

Title

Motivations and barriers for cross-sector cooperation and collaboration

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EXTENDED ABSTRACT

(1) General background

Universities are driven to collaborate with external partners by a variety of factors, including external demands for new knowledge (Meyer-Krahmer and Schmock, 1998; Schartinger et al., 2002) and universities' need for financing (OECD, 1999; Santoro and Gopalakrishnan, 2000), which generate interdependent relationships (Geisler, 1995). However, the complexity of such interactions means that they do not fit in a single specific pattern (Thune, 2007). There is also a lack of understanding of the links that bind different agents together (D'Este and Patel, 2007; Lam, 2011; D'Este and Perkmann, 2011), that is necessary for evaluating the effects produced by current policies (Woolgar, 2007). On the one hand, there is a need to investigate the way cooperation-fostering measures operate and to pay closer attention to the incentives that push the academic sector towards cooperation (McLellan et al., 2006; Dutrénit, *et al.*, 2010). On the other hand, it is also important to identify the barriers that prevent or hamper collaboration relationships. Only by understanding factors influencing the different interconnection mechanisms and the processes of generation of collaboration relations is it possible to properly assess and redirect stimulus policies that were hitherto unidirectional and indiscriminate and therefore partly inefficient or with limited impact.

Normally scientists direct their activities according to a reputation-based science reward system, whereas the productive sector is guided by the imperative of producing tradable results (Dasgupta and David, 1994). This means that two diverging logics intervene here. The main limits to collaboration on the part of researchers lie in a complicated balance between their preoccupation with maintaining individual career trajectories and the socio-economic viability of the organisations in which they perform their activities, and the potential impact that collaboration with industry, public administrations or non profit institutions may have on their research freedom and task priorities. Despite such potential disadvantages, the rendering of services and the participation in cooperative research continues to take place, and a plausible explanation for this could be found in individual responses to incentives, in the diversification of trajectories of professional science careers or in the presence of disparate scientific and/or technological goals (Perkmann and Walsh, 2007).

Equally, scientists can also obtain certain benefits from this exchange, as for example the awarding of funds that they can employ in acquiring equipment and materials or in the training of new researchers (protective space reference), together with a business vision of the problems they face in their research lines (Lee, 2000). It has even been empirically demonstrated that the combination of research activities and cross-sector relations provides profitability both in terms of scientific production and in access to financing from competitive public sources (Manjarrés Henríquez et al., 2008). At the same time, the perception of potential negative impacts on research agendas can prove to be a barrier to further interactions. All this sets new challenges for studies of science, technology and innovation policies.

(2) Approach

In this context, insufficient attention has been paid to the study of the professional values of researchers, their motivations and attitudes towards cooperation despite the fact that research collaboration has been established as one of the keys to a better understanding of the dynamic of knowledge transfer practices and relations (Bozeman et al. 2012). We

therefore set out to compare scientists' readiness to cooperate with other agents, comparing differences in this readiness between different scientific fields.

We take research groups as our unit of analysis, as they represent the backbone of the research system in our case study. They are organisational units of a functional nature but with dynamic characteristics, representing advantages for the development of research activity due to the complementary nature of their components and the availability of an optimal critical mass (Rey Rocha et al., 2008). Groups are also crucial for cooperative relations. For this reason it is of great interest to know how researchers assimilate those contradictions between trends that favour, and others that hinder, the transfer of knowledge at the same time.

The core of the study is a survey among the heads of the research groups. The opinions of scientists heading research groups is used as a proxy for the experiences of the collective. The survey population is constituted by the total of active research groups in universities and public research centers following up-to-date official sources. From these we obtained a final sample of 851 research groups. The methodology applied consisted of a self-completed online survey, with telephone reinforcement. The field work was performed in Fall 2011, applying the corresponding statistical consistency controls to the principal data.

(3) Results

We first seek to obtain a general overview of the motives and barriers for cooperation through the opinion of the leaders of the research groups, as well as the differences in importance between fields. We also check research groups' cooperation with different types of agents: firms, public administrations and non-profit institutions. With the purpose of discovering the factors that define researchers' assessment of cooperative relations, a factor analysis is performed to understand the underlying dimensional properties and, if appropriate, to reduce according to coalescing variables. Our results distinguish three main motives to cooperate (related to the conditions for knowledge production, knowledge application and engagement, and to financial resources) and two types of barriers due to scientific reasons and research groups' credibility. Significant differences exist between fields in the importance given to scientists' readiness to cooperate.

Secondly, the use of logistic regressions taking as dependent variables research groups' distinct cooperation with external agents enables us to ascertain noticeable disciplines dissimilarities. Work in progress identifies different patterns of collaborative behaviour among research groups, taking into account both the types of external agent and scientific fields. For example, while both knowledge application and engagement and financial resources are the main motives to collaborate with firms, conditions for knowledge production influence decisions about collaboration with public administration.

(4) Conclusion and/or (policy) implications of the work

This study will enable us to assess how researchers' opinions on and attitudes towards cross-sector cooperation, affect the degree of participation of their groups in knowledge transfer activities among scientific fields. It will also facilitate the better identification of barriers to collaboration and how these may affect research groups from different scientific disciplines and their potential to collaborate with partners from different types of external organisation.

The structure and activity of research groups has acquired increasing importance for the purposes of evaluation, among other issues in assessing the success achieved (productivity, impact). Included among the influential group characteristics are structural as well as

functional factors (see, for example, Martin-Sempere et al., 2002; Adams et. al. 2005; Lee and Bozeman, 2005). We understand that, in the same way, certain combinations of group features are better disposed to the transfer of knowledge. It is expected that the consolidated groups (size, accumulated experience) display greater willingness to cooperate.

In addition, the absence of a clear alignment in the values and opinions expressed by the heads of research groups would prompt some further analysis. This is linked back to the set of values and rules that shape the scientific ethos described by Merton (1973). Ultimately, discovering which factors define researchers' assessment of their cooperation relations will yield useful insights for evaluating stimulus policies and their potential for readjustment and improved targeting.

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