

# CREATING LEGITIMACY: A CASE STUDY OF INSTITUTIONAL ENTREPRENEURSHIP IN NANOTECHNOLOGY

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## Research Questions

Science-based technologies are often viewed as both heralds of progress and harbingers of catastrophe. As demonstrated by the barriers facing genetically modified organisms and nuclear power, public perception can play a pivotal role in the commercial success or failure of such technologies (Krimsky, 1992; Jasper, 1992). Importantly, public perception can affect the outcomes of technology commercialization regardless of the actual threats posed by the technology. In the field of nanotechnology, entrepreneurs increasingly recognize this potential. Authors of a recent nanotechnology trade report argue, “NGO’s with an axe to grind, journalists seeking the next big story, and consumers skeptical of what they perceive as corporations ‘playing God’ could set off a self-reinforcing groundswell that could make the use of nanoparticles *verboten*...even if no real risks were actually shown to exist” (Nordan, 2005). Academic researchers drawing on technology management and institutional literatures validate these concerns, arguing that the successful emergence of a technological field necessitates the development of public trust (Aldrich & Fiol, 1994; Gurad, Jain & Kuraswamy, 2002).

Research has shown that institutional entrepreneurs with sufficient resources can create trust building institutions. However, while there is an increasing awareness of institutional entrepreneurship, we do not know why and how institutional entrepreneurs attempt to develop public trust for emerging science-based technologies. In this dissertation, I will explore two related questions: *What internal and external events drive*

*institutional entrepreneurs to mobilize collective action and to use collective resources to generate public trust? And, How do institutional entrepreneurs attempt to generate public trust of new science-based technologies?*

### **Rationale**

New technologies require a defined institutional space with norms and rules governing their production, distribution and consumption (Garud, Jain & Kuraswamy, 2002). This space, or technological field, is embedded within the larger organizational field composed of the sets of institutions and networks of organizations that make up a recognizable area of public life (DiMaggio & Powell, 1983). Stakeholders such as the general public and government officials come to trust in and accept an emerging organizational field as appropriate and right through the process of social legitimation, whereby field boundaries, definitions, practices and standards become institutionalized (Aldrich & Fiol, 1994). It is increasingly recognized that interested individuals with sufficient resources can influence the legitimation of emerging organizational fields by creating and promoting institutions they value (DiMaggio, 1988; Fligstein, 1997; Garud, Jain & Kuraswamy, 2002; Maguire, Hardy & Lawrence, 2004). However, other than broad commonalities across descriptive accounts of institutional entrepreneurship, the “literature offers few detailed strategic prescriptions for managers” seeking to generate legitimacy for novel undertakings (Suchman (1995: 593).

Most studies of institutional processes have focused on existing fields (e.g. Brint & Karabel, 1991; Galaskiewicz, 1991; Greenwood, Hinings, & Suddaby, 2002). A handful of recent studies of institutional entrepreneurship in emerging fields are exceptions. In these studies, researchers have examined the creation of technological

standards (Garud, Jain & Kuraswamy, 2002; Garud & Rappa, 1994) and the institutionalization of new practices (Maguire, Hardy & Lawrence, 2005). But the creation and manipulation of the meaning of new technologies and the relationship between such meanings and public trust has been largely ignored.

The dearth of studies on emerging technologies and public trust may result in part from researchers' acceptance of Aldrich and Fiol's (1994) speculation that widespread acceptance of profit seeking renders public trust (which they term sociopolitical legitimacy), less crucial to emerging fields than other types of legitimacy. However, science-based technologies often spark fear and public mistrust regardless of their profit potential. For these technologies, sociopolitical legitimacy is not automatic. Although the potential losses from commercialization failures are substantial, we know little about the efforts of institutional entrepreneurs working to generate public trust of emerging science-based technologies.

### **Research Design**

I will utilize an embedded, single case design to explore the development of science-based technologies within the nanotechnology field. Single case designs are appropriate when the case represents an *extreme* case or when the case is *revealer*, meaning that it gives the investigator an opportunity to analyze phenomena that have been inaccessible (Yin, 1984). Because of the basic science nature and substantial possible consequences of nanotechnology, both positive and negative, the legitimization of nanotechnology can be considered an extreme case. The case provides an opportunity to study institutional entrepreneurship focused on an aspect of the institutional

environment, public trust, which has previously not been studied. Additionally, the case will allow the phenomenon to be studied real-time as it unfolds in the actual context.

