looked up for every publication individually. The journals, as an intermediate layer with distorting averages, are not taken into account because the impact of any publication is measured separately.

Another important advantage of citation based rankings lies in the fact that they are not necessarily limited on journal publications. Because the measurement is carried out directly at the individual paper, citations on monographs, chapters in edited volumes as well as online publications can be taken into account. The arbitrary neglect of monographs and edited volumes aligned to journal based rankings can be overcome. The scope of the analysis might be a problem of the database indeed, but is not limited by the method of ranking.

However, citation based rankings have got their very own objections, too. First, they have higher requirements on the underlying database and the effort needed to collect the relevant data. In practical terms, every publication of every considered scholar requires an own database request. Second, in contrast to journal rankings, the underlying data change quickly. Old publications gather new citations over the time. A new edition of a citation based rankings requires a completely new data request because the old papers still get cited.

2. The method

2.1 Google Scholar as a data source

In contrast to other well known databases such as SCI, SSCI, SCI-X or Scopus, Google Scholar searches all types of publications and can be used free of charge. Not only academic journals, but also academic books, such as monographs and edited volumes, and papers published online are included. That means citations of such publications can be tracked as well as citations within those sources will be taken into account. The competitive advantage or disadvantage Google Scholar has got against its competitors depends on the research culture and citation characteristics of the academic discipline that should be measured, the relevant scope Google Scholar can provide in a certain discipline and the performance of its competitors (for a SSCI-based ranking of German business researchers see Dilger 2010). In a discipline such as medicine or natural sciences, where nearly all relevant publications appear in journals listed in the SCI, the broader scope of Google Scholar might not be of any advantage. For German Business Administration, however, this is the crucial point indeed. Google delivers a

much better coverage in citation tracking than any of its competing alternatives (cf. Breuer 2009). It is far from perfect, but since a comprehensive German (or European) citation data base still does not exist (cf. Dilger 2000) it seems to be the best alternative available.

In contrast to the SSCI Google allows queries with fully spelled Christian names instead of initials. This is of rather practical relevance because it limits the problems with distorting results due to different persons with the same surname. Such false matches must be eliminated by hand which is very costly in terms of time and error-prone nonetheless. Avoiding them from the beginning makes it more practical to create a ranking.

Similar to SSCI Google offers search categories in the US version of the Advanced Scholar Search. That further minimises the practical problem of false matches that otherwise would have to be eliminated by hand. Unfortunately, this feature is not working completely yet. There are still plenty of publications not sorted under any of the categories. So if this function is used to search only in certain disciplines, books that are not categorised get sorted out even if they would match the searched field.

A grave further problem is the lack of transparency how Google gets its data. There is no documentation on what the sources of the data are, what is included and what is not. Apart from that, Google contains self citations.[1] The above mentioned concept of citations as a sign for academic reputation requires that a paper gets cited by someone else, not the author him- or herself. Self-citations allow a manipulation of the citations by the author: One could push up one's own results by citing the own articles. This, however, is not expected to be a large problem at the current time. Since citation based rankings are new to German Business Administration, there are no incentives for such behaviour at this point. At least for a first edition, this problem might be of rather theoretical nature.

Much discussed in literature is the insufficient data quality of Google Scholar. Due to its broad scope and automatic procedures to search the web and other databases for citations, from time to time nonsensical or non-scholarly citations appear. This problem is well known but rather limited (estimated at around 5 to 8 percent of citations, see Vaughan/Shaw 2008 and Harzing 2008).

Another severe distortion of the database occurs when books are reprinted in new editions. Google Scholar does not differentiate between different editions of the same books and as-

[1] This is true in spite of claims by Google to the contrary, see Henrekson/Waldenström (2008).

signs in every case the year of the last edition as the year of publication. If the query is limited to a certain time period (like 2005 to 2009 in this ranking), this leads to serious problems: A book might be published in the first edition long before the enquired time period and since then gather citations from year to year. If a new edition gets published within the enquired period, this year is displayed as a year of publication. The citations however are not differentiated between the two editions. It looks as if the book accumulates citations from times before its publication. Within the search mechanism of Google Scholar only the publishing period can be limited but not that of the citations. This disparity has far reaching consequences, since very successful books gather a lot of citations and are reprinted in new editions over a long time: First, the real impact of such a blockbuster cannot be measured for a certain period but only over the full time span from the point of first appearance to today. Second, if a search is limited to recent years, such a book (new edition within the searched period) gets falsely attributed all the citations since its first edition.

