Expertise Overlap between an Expert Panel and Research Groups in Global Journal Maps

A.I.M. Jakaria Rahman[1], Raf Guns[2], Ronald Rousseau[3] and Tim C.E. Engels[4]

[1] *jakaria.rahman@uantwerpen.be*
Centre for R&D Monitoring (ECOOM), Faculty of Political and Social Sciences, University of Antwerp, Middelheimlaan 1, B-2020 Antwerp (Belgium)

[2] *raf.guns@uantwerpen.be*
Institute for Education and Information Sciences, University of Antwerp, Venusstraat 35, B-2000 Antwerp (Belgium)

[3] *ronald.rousseau@uantwerpen.be*
ronald.rousseau@kuleuven.be
Institute for Education and Information Sciences, University of Antwerp, Venusstraat 35, B-2000 Antwerp (Belgium); and KU Leuven, Dept. of Mathematics, B-3000 Leuven (Belgium)

[4] *tim.engels@uantwerpen.be*
Centre for R&D Monitoring (ECOOM), Faculty of Political and Social Sciences, University of Antwerp, Middelheimlaan 1, B-2020 Antwerp, and
Antwerp Maritime Academy, Noordkasteel Oost 6, B-2030 Antwerp (Belgium)

Abstract
There are no available methods to measure overlap in expertise between a panel of experts and evaluated research groups in discipline-specific research evaluation. This paper explores a bibliometric approach to determining the overlap of expertise, using the 2009 and 2011 research evaluations of ten Pharmaceutical Sciences and nine Biology research groups of the University of Antwerp. We study this overlap at the journal level. Specifically, journal overlay maps are applied to visualize to what extent the research groups and panel members publish in the same journals. Pharmaceutical Sciences panel members published more diversely than the corresponding research groups, whereas the Biology research groups published more diversely than the panel. Numbers of publications in the same journals vary over a large scale. A different range of coverage was found for different research groups; there is also a significant difference between maximum and minimum coverage based on discipline. Future research will focus on similarity testing, and a comparison with other disciplines.

Conference Topic
Methods and techniques

Introduction
Expert panel review is considered the standard for determining research quality of individuals and groups (Nedeva et al., 1996; Rons, et al., 2008; Butler & McAllister, 2011; Lawrenz et al., 2012), but also, for instance, for research proposals submitted to research funding organizations. The principal objective of such evaluations is to improve the quality of scientific research. Currently, there are no available methods that can measure overlap in expertise between a panel and the units of assessment in discipline-specific research evaluation (Engels et al., 2013). Rahman et al. (2014) explored expertise overlap between panel and research groups through publishing in the same Web of Science subject categories. Since one category may comprise a wide array of different subfields and topics (Bornmann, et al., 2011), it is up for discussion how relevant it is to have panel members and research group members publishing in the same subject categories. This paper presents a journal level analysis to explore this issue. Journals cover more closely related subfields and topics (Tseng & Tsay, 2013). This paper uses overlay maps at the journal level (Leydesdorff & Rafols,

2012), with special attention to the quantification of similarity between groups and panel for two disciplines.
In 2007, the University of Antwerp (Belgium) introduced site visits by expert panels that promise communication and participation between expert and research groups. It is expected that each research group's expertise is well covered by the expertise of the panel members.
We have used the data collected in the frame of research evaluation by the University of Antwerp. This research in progress paper explores the expertise overlap between expert panel and research groups of the department of Biology and Pharmaceutical Sciences. Hence, the research questions are:

1) To what extent is there overlap between the panel's expertise and the expertise of the groups as a whole?
2) To what extent is each individual research group's expertise covered by the panel's expertise?