An embedded case design includes multiple units of analysis within a single case. The units of analyses will include the nanotechnology field, collective groups within that field as well as individual institutional entrepreneurs. The cases of collective groups and individual entrepreneurs are embedded within the overall single case of the nanotechnology field. A primary benefit of an embedded case design is that it allows for some comparison across cases within the single case.

Data collection and analysis will be guided by a conceptual framework which includes the research questions, a process perspective (Pettigrew, 1997; Langley, 1999), and the following theoretical presupposition derived from the literature: the legitimization of a technological field is assumed to be a process involving social construction and political struggle and requiring collective agency. I will collect data at the individual, collective and field levels. I will collect text data from news reports, congressional hearings, and electronic trade journals; field data through observation of nanotechnology investing conferences; and interview data from semi-structured interviews of institutional entrepreneurs. I will organize the data by writing case summaries of the larger context and embedded organizational units. I will then analyze this data through an inductive, case comparison sensitive to the context of the larger case (Eisenhardt, 1989; Yin, 1984).

### **Contribution**

Considerable attention and public financial support is devoted to the commercialization of science-based technologies and the industries which emerge around them (Garud & Karnoe, 2003). This study will build on limited prior research on

institutional entrepreneurship in emerging contexts by drawing on studies of science and technology and organizational perception management to explore the efforts of institutional entrepreneurs to generate public trust of science-based. A better understanding of the process by which such technologies gain legitimacy will provide guidance to those seeking to commercialize new technology and contribute to our understanding of the broader question of how institutions originate and change.

## References

- Aldrich, H. E. & Marlene C. F. 1994. Fools rush In: The institutional context of industry creation. *Academy of Management Review*, 19: 645-670.
- Brint, S. and Karabel, J. 1991. Institutional Origins and transformations: the case of American community colleges. In W. W. Powell & P. J. DiMaggio (eds.), *The new institutionalism in organizational analysis*: 337-360. Chicago: University of Chicago Press.
- DiMaggio, P. J. and Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological review*, 48: 147-160.
- Fligstein, N. 1997. Social skill and institutional theory. *American Behavioral Scientist*, 40: 397-405.
- DiMaggio, P. 1988. Interest and agency in institutional theory. In L. Zucker (ed.), *Institutional patterns and culture*: 3-22. Cambridge, MA: Ballinger.
- Eisenhardt, K. M. 1989. Building theory from case study research. *Academy of Management Review*, 14: 532-550.
- Galaskiewicz, J. 1991. Making corporate actors accountable: Institution-building in Minneapolis-St. Paul. In W. W. Powell & P. J. DiMaggio (eds.), *The new institutionalism in organizational analysis*: 293-310. Chicago: University of Chicago Press.
- Garud, R. and Karnoe, P. 2003. Bricolage vs. breakthrough: Distributed and embedded agency in technology entrepreneurship. *Research Policy*, 32: 277-300.
- Garud, R. and Rappa, M. 1994. A socio-cognitive model of technology evolution. *Organization Science*, 5: 344-362.
- Garud, R. Jain, S. & Kumarsaswamy, A. 2002. Institutional entrepreneurship in the sponsorship of common technological standards: The case of Sun Microsystems and Java. *Academy of Management Journal*, 45: 196-214.
- Greenwood, R., Hinings, C. R., Suddaby, R. 2002. Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*. 45: 58-80.
- Jasper, J. 1992. Three nuclear energy controversies. In Dorothy Nelkin (ed.), *Controversy: politics of technical decisions*: 97-111. Newbury Park, CA: Sage Publications.
- Krimsky, S. 1992. Regulating recombinant DNA research and its applications. In Dorothy Nelkin (ed.), *Controversy: politics of technical decisions*: 219-248. Newbury Park, CA: Sage Publications.
- Langley, A. 1999. Strategies for theorizing from process data. *Academy of Management Review*, 24: 691-710.
- Maguire, S., Hardy, C., Lawrence, T. B. 2005. Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. *Academy of Management Journal*, 47: 657-679.
- Nordan, M. 2005. A prudent approach to nanotech environmental, health, and safety risks. New York: Lux Research Inc.
- Pettigrew, Andrew M. 1990. Longitudinal field research on change: Theory and practice. *Organization Science*, 1:268-292.

Yin, R. K. 1984. *Case study research design and methods*. Beverly Hills: Sage Publications.