Despite its massive consequences, this problem has not been discussed in the literature yet. To avoid distortions in this ranking, books with more than one edition are treated like there was only the first one. To our view this is the most adequate way to deal with the problem since the major findings are usually presented in the first edition of a book. Unaltered reprints do not form a new academic output and new updated editions normally do not contain as much new content as the first edition. That means that in the ranking books only get counted if the first edition was published within the searched time period. New editions of books, which were first published before the searched period, are not taken into account (because they would otherwise carry all the old citations).

The main purpose of Google Scholar however is not citation analysis. So additional software is helpful to manage the queries and calculate the citation metrics. This can be done with Publish or Perish, which delivers rather comprehensive citation metrics and can be obtained free of charge.[2]

2.2 Object of the enquiry

The following ranking shall be a rather comprehensive ranking of all professors of German Business Administration. Therefore the register of members of the German Academic Asso-

[2] A download is possible via www.harzing.com/pop.htm (last request on 08.04.2010).

ciation for Business Research (Verband der Hochschullehrer für Betriebswirtschaft, VHB) was used as a source of data. It contents active professors and researchers at German and international universities or research institutions as well as retired professors. A professor emeritus might still be a very active member in the scientific community and not stop his activities in research and publishing when he or she retires (perhaps involuntarily according to German labour law). In contrast to the Handelsblatt-BWL-Ranking (see Müller/Storbeck 2009) we enquire the research performance of both active and retired professors. However, professors who are not members of the VHB are not included in this ranking. The last edition of the register of members was published in 2007 and is basis for the names of the enquired scholars.

The aim of this study is to scan the citations of recent publications. The ranking shall reflect the current state of research and give an overview of the most active and visible or at least most cited researchers in German Business Administration. Therefore a time span of five years was chosen. Only publications from the years 2005 to 2009 are considered.

The queries in Google Scholar are constricted on the search categories 'Business, Administration, Finance and Economics' and 'Social Sciences, Arts and Humanities'. The queries were executed between 3rd and 5th of January 2010. So they only count citations from the same time period. In the end, the whole ranking consists of 1,572 enquired persons with 872 of them having more than zero citations.

Co-authorships were counted on a strict pro-rata basis by 1/n. To our view this is the most straightforward approach since alternatives such as that chosen by the Handelsblatt-BWL-Ranking seem to be kind of arbitrary (see Müller/Storbeck 2009 for the method, Hofmeister/Ursprung 2008 and Müller 2010 for critique).

2.3 Quality of data and manual corrections

A manual review of the collected data is obliged because of two main objections that cannot be addressed by the ex-ante design of the queries: There may be different scholars with identical Christian name and surname. This is as well the case within the register of members of the VHB as on the much broader scope in Google Scholar. The results of the queries in Google Scholar have to be matched with the publication list that is usually published on the website of the professors.

Beside this, the abovementioned problem concerning the different editions of books compels a manual review. Within the results of every query the publishing dates of every book have to be checked. Only if the first edition of a book was published within the defined time span of 2005 to 2009, the citations should be counted. Books with older dates of first appearance (and just the last re-edition within the period) have to be excluded because their citations are from older times and would otherwise distort the results (see above).

The problem of unscientific citations only occurred very sporadically and is not seen as a major distortion. There are some nonsensical citations or citations from non-academic texts (cf. Harzing 2008) but they form a kind of statistical noise and do not distort the results systematically in one or another direction. A different problem is created by students' theses (e.g. bachelor or master thesis) that get published online and as books-on-demand and often cite textbooks. Students' theses account for about 20 percent of the citations of text books. For a professor to have a lot of graduates is rather a measure of performance in teaching than in research. The citations in students' theses are however only taken into account if they are published as books-on-demand and have got ordinary ISINs, so by definition they are books and as such a source of citations. In the top ranks, however, textbooks do not have a substantial influence on the ranking order anyway and apart from them citations from students' theses occur very rarely.

Google Scholar does not exclude self citations, which may in future become a problem of citation based rankings on this data source (see above). Currently, there is neither an option in Google Scholar or in referring software such as Publish or Perish nor any useful ex-post correction method to exclude them. For our first analysis, however, this tends to be no major problem because there is no special incentive to cite oneself.

For the manual corrections a top-down approach was used. Since all described possible distortions tend to overstate instead of underestimate the true citations, they can be corrected top-down to sort out the leading group of scholars.