Data and Method

In this paper, we present an analysis of the 2009 assessment of ten research groups (2001-2008) of the Department of Pharmaceutical Sciences, and the 2011 assessment of the nine research groups (2004-2010) belonging to the Department of Biology, University of Antwerp. The citable items from the Science Citation Index Expanded of the Web of Science (WoS) published by the research groups in the reference period were considered.
Both panels were composed of five members (including the chair). All the publications of the individual panel members up to the year of assessment were taken into account. The combined publication output of the Pharmaceutical Sciences panel members is 1,029 publications. In total, these publications appeared in 300 different journals. The number of publications per panel member ranges from 124 to 353, in 39 to 93 different journals. The Biology panel members' publication output amounts to 786 publications in 217 different journals. The number of publications per panel member ranges from 76 to 262, in 36 to 76 journals. There are no co-authored publications between panel members in both cases.

Table 1: Publication profile of the Pharmaceutical Sciences and Biology research groups

Pharmaceutical Sciences research groups (2001-2008)			**Biology research groups (2004-2010)**		
Group code	**Number of Publications**	**Number of Journals**	**Group code**	**Number of Publications**	**Number of Journals**
PSRG - A	40	22	BRG - A	168	53
PSRG - B	62	32	BRG - B	58	33
PSRG - C	61	35	BRG - C	212	212
PSRG - D	32	17	BRG - D	175	68
PSRG - E	64	42	BRG - E	168	69
PSRG - F	34	21	BRG - F	58	35
PSRG - G	67	31	BRG - G	280	139
PSRG - H	39	27	BRG - H	67	42
PSRG - I	29	10	BRG - I	86	52
PSRG - J	11	09	**----**	**----**	**----**
All groups together	**372**	**180**	All groups together	**1,153**	**372**

PSRG = Pharmaceutical Sciences Research Group; BRG = Biology Research Group.

Table 1 lists the number of publications of the research groups. The Pharmaceutical Sciences research groups published 372 publications in 180 journals, including 67 joint publications

between the groups, while the Biology research groups generated 1,153 publications in 372 journals, and there are 119 joint publications between the groups.

For this paper, we adopted the overlay mapping methods based on a global journal map from Web of Science data (Leydesdorff & Rafols, 2012). Journals overlay maps were created for the panels, all individual research groups, and the combined research groups of each department. To this end, all Source titles (Journal titles hereafter) pertaining to the entire citable journal output of the panel members and the groups were retrieved and entered into network software, and overlay information was added to the global journal map. The overlap of research group and panel publications was visualized on a global journal map based on the retrieved journal titles, using the visualization program VOSviewer (van Eck & Waltman, 2010).

Analysis and Results

Panel profiles versus Group profiles

Pharmaceutical sciences panel publications are found in 300 different journals, whereas those of the combined Pharmaceutical Sciences groups cover 180 journals. The journal overlay maps for the Pharmaceutical Sciences combined groups (Fig. 1) and the panel (Fig. 2) clearly show that the publication scope of the panel is wider than that of the combined groups. The panel publications are strong (11.86%) in 'Pharmaceutical Research', 'British Journal of Clinical Pharmacology', and 'Archiv der Pharmazie' journals, whereas the research group publications are clustered (8.6%) in 'Kidney International', 'Planta Medica', 'Environmental Science & Technology' journals.

