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The role of guarantor in scientific collaboration: The neighbourhood matters

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ABSTRACT

Output resulting from institutional collaboration has been widely used to create performance indicators, but focusing on research guarantors has recently provided a way to recognize the salient role of certain scientific actors. This paper elaborates on this approach to characterize the performance of an institution as guarantor based not only on its guarantor output but also on the importance of the institutions with which it collaborates. Accepting that guarantorship implies in some way acknowledgement of a prominent role on the part of the collaborating institutions, and that this recognition will be more important the more important the collaborating institutions, the paper describes two approaches to measuring this acknowledgement and discusses their effectiveness in helping to recognize prominent scientific actors by using a case study in the Library and Information Science field. The results show a high assortativity in scientific collaboration relationships, confirming the original hypothesis that important institutions tend to grant prestigious institutions the recognition of their relevance.

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1. Introduction

Currently it is assumed that institutional and especially international collaboration is an indicator of quality in research, and even increases the impact of scientific output (Goldfinch, Dale & DeRouen, 2003; Katz & Hicks, 1997; Narin, Stevens & Whitlow, 1991; Sooryamoorthy, 2009). In accordance with this principle, the output resulting from institutional collaboration has been used to create performance indicators for such bibliometric rankings of institutions as the Leiden Ranking (Waltman et al., 2012), the SClmago Institutions Rankings (SClmago Research Group, 2014), or other higher education institution rankings such as the Times Higher Education World University Rankings (Baty, 2011).

Other authors have, however, found an imbalance in the benefits the parties derive from international collaboration (Guerrero-Bote, Olmeda-Gomez & Moya-Aneón, 2013; Leimu & Koricheva, 2005). Such benefits (in terms of visibility and impact) are less evident for countries that have on average a greater impact, while countries with less scientific capacity benefit more from this type of association (Guerrero-Bote et al., 2013). Nevertheless, the indicators of institutional and international collaboration reward equally each of the parties collaborating. In this sense, we believe that the “research guarantor approach” (Moya-Aneón et al., 2013) provides a way of attributing credit to the participating parties that can improve our ability to explain the internal dynamics of institutional and international collaboration, and help to better recognize the party that has more weight in the research.

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The Research Guarantor concept introduced by Rennie, Yank and Emanuel (1997), together with the list of contributors, has been adopted as a specific element of the authoring system, especially in the field of biomedicine. According to these authors, the guarantors are “those people who have contributed substantially, but who also have made added efforts to ensure the integrity of the entire project. Because of this, an author who acts as research guarantor (RG) typically receives more credit than the other collaborators (Wren et al., 2007). What is more, research guarantors are often ‘identified as the persons who take responsibility for the integrity of the work as a whole, from inception to published article’ (ICMJJE, 1997). Thus, it is reasonable to say that the research guarantors “play a leading role in research” (Moya-Anegón et al., 2013) and that they are key players in institutional collaboration.

Despite the theoretical advantages of the contributor/guarantor system, explicit mention of the guarantor is not widespread, making it difficult to use directly. To determine which collaborator is primarily responsible for the research, Moya-Anegón et al. (2013) proposed the use of the corresponding author information and discussed the implications and possible limitations of this method. This has been used successfully to identify “leading authors” (Cova, Jarmelo, Formosinho, de Melo, & Pais, 2015), and even to develop leadership indicators for individual authors (Alvarez-Betancourt & Garcia-Silvente, 2014). However, the original idea was to assign the role of Research Guarantor only to the institution to which the corresponding author belongs as being less risky than assigning it to the author themselves. Thus, we do not assume that the individual who acts as the corresponding author is the Research Guarantor, but that the group or institution to which the corresponding author belongs is the Research Guarantor. In our case, the level of analysis is that of the institutions, so we think that the research guarantor approach adapts well to our study.

The type of role that these indicators aim to describe is different from that derived from the concept, common in the literature, of superior performance in terms of output or other more qualitative indicators (Klavans & Boyack, 2008, 2010; Moiwo & Tao, 2013; Shelton, 2008). Although “research guarantorship” is not explicitly about the quality of the results published, it does introduce a new dimension related to the ability to have a salient role in the process of doing science, and therefore to the characteristics of the individual contributions of the parties.

Two indicators derived from this approach –Scientific Leadership, and Excellence with Leadership– are currently used in the SCImago Institutions Rankings (SCImago Research Group, 2014). Both indicators have been analysed in depth (Jeremić, Jovanović-Milenković, Radojičić, & Martić, 2013; Moya-Anegón et al., 2013; Manganote, Araujo & Schulz, 2014;), and there is evidence of their usefulness in identifying and describing pre-eminent actors in science (Lillo & Martini, 2013; Zacca-González, Vargas-Quesada, Chinchilla-Rodríguez, & de Moya-Anegón, 2014; Manganote et al., 2014; Chinchilla-Rodríguez, Miguel, & Moya-Anegón, 2014; Chinchilla-Rodríguez, Zacca-González, Vargas-Quesada, & Moya-Anegón, 2015).

However, although these research guarantorship based indicators are useful to describe institutions’ scientific performance, there are situations in which the role of their leadership can be overestimated: when an institution systematically appears alone on the byline and when it systematically leads other institutions with much lower scientific reputations. Manganote et al. (2014) obtained results that seem to support this idea when analysing the relationship between the percentage of production as guarantor (%RG), the percentages of papers published in first quartile journals (%Q1), the percentage of papers produced under international collaboration conditions (%CI), and the normalized impact of the scientific production (NI). According to those authors, above 50% of production as RG there is a significant negative correlation between %RG and the remaining variables associated with the quality of the output. Thus, “a high value of normalized leadership may be an indicator of research isolation with the consequences on quality and impact of the corresponding research. For a significant number of institutions, an important part of their production as guarantor is in the absence of international collaboration or it is with institutions whose production is not characterized by any high performance in terms of quality indicators. This could make it necessary to take not only the gross number of papers as guarantor into account but also the characteristics of the collaboration in which this production arises.

The role of research guarantor has been described by using counts of the total output and of the scientific output of excellence. Neither of these indicators, however, refers specifically to the relationship established between the guarantor and the collaborators. Instead, they describe the results of that collaboration. In the context of scientific output, guarantorship can be defined as an asymmetric relationship between one party exercising direction of the work and one or more collaborators. In this relationship, the guarantors should get more credit as recognition for the additional workload they bear, as well as receive differential recognition as appreciation for their performance in a specific function that characterizes the agents who are more autonomous and prominent. Such relationships can also be used to describe the structure of a scientific collaboration, an approach used by Cova et al. (2015), for whom information about the corresponding author could be useful “to detail collaborative fluxes, including the sense of collaboration. In our opinion, these collaborative fluxes can also be used to distinguish prominent actors in the structure of scientific collaboration between institutions.

Although we make limited use of network theory in this work, the fact is that, from this point of view, research guarantors fit well with the definition of “prestigious actor” as “one who is the object of extensive ties, thus focusing solely on the actor as a recipient [of inbound ties]” (Wasserman & Faust, 1994:174). In our opinion, when a collaboration is established between a guarantor and one or more contributing parties, the latter can be considered to acknowledge the scientific authority of the guarantor. Furthermore, we understand that this recognition is of greater value the higher the scientific level of the collaborators involved. Thus the guarantorship skills of a scientific actor (an institution in the case of the present study) can be described through the recognized prestige that comes from the collaborators’ acceptance of the role.

In this paper, we study the recognition obtained by scientific institutions from their collaborators when acting as RG. To this end, we developed two different ways of measuring this recognition as guarantor, and applied them to describe the

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