

## Application for participation at the Doctoral Forum

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**Description of doctoral research project** (including research questions, theoretical background, planned methodology, current status)

## **Towards a Bibliometric Method of Assessing Expert Panel Composition**

### **Introduction**

Discipline-specific research evaluations are a common practice at many universities worldwide. These evaluations are carried out by committees of peers. The expert panel is specifically appointed for the evaluation. The panel provides conclusions and recommendations in accordance with a standard evaluation protocol. The panel specialists arrive at conclusions and recommendations through consensus. 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. To the best of our knowledge, no methods have been established to measure and quantify overlap in expertise between panels and research groups (or other units of assessment) in discipline-specific research evaluation (Engels et al., 2013).

The principal objective of such evaluations is to improve the quality of scientific research. Depending on the research group, these recommendations deal with the implementation or the impact of a program, or part of it. An expert panel usually comprises independent specialists, i.e. it is a multidisciplinary and/or interdisciplinary group of experts, each of which is recognized in at least one of the fields addressed by the program under evaluation. Experts are typically selected in two ways: i) straightforward selection: the evaluation managers have access to a list of acknowledged experts in specific fields, and limit their selection process to ensuring the expert's independence regarding the program under evaluation; and ii) gradual selections: preferred profiles of experts are developed with respect to the topics under scrutiny in the evaluation.

In research evaluation the extent to which the expertise of the panel members charged with research assessment is congruent with the research of the groups, is crucial to the trustworthiness of the assessment (Engels et al. 2013). Yet, a sufficiently high degree of congruence between the expertise of the panel members charged with research assessment and the research of the units is a prerequisite for a sound, reliable assessment. Only panel members who are credible experts in the field will be able to provide valuable, relevant recommendations and suggestions that should lead to improved research quality. In this respect, Langfeldt (2004) explored expert panel evaluation and decision-making processes, and concluded that overlap of expertise between experts is highly desirable in order to foster cooperation among panel members. Moreover, each group expects its research interests to be well covered by the expertise of at least one panel member.

## **Research questions**

The goal of this project is therefore to identify a bibliometric methodology to assess the congruence of panel expertise and research interests in the research groups. Our main research questions are:

- a) How can we quantify expertise overlap between the panel and the research groups under evaluation?
- b) To which extent is each individual research group's expertise covered by the panel's expertise?
- c) Does the closeness of a group's expertise to a panel's expertise benefit the group's score?
- d) Do research groups whose research is closely related to that of a panel member obtain a better score?
- e) How can the overall fit of a panel be expressed and compared across evaluations?

## **Data and Methods**

In 2007, the University of Antwerp, Belgium, decided to introduce evaluative site visits by expert panels, during which the panel meets the spokesperson of each research group and other relevant stakeholders, and panel members are given the opportunity to ask additional questions or request clarification of specific points described in the self-evaluation report they received in advance. The site visits thus guarantee interaction and involvement between experts and research groups. The overall annual research output of the University of Antwerp comprises over 2000 peer-reviewed publications, the large majority of which are included in the Web of Science (Engels et al., 2013).

Using data collected in the framework of research evaluations of university of Antwerp, this project will study the expertise overlap between expert panels and the research groups involved in the evaluation. In this project, we will analyze all the research groups and respective panels of the Department of Chemistry, Physics, Pharmaceutical Sciences, Biology, Veterinary Science, Biomedical Sciences, Medical Sciences, Informatics, and Mathematics. All articles, letters, notes, proceeding papers, and reviews that are indexed in Web of Science and published by the research groups will be considered in the assessment. All publications of the individual panel members up to the year of assessment of the respective department will be taken into account.

We will adopt overlay mapping methods based on global maps of science at the subject category level (Rafols & Meyer, 2010; Rafols, Porter, & Leydesdorff, 2010) and at the journal level (Leydesdorff & Rafols, 2012). The aim is to visually represent

the expertise of research groups and panel members in intellectual space using visualization software such as VOSviewer (van Eck & Waltman, 2010) and Pajek (Nooy, Mrvar, & Batagelj, 2012). In addition, the applicability of different correlation and similarity measures for assessing expertise overlap will be explored.