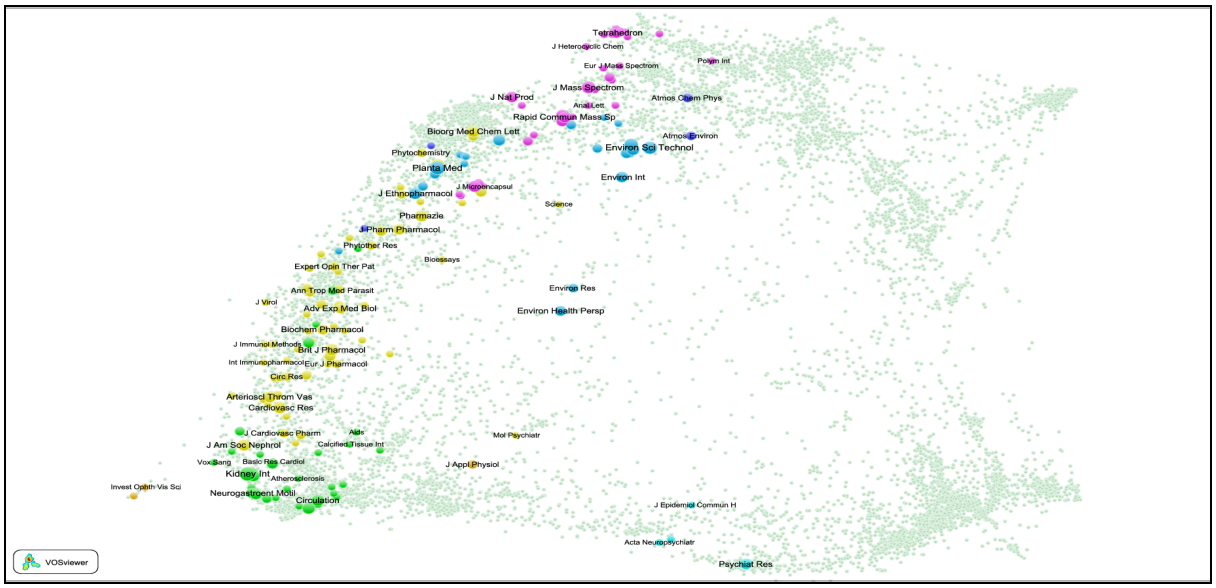

Figure 1. Pharmaceutical Sciences groups' publications overlay to the global journal maps.

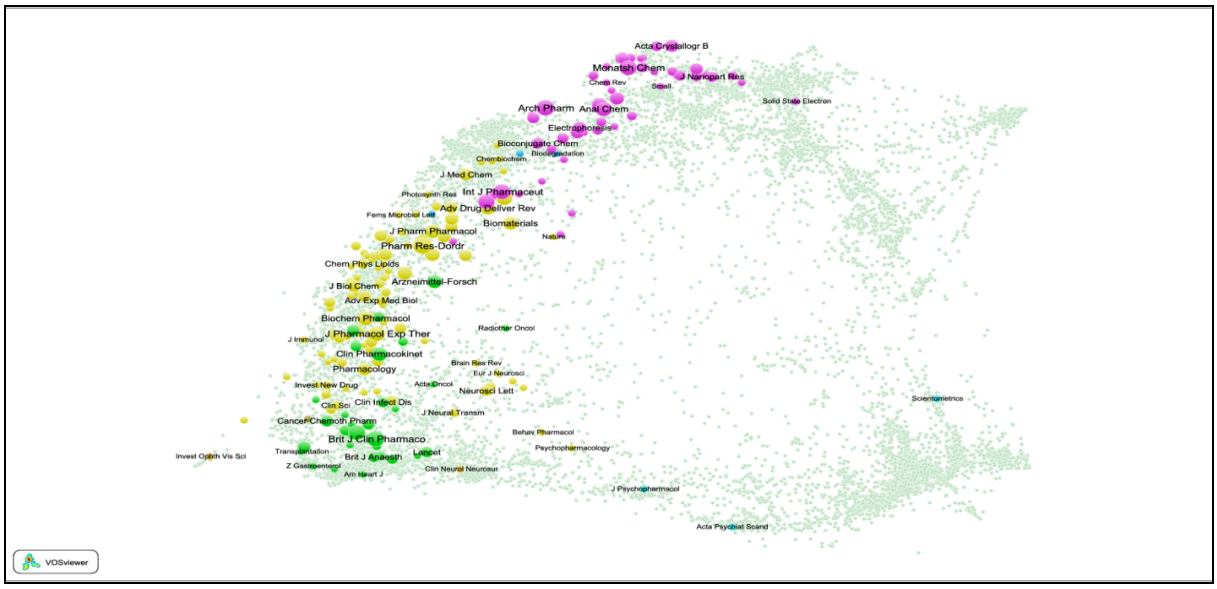

Figure 2. Pharmaceutical Sciences Panel publications overlay to the global journal maps.

