From boundary line to boundary space: The creation of hybrid organizations as a Triple Helix micro-foundation

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**ABSTRACT**

In a Triple Helix framework, independent hybrid organizations can be created at the intersection of overlapping yet separate institutional spheres to address innovation blockages. However, the formation process of these organizations, which incorporate and combine elements from the Triple Helix spheres, has seldom been investigated. We address this gap by proposing a model that conceptualizes the creation process of these organizations. We argue that their creation opens up a “boundary space” that differs from a boundary line. By comparing empirical results of three cases, we identify a three-step creation process (recognizing a gap; bringing Triple Helix representatives together and creating a consensus; and designing an ad hoc contingent solution). We highlight the individual role of a boundary spanner in these dynamics. The results provide new insights on the micro-foundations of the Triple Helix. They also suggest an extension of the “boundary spanner” concept.

**1. Introduction**

The Triple Helix of University-Industry-Government relations provides a framework for overcoming blockages to innovation in knowledge-based economies and regional innovation systems (Etzkowitz, 2008). The intersection of these overlapping yet separate institutional spheres provides a location conducive to “innovation in innovation” (Etzkowitz, 2003), the formation of new independent hybrid organizations that integrate and combine elements from the various Triple Helix spheres in their design. Such organizations, which include venture capital firms, incubators and science parks, aim at enhancing innovation, especially in the form of new venture creation.

Many governments and universities throughout the world have dedicated considerable funds and other resources to forming such organizations, hoping to enhance innovation and technology venture creations (Avnimelech et al., 2007; Bergek and Norrman, 2008; Champenois, 2012; Wonglimpiyarat, 2013; Croce et al., 2014; Rubin et al., 2015). The performance of these organizations in terms of university-industry cooperation (Franco and Haase, 2015), innovation and local entrepreneurship has been well researched and documented (Rothaermel and Thursby, 2005; Mian et al., 2012; Barbero et al., 2014; Fernandez-Alles et al., 2015). Recent research advocates shifting the focus from strict performance to the internal practices of these organizations (Scillitoe and Chakrabarti, 2010; Lundqvist, 2014; Rubin et al., 2015; Shane et al., 2015; Weckowska, 2015).

Nevertheless, while one aspect of these organizational practices pertains to their genesis, Triple Helix research has seldom investigated how these novel organizational models, operating at the intersection of overlapping spheres, are invented and implemented. The purpose of this paper is to address this gap by posing the following question: *How are hybrid independent organizations that support innovation and that exist between institutional spheres created?*

We propose a model that conceptualizes the creation of such organizations as resulting from the existence of an innovation gap and from collective action catalyzed by a specific type of individual. This individual catalyst is called a *boundary spanner* because he or she links separate institutional spheres and draws elements from Triple Helix spheres to contribute to the emergence of a new hybrid organization. We illustrate our model with three case studies of organizations supporting new academic venture creations, from the USA and France. We thus identify three steps in the creation process of such organizations: recognizing a gap; bringing Triple Helix representatives together and creating consensus; and designing an ad hoc organizational solution. The three steps are catalyzed by the boundary spanner.

A major theoretical contribution of the paper is that it enriches the Triple Helix framework by providing a better understanding of one of its micro-foundations: namely, the creation process of “innovation in innovation” (Etzkowitz, 2003). We propose a new boundary concept to conceptualize the intermediary position that hybrid organizations occupy, arguing that their creation takes place within a “boundary space.”
that, rather than separating the spheres, integrates elements from overlapping spheres.

The paper begins by discussing the Triple Helix framework and proposes the concept of “boundary space,” a liminoid realm in which creative intercalation of elements from the Triple Helix spheres produces a novel organizational design. In the next section, we focus on the literature dedicated to boundary spanning/spanner. Both sections enable us to identify knowledge gaps and to derive two propositions as a model for the creation of independent hybrid organizations. After explaining the methodology, we illustrate and refine the theoretical model by presenting a comparison of empirical results of three cases. We conclude by discussing the implications of our findings for both theory and practice.

2. Triple Helix framework and boundary spaces

In the Triple Helix model, improvement in the conditions for innovation is conceived as resulting mainly from the increasing relations among university, industry, and government spheres, which partially overlap (cf. Fig. 1) (Etzkowitz and Leydesdorff, 2000).