3 Results

3.1 Top ranks and long tail phenomenon

It is not surprising that the citations of academics follow a long tail distribution (cf. Anderson 2008). A very small group at the top accumulate a lot of citations whereas for the mass or researchers the differences between the ranks are insignificant. Figure 1 shows the top 200 researchers ranked by citations on their publications:

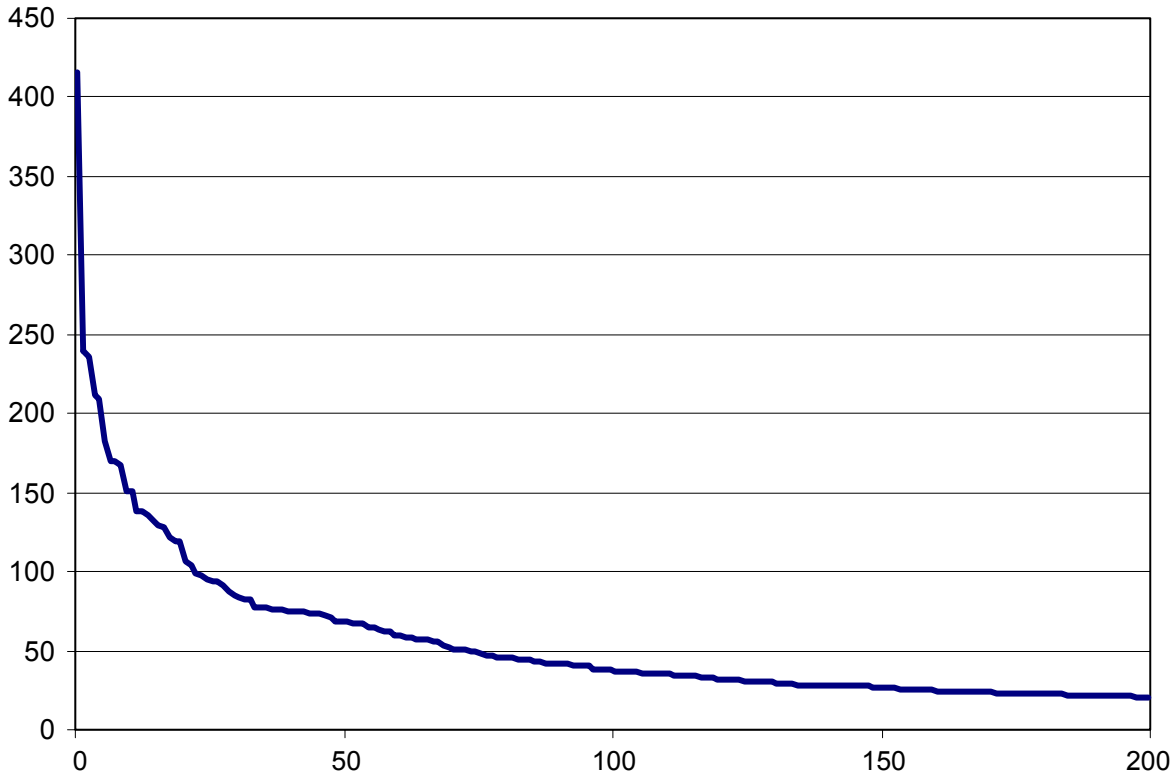

Figure 1: Ranks 1-200 – long tail phenomenon

With respect to the privacy of the surveyed scholars only the top 10 are mentioned by name. Table 1 shows that the differences between the ranks are quite distinct in the top ranks and tend to narrow.

R		Publ.	Cit.
1	Christian Leuz (University of Chicago)	33	415.43
2	Hartmut Stadtler (Universität Hamburg)	14	240.00
3	Martin Weber (Universität Mannheim)	47	235.85
4	Christian Homburg (Universität Mannheim)	38	211.34
5	Erik E. Lehmann (Universität Augsburg)	34	209.66
6	Dirk Matten (York University Toronto)	35	182.07
7	Joachim Henkel (TU München)	10	170.00
8	Klaus G. Grunert (Wirtschaftsuniversität Aarhus)	39	169.68
9	Oliver Gassmann (Universität St. Gallen)	36	166.75
10	Andreas Herrmann (Universität St. Gallen)	37	151.31

Table 1: Top 10 ranked by citations

It is notable that half of the professors in the top 10 hold chairs outside Germany and three of ten are employed outside the German speaking part of the world. This is a difference to the Handelsblatt-BWL-Ranking that was limited to professors within Germany, Austria or Switzerland.

3.2 Comparison with the Handelsblatt-BWL-Ranking

The Handelsblatt-BWL-Ranking is currently the leading research ranking of German professors in Business Administration and follows the journal based approach (see above). Since our ranking is based on citations and in view of some previous studies (see Müller 2010), one would expect major deviations between the outcomes of the two rankings. Therefore the ranks of the top researchers of both rankings are compared in Table 2.