Contrariwise, Biology panel publications appeared in 218 journals, while those of the combined Biology groups cover 372 journals. The overlay maps for the Biology department (Figs. 3 and 4) revealed a wider publication scope for the combined research groups compared to the Biology panel. The panel's publications are strong (8.58%) in 'Environmental Pollution', 'Biological Journal of the Linnean Society', and 'Journal of Experimental Biology', whereas the groups' publications tend to be mainly clustered (12.47%) in 'Experimental and Applied Acarology', 'General and Comparative Endocrinology', 'Journal of Experimental Biology'.

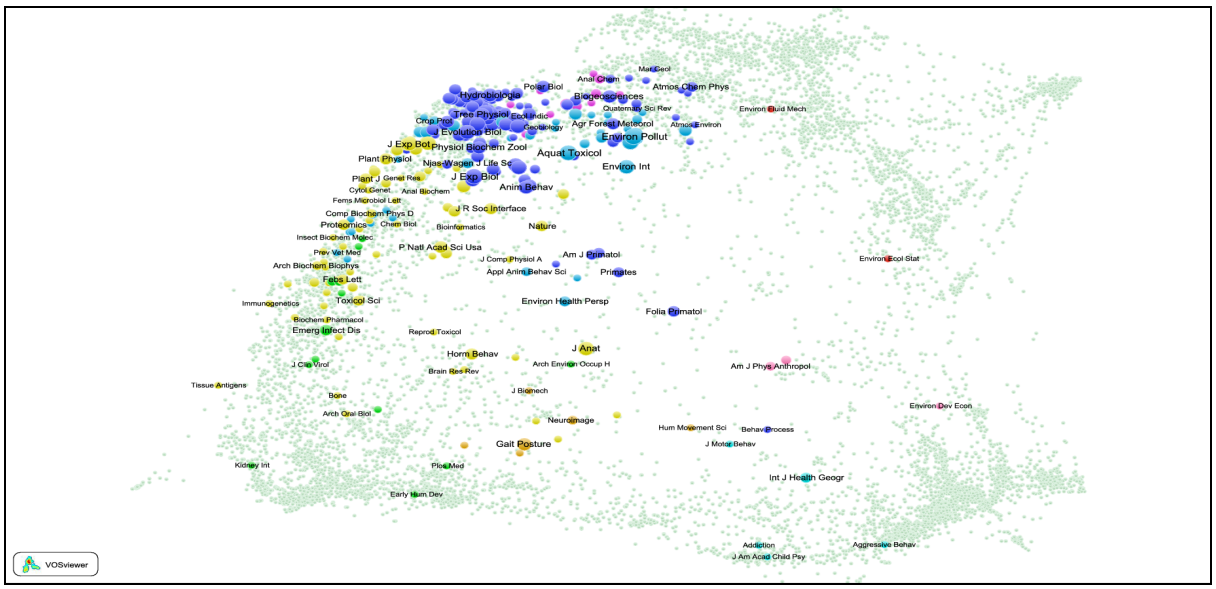

Figure 3. Biology groups' publications overlay to the global journal maps.