Furthermore, we will adopt the barycenter method (Rousseau, 1989, 2008) to identify the ‘center’ of a research group’s (or panel member’s) output on a global map of science. The barycenter locations are determined by a weighted average of the vertices’ coordinates according to the number of publications in each WoS subject category (or journal). The barycenter can then be visualized on the global map of science according to the same procedure that was used to create the overlay maps. In addition, one can calculate the Euclidean distance between, for instance, the barycenter of a group and its panel, yielding a measure of cognitive distance between their research profiles. Based on the barycenter’s weighted average of the vertices’ coordinates, the distances will be calculated between expert panel, individual panel members, combined groups, and individual groups, since it is important to see how far or close a given group is situated from the panel’s or the panel members’ coordinates.

Expertise as measured by publications is one measure. It may well be that panel members have lots of other expertise that is not expressed in publications. An important addition to the analysis might therefore be to conduct a survey among the professors that have been evaluated in order to gain their opinion on the assessment process. Moreover, a regression model will be implemented to answer research questions c) and d). Among the control variables in the model will be the bibliometric performance indicators that have been collected in the frame of the research assessment exercises. The regression approach will be further elaborated in order to test the predictive validity of the assessment scores, e.g. implementing a negative binomial regression model with the citation impact of the (at the time of evaluation) and/or in order to replicate the findings as reported in Engels et al (2013) for a set of life sciences research groups. It might also be useful to do some analysis on research assessments in the social sciences and humanities, but as a start the physical and life sciences are a better bet because they tend to be much better covered by the Web of Science.

### **Significance of the study**

The aim of the current project is to develop and test a bibliometric method to identify the overlap of expertise between the expert panel and the research groups. The proposed project aims to develop a suitable methodology that can be implemented in order to improve current practice. It might be very useful and have considerable impact if the research on panel composition resulted in a software tool that can help research administrators assess the suitability of a proposed panel or panel member. It is anticipated that the investigations will lead to the development of new indicators that either are of general use, or are especially suitable for expert panel composition in a certain research area.

## Current status

We have been working on this project for the past one and a half year. We have explored Physics and Chemistry department's panel and group publications overlap in Web of science subject categories, using a global map of science (Rafols & Meyer, 2010; Rafols et al., 2010), and submitted a research in progress paper in the STI conference 2014, and a full paper in Journal of Informetrics. We have submitted a research in progress paper to the ISSI conference 2015 where we explored overlap at the journal level (Leydesdorff & Rafols, 2012) between research groups and panels using data from the Pharmaceutical and Biology department's research assessment. Currently we are exploring journal level overlap in the Veterinary and Biomedical science department.

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**Motivation for student participation** at the Doctoral Forum and the issues you wish to receive feedback on from the senior researchers.

We believe that the doctoral forum will have a significant impact on our ongoing research. We are looking for feedbacks from the doctoral forum on some issues, for example, Overlap at the journal level is still very crude; a journal like JASIST incorporates very different kinds of research. Therefore, what method should we apply to 'drill down' to an even finer level. Moreover, according to scientific disciplines, what overlap leads to the best standards for evaluation for the formation of a balanced panel. In addition, how could we identify the impact of panel composition on research groups to be evaluated.

The feedback from the senior researchers and other participants will help us to gain insights about the research project. It will be an excellent opportunity for us to present our proposal and get feedback from others, as well as come to know about other projects too. Discussions with colleagues may result in new ideas for research projects, and in the long run, will very likely result in new publications. Moreover, some new research connections for collaboration work may come up with some of the people present. Furthermore, Open discussions may result in new directions for the research of the overall research community in this field. Our participation in the doctoral forum may save us months of research and catapult several of our projects forward.