R		R(HB)
1	Christian Leuz (University of Chicago)	-
2	Hartmut Stadtler (Universität Hamburg)	59
3	Martin Weber (Universität Mannheim)	5
4	Christian Homburg (Universität Mannheim)	1
5	Erik E. Lehmann (Universität Augsburg)	46
6	Dirk Matten (York University Toronto)	-
7	Joachim Henkel (TU München)	31
8	Klaus G. Grunert (Wirtschaftsuniversität Aarhus)	-
9	Oliver Gassmann (Universität St. Gallen)	36
10	Andreas Herrmann (Universität St. Gallen)	8

Table 2: Ranks of the top 10 of this ranking in the Handelsblatt-BWL-Ranking

Three researchers are within the top ten in both rankings. The other persons from the top ten of this ranking receive either relative good but not top ranks within the Handelsblatt-metric as well or have been excluded by the different design of the ranking (Handelsblatt does not include professors with chairs at non-German-speaking universities).

The comparison can also be done the other way round. Table 3 delivers the ranks in our ranking for the top ten of the Handelsblatt-Ranking:

R(HB)		R(GS)
1	Christian Homburg (Universität Mannheim)	4
2	Ulrich Lichtenthaler (WHU Vallendar)	18
3	Adamantios Diamantopoulos (Universität Wien)	11
4	Martin Högl (WHU Vallendar)	(1,114)
5	Martin Weber (Universität Mannheim)	3
6	Armin Scholl (Universität Jena)	15
7	Nils Boysen (Universität Jena)	96
8	Andreas Herrmann (Universität St. Gallen)	10
9	Dirk Sliwka (Universität zu Köln)	23
10	Stephan M. Wagner (ETH Zürich)	20

Table 3: Ranks of the top 10 of the Handelsblatt-Ranking in this ranking

3.3 Sections of the VHB

The VHB consists of 16 sections that reflect the different sub-disciplines of Business Administration and wherein the academic work is mainly carried out. To rank the sections according to the citations their members' academic work receives, the individual results have to be aggregated in the different sections. Therefore, the data has to be completely reviewed from rank one to 1,572. Since this project is not yet finished and only the top 200 have been manually corrected, the ranking of sections is done alternatively by the percentage of the section members that are within the top 200 researchers.[3]

[3] The expected value for the average section would be 200/1572 = 12.72%.

Section	Members	in top 200	% in top 200
Logistics (LOG)	99	23	23.23
Management of Technology and Innovation (TIM)	134	31	23.13
Marketing (MARK)	187	36	19.25
International Management (INT)	140	24	17.14
Administrative Science (WISS)	79	13	16.46
Operations Research (OR)	109	17	15.60
Production Management (PROD)	166	23	13.86
Banking and Finance (BAFI)	130	18	13.85
Organization (ORG)	254	35	13.78
Sustainability Management (UMW)	91	12	13.19
Academic Management (HSM)	47	6	12.77
Business Information Systems (WI)	180	22	12.22
Human Resource Management (PERS)	150	15	10.00
Public Business Administration (ÖBWL)	69	6	8.70
Accounting (RECH)	256	11	4.30
Business Taxation (STEU)	101	2	1.98

Table 4: Sections of the VHB compared by their fraction of members in the top 200

However, a ranking of the sections is problematic because of two reasons: First, the publication and citation cultures of the different sub-disciplines are highly different. Publications in International Management might find their audience all over the world, whereas those in German Business Taxation might get attention chiefly in Germany. The second reason is that researchers typically are members of more than one section and publish multidisciplinary. Their mostly cited work could be to other themes than those of the particular section.

4 Conclusions

This study shows that the construction of a citation based ranking of academics in German Business Administration is both a desirable and a difficult task. In general terms, citation based rankings have substantial advantages compared to journal based alternatives: They allow enlarging the scope towards monographs, edited volumes and academic internet publications. Besides that, they measure the impact of every publication on its own and avoid mean values on a journal level.

The choice of the data base, however, is crucial and depends on the specifications and characteristics of the ranking project. For German Business Administration we argued, Google Scholar is a well applicable source of readily available data. Nevertheless, its technical shortcomings necessitate diligent review and manual corrections. With that in mind, we constructed a ranking of academics in German Business Administration according to the impact of their recent publications (2005-2009). The comparison of the results with those of the Handelsblatt-BWL-Ranking, that follows the journal based approach, shows, that differences in methods lead to different results.

A problem of citation based rankings with Google Scholar in particular might be caused by self-citations. Rankings will create incentives in monetary and non-monetary forms and thus seduce scholars to cite their own work (or to induce their students to do so). However, because of the novelty of this ranking approach in German Business Administration, we do not consider it to be a problem at this point in time.

The citation data collected in this project give room to a variety of follow-up questions. The comprehensive information of the members list of the VHB could be used to study critical factors for success such as age, career, education or position in the faculty. Besides that, the comparison of rankings is an important and difficult task. Since different methods lead to different results, the question of validity is essential and to be discussed in future.

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