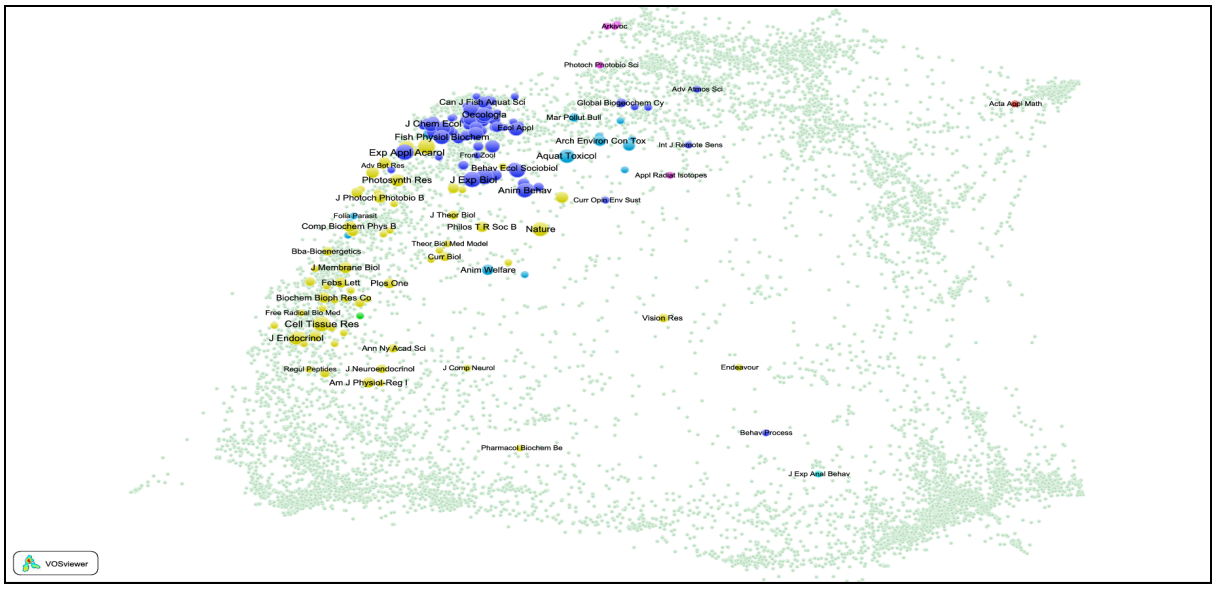

Figure 4. Biology Panel members' publications overlay to the global journal maps.

Table 2 shows that there is no common journal in the top five journals between the Pharmaceutical Sciences panel and groups. Table 2 further shows that there is only one common journal, *Journal of Experimental Biology*, (panel 3.82%, groups 2.26%) in the top five journals between Biology panel and groups.

Table 2: Top five Journals title for the panels and the groups

Panel publications			Group publications		
Pharmaceutical Sciences Department					
Journals Title	**Records**	**% of 1029**	**Journals Title**	**Records**	**% of 372**
Pharmaceutical Research	52	5.05	Kidney International	13	3.5
British Journal of Clinical Pharmacology	35	3.4	Planta Medica	11	2.96
Archiv der Pharmazie	35	3.4	Environmental Science Technology	8	2.15
Clinical Pharmacology Therapeutics	27	2.62	Journal of Mass Spectrometry	7	1.88
Monatshefte Fur Chemie	23	2.23	Chemosphere	7	1.88
Biology Department					
Journals Title	**Records**	**% of 786**	**Journals Title**	**Records**	**% of 1153**
Experimental and Applied Acarology	35	4.45	Environmental Pollution	40	3.47
General and Comparative Endocrinology	33	4.2	Biological Journal of the Linnean Society	33	2.86
Journal of Experimental Biology	30	3.82	Journal of Experimental Biology	26	2.26
Proceedings of the Royal Society B:Biological Sciences	22	2.8	Aquatic Toxicology	23	1.2
New Phytologist	22	2.8	Environmental Science Technology	22	1.91

Together, the Pharmaceutical Sciences panel and groups have 60 journals in common. In addition, 240 journals have panel publications but no group publications, while 120 journals contain group publications but no panel publications. Further, Biology panel and group publications were common in 93 journals. Moreover, 125 journals contained panel publications but no group publications and 279 journals have group publications but no panel publications.

These findings demonstrate that Pharmaceutical Sciences panel published more diversely than the groups, whereas the opposite is true for the Biology department. However, the Pharmaceutical Sciences panel overlaps in one third of the journals of groups' publications, whereas the Biology panel overlaps almost half the journals where biology groups have publications too.

Panel profile versus Individual group profile

Overlay maps of the publications of the individual groups were created, and subsequently compared with the two panel overlay maps. Most Pharmaceutical Sciences research groups have at least one journal in common with the panel; this is the case for PSRG-A (50%), PSRG-B (40.63%), PSRG-C (31.42%), PSRG-D (58.82%), PSRG-E (40.78%), PSRG-F (61.9%), PSRG-G (16.13%), PSRG- H (37.03%), and PSRG-J (20%). Only PSRG-I has none. All Biology research groups have one or more journals in common with the panel: BRG-A (41.51%), BRG-B (18.75%), BRG-C (33.33%), BRG-D (35.29%), BRG-E (42.65%), BRG-F (48.57%), BRG-G (35.97%), BRG-H (19.05%), BRG-I (25%).