Collaboration between these institutional spheres, with each one playing its traditionally defined role, marks the first step in the formation of a Triple Helix (Etzkowitz, 2008). This collaboration often starts with discussions between universities, firms and/or governments, and generally responds to a perceived gap in the regional innovation system, frequently triggered by an economic crisis or the development of a regional growth project (Svensson et al., 2012).

The next step in the development of a Triple Helix is the internal transformation of existing institutions that, on top of their traditional tasks, “take the role of the other” (Etzkowitz, 2008) and perform new tasks. For example, industry firms pursue their core mission of producing goods and services while increasingly providing high level training, as evidenced by a number of leading companies’ formation of their own “universities” in their area of expertise. Similarly, while governments are responsible for providing the regulatory regime, they also offer newly created ventures public venture capital (Etzkowitz et al., 2001; Mazzucato, 2014).

Finally, the Triple Helix model posits a third stage in which “innovation in innovation” (Etzkowitz, 2003) takes place, beyond the traditional and narrower sense of “innovation” as product innovation within firms. As relations among university-industry-government actors continue to increase, the conditions that produce innovation are enhanced (Fitjar et al., 2014).

Thus, the Triple Helix can be a platform for “institution formation” (Etzkowitz, 2008) or creation of hybrid organizations that integrate and combine elements from the various Triple Helix spheres in their institutional design, to promote innovation. Organizational innovations such as venture capital firms, science parks and incubators, which synthesize elements of several institutional spheres, exemplify such hybrid organizations (Etzkowitz, 2008). These hybrid organizations are often autonomous in that they are not incorporated into one particular sphere, unlike other intermediate organizations that support Triple Helix collaborations and facilitate technology commercialization, such as government-supported organizations that act as sponsors of specific technological innovations, university incubators, or industry consortium associations (Johnson, 2008). Hybrid organizations exist as entities independent from the spheres from which their elements were drawn. They are not controlled by any actor in particular but are accountable to several different stakeholders belonging to distinct spheres.

A prototypical example is American Research and Development (ARD), created in Boston in 1946 by the New England Council. MIT President Karl Compton played a key role therein (see Section 5.). At its inception, the first venture capital firm pursued a government-like mission of social good, was headed by a Harvard University professor, drew on mechanisms from the financial industry to design its own activities, and received industry funding as well as funding from technical universities other than MIT (Etzkowitz, 2002, 2008).

Another example is the Research Corporation, created in the early 20th century by a chemist at the University of California to organize technology transfer from the university to firms (Mowery and Sampat, 2001; Etzkowitz, 2002). Based on the government-sponsored patent system, the Research Corporation invented the technology transfer office as an independent organization. The organizational model worked as the primary means of commercializing academic research in the US for much of the 20th century, when most universities believed it was not appropriate or were unwilling to commit resources to establish their own technology transfer offices.

Such hybrid autonomous organizations (that we call “HAOs” in the remainder of the paper) are usually invented within a “consensus space” (Etzkowitz, 2002, 2008; Ranga and Etzkowitz, 2013). A consensus space is defined as the “set of activities that bring together the Triple Helix system components to brainstorm, discuss and evaluate proposals for advancement towards a knowledge-based regime” (Ranga and Etzkowitz, 2013). These activities generate social and relational capital and therefore facilitate coordination within and between different institutional spheres (Villarreal and Galvo, 2015). The existence of a consensus space is a condition for the creation of HAOs that promote innovation in response to local conditions. This type of innovation takes advantage of resources at hand, in contrast to bureaucratically implemented solutions that may or may not consider local dynamics. By cross-fertilizing diverse perspectives, ideas may be generated and results may be achieved that individual actors could not have accomplished alone. The concept of “consensus space” was introduced in an analysis of the creation of ARD (see Section 5.), and in particular the experience of the New England Council, created by six New England governors to develop a strategy for the renewal of a region that had been in economic decline since the early 20th century (Etzkowitz, 2002).

Through their activities and skills, HAOs constitute an innovation space (Ranga and Etzkowitz, 2013): a space in which a novel project is undertaken, drawing upon the resources aggregated within the consensus space, which enhances the development of local innovative firms. These projects typically harness the resources of existing “knowledge spaces” in universities, R&D units of firms, and government research organizations, and enhance these spaces, creating links among them and across the Triple Helix.

However, Triple Helix researchers have generally focused on Triple Helix structures and collaborations, as well as on intra-sphere dynamics. The outcome of overlapping Triple Helix spheres – or the
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