Characterising Triple Helix linkages: Analysis of the flow of resources and the strength of link

Africa Villanueva-Felez, *INGENIO (CSIC-UPV), Valencia, Spain*
Alejandro Escriba-Esteve, *Management Department - Universidad de Valencia, Spain*
Rudi Bekkers, *Department of Industrial Engineering and Innovation Science (IEIS)-Eindhoven University of Technology, Netherlands*

Research Topic

Social relationships are central to Triple Helix, yet notably difficult to measure and analyse. The establishment of linkages between the different types of actors has been considered as one of the processes through which knowledge flows across different institutional spheres, but are also seen as an outcome of policies oriented to the improvement of these flows (Molas-Gallart, Tang & Morrow, 2000). It is understandable, then, that efforts to define and collect indicators of university-society relationships (so-called Third Mission indicators) have predominantly focused on clearly identifiable inputs (number of employees in technology transfer, investments in spin-offs, etc.) and outputs (for instance, technology commercialisation indicators, income from licences) of knowledge transfer activities. While such measures have their uses, we believe that the analysis of social links remains a crucial yet understudied aspect of the efforts to measure Triple Helix Linkages, and to develop innovative indicators.

In this sense, some relevant efforts have been made from the Social Network Perspective, addressing topics such as the structure of collaborations in research projects and journal papers (Meyer & Bhattacharya, 2004), the identification of academic research networks that facilitate academic publications (Lowrie & McKnight, 2004), and the analysis of the relationship between social networks and academic career (Etzkowitz, 2000).

Paradoxically, most studies focus on the actors themselves and there are only very few studies taking individuals' relationships as their unit of analysis (Link, Siegel, & Bozeman, 2007; Palmberg, 2008). The investigation of the characteristics of the links between the individuals involved in knowledge creation on the one hand, and transfer processes on the other, deserves more attention among the efforts to measure Triple Helix linkages.

In this paper we propose an approach that focuses on the relational features of social linkages established by researchers in the field of nano-materials. We expand the concepts of Granovetter (1973) and use them to measure the relationship between, on the one hand, the ties which researchers establish with other academics, with governmental research organisations, and with firms, and, on the other, the interchange of resources through those linkages.

Methodology and data

The paper studies the social relationships of researchers with other Triple Helix actors (i.e. academic and public research organisations, and firms), and examines whether the characteristics of these social links are related with the interchange of resources in each relationship. In order to do so, we use primary data obtained using a survey, launched during April and July 2008, conducted in Spain. The unit of analysis is the relationship between two agents. With the relationships reported we constructed a dyadic data set.

Drawing on this data we used cluster analysis to classify and characterise different types of social relationships, based on the flow of resources interchanged by the two agents involved in the social. The variety of resources considered to identify types of relationships include (1) information related to advances and discoveries in general, (2) information that is personalised or adapted to the receiver's needs, (3) knowledge that the receiver consider difficult to acquire from another source, (4) professional advise, (5) access to other researchers, (6) access to funding, and (7) help to establish a reputation as a researcher. We analyse these relationships separately for each of the Triple Helix spheres (being university, government, and industry). The paper also develops and test measures of tie strength.

Finally, we use non-parametric tests to study the relation between the different kinds of linkages (obtained through cluster analyses) and their well-known indicators from social network studies, such as the degree of trust, friendship, frequency of communication, etc. We search for significant differences in relational behaviours depending with whom and in which sphere the researcher maintains a relationship. We also identify the relationships in each sphere which provide with more resources to the researcher to accomplish his/her research and transfer activities.

Results

The study identifies three main types of relationships developed by researchers, which repeat within each of the three institutional spheres:
1. Relationships with high levels of resources flow,
2. Relationships with low levels of resources flow,
3. Relationship with intermediate levels of resources flow.

Our results show a direct positive relation between the level of resources exchanged in each type of relationship and the strength of the link as defined by Granovetter (1973). In fact, we observe a positive and significant relationship with some of link strength indicators, such as trust, friendship, and reciprocity.

In this sense, our study provides interesting insights for the analysis and understanding of the influence of Triple Helix relationships on knowledge creation and transfer. Our contribution is related to
1. the proposal of new ways of measuring and classifying the relationship between different spheres of the Triple Helix, by using social Network perspective
2. the potential implications of these measures with regard to the understanding of the factors that have an impact on knowledge transfer and creation through different actors.

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