These data show that the research outputs of three of the ten Pharmaceutical Sciences research groups (A, D, F) are 50–62 percent, four groups (B, C, E, H) are 30–40 percent, two groups (G, J) are 20 to 15 percent covered by the panels' expertise thematically, whereas one group (group I) is not covered at all. At the same time, three out of nine Biology research groups (A, E, F) are 40-50 percent, three research groups (C, D, G) are 30-40 percent, and another three research groups (B, H, I) are below 25 percent covered by the panel's expertise.

Conclusion

The results indicate that the Biology research groups published more diversely than the panel, which is similar to the findings in Rahman et al. (2014). However, the Pharmaceutical Sciences panel published more diversely than research groups, which is opposite to what was found in Rahman et al. (2014) where the research groups published more diversely in Web of Science subject categories than the panel did. The most likely reason is that all panel members' publications are taken into account (published over the course of over 20 years, often working in different countries and on different topics), whereas the research groups have a specific focus and choose the journals accordingly.

Pharmaceutical Sciences panel overlaps in one third of the journals of the corresponding group's publications, whereas the Biology panel overlaps in close to half the journals where Biology groups have publications. In addition, the number of publications in the same journals by the expert panel and research group varied, and a different range of coverage was found for different research groups. There is also a significant difference between maximum and minimum coverage based on discipline. To quantify which overlap leads to the best standard for evaluation, a considerable range of percentage of common journals between the panel and research group needs to be identified. The considerable range of percentage will express a well-covered, partially covered, and hardly covered expertise based on journal level matching. In subsequent analysis, we will compare results with corresponding results for other disciplines and explore other criteria for adequate relations between evaluation panels and groups.

Acknowledgments

This investigation has been made possible by the financial support of the Flemish Government to ECOOM, among others. The opinions in the paper are the authors' and not necessarily those of the government. The authors thank Nele Dexters for assistance.

References

Bornmann, L., Mutz, R., Marx, W., Schier, H., & Daniel, H.-D. (2011). A multilevel modelling approach to investigating the predictive validity of editorial decisions: do the editors of a high profile journal select manuscripts that are highly cited after publication? Journal of the Royal Statistical Society: Series A (Statistics in Society), *174*(4), 857–879.

Butler, L., & McAllister, I. (2011). Evaluating University research performance using metrics. *European Political Science*, *10*(1), 44–58.

Engels, T. C. E., Goos, P., Dexters, N., & Spruyt, E. H. J. (2013). Group size, h-index, and efficiency in publishing in top journals explain expert panel assessments of research group quality and productivity. *Research Evaluation*, *22*(4), 224–236.

Lawrenz, F., Thao, M., & Johnson, K. (2012). Expert panel reviews of research centers: The site visit process. E*valuation and Program Planning*, *35*(3), 390–397.

Leydesdorff, L., & Rafols, I. (2012). Interactive overlays: A new method for generating global journal maps from web-of-science data. *Journal of Informetrics*, 6(2), 318–332.

Nedeva, M., Georghiou, L., Loveridge, D., & Cameron, H. (1996). The use of co-nomination to identify expert participants for Technology Foresight. *R&D Management*, *26*(2), 155–168.

Rahman, A. I. M. J., Guns, R., Rousseau, R., & Engels, T. C. E. (2014). Assessment of expertise overlap between an expert panel and research groups. In Ed Noyons (Ed.), Context Counts: Pathways to Master Big and Little Data. Proceedings of the Science and Technology Indicators Conference 2014 Leiden (pp. 295–301). Leiden: Universiteit Leiden.

Rons, N., De Bruyn, A., & Cornelis, J. (2008). Research evaluation per discipline: a peer-review method and its outcomes. *Research Evaluation*, *17*(1), 45–57.

Tseng, Y.-H., & Tsay, M.-Y. (2013). Journal clustering of library and information science for subfield delineation using the bibliometric analysis toolkit: CATAR. *Scientometrics*, *95*(2), 503–528.

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538.