The lab is my world or the world is my lab?
Knowledge boundary and Professional role identity work of R&D organizational members encountering Open innovation

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Introduction

Recently, a new stream of literature is calling for a paradigmatic shift in innovation research and practice, naming it “open” or “distributed” innovation (Chesbrough 2003, 2006; Von Hippel 2005; Benckler 2002). Currently, a growing number of large and mature organizations are experimenting with such “open innovation” models to various degrees (Thomke and Von Hippel 2002; Rigby and Zook 2002; Chesbrough 2003, 2006; Adner 2006; Huston and Sakkab 2006; Pisano and Verganti 2008). Organizations have always been challenged by the traditional approach of the resource heavy and uncertain internal R&D processes and an opportunity has been created with the dramatic decrease in the costs of transaction, knowledge transfer and communication (Benckler 2002, Baldwin and von Hippel 2009). However, the “open innovation” model clashes with the traditional R&D model on several levels and there is little research on how organizations deal with the resulting tension (Raymond, E. S. 1999; Baldwin and Von Hippel 2011, Lakhani, Lifshitz-Assaf and Tushman in press).

This is a pioneering in depth field study of a large and mature technology based organization which has experimented with opening the boundaries of the innovation process by broadcasting their strategic R&D problems via “Open innovation” communities & platforms; for
the world to solve. Scholars have recognized the need to explore the use of open innovation by organizations in greater detail (Gann 2005; Helfat 2006; Lakhani, Lifshitz-Assaf and Tushman in press), yet to date there are few papers that have systematically undertaken this endeavor (West and O’Mahony 2005; Dahlander and Wallin 2006). Most of the current literature that investigates “open innovation” focuses on either open innovation communities, (Raymond E. S. 1999; Lerner and Tirole 2002; von Krogh and von Hippel. 2006; West 2003; Fleming et al 2007), policy and Intellectual property aspects (Chesbrough 2003; Von Hippel 1988, 2005, Williams 2010) or contest design (Jeppesen and Lakhani 2009; Boudreau et al 2009; Che and Gale 2003; Fullerton and McAfee 1999; Taylor 1995; Terwiesch and Xu 2008). In contrast, the popular managerial literature is bourgeoning with guidance and anecdotes about organizations that are increasingly experimenting and adopting “open innovation” models (Boudreau and Lakhani 2002; Thomke and Von Hippel 2002; Rigby and Zook 2002; Chesbrough 2003, 2006; Adner 2006; Huston and Sakkab 2006; Pisano and Verganti 2008).

The need for such a study is particularly highlighted by the tension between the traditional R&D model that emphasize the boundaries of the organization and the novel “open innovation” model that rebels precisely against these boundaries (Lakhani, Lifshitz-Assaf and Tushman in press; Baldwin and Von Hippel 2011). Furthermore, scholars argue that open and user driven innovation increasingly competes with and may displace producer innovation in many parts of the economy and represents a paradigm shift in innovation research, policy making, and practice (Baldwin and Von Hippel 2011). However, it is unclear how the difference between these models will express itself in R&D organizations. This study sheds light on this gap in our models by focusing on the R&D org members and the influence of open innovation on their professional role identity and knowledge boundary work.

Since the phenomenon of “open innovation” and related theories are nascent, this field study takes an inductive grounded theory building approach (Glaser and Strauss 1967). Edmondson and McManus (2007), in their work on methodological fit of field research, noted that “In studies where theory is nascent or immature, researchers do not know what issues may
emerge from the data and so avoid hypothesizing specific relationships between variables” (2007). Therefore in the primary stages of this study, the research question was broad and open ended: How do R&D org members, in a large and mature technologically oriented organization, experience “open innovation”. As I progressed and began the iterative process of data collection and analysis I discovered patterns of reactions post the open innovation experiment. Consequently the focus of inquiry became: How opening the organizational boundaries of innovation, via “open innovation” models, influences the knowledge boundary work of R&D organizational members.

Method:

I conducted an in –depth longitudinal study of 2.5 years at the US National Aeronautics and Space Administration, NASA, more specifically at NASA’s space life science directorate (SLSD) and its related internal units. I chose to conduct a field study in a single organization due to the lack of current knowledge in the literature regarding the open innovation model in organizations (Yin 1994; Edmondson and McManus 2007). It was designed as an inductive longitudinal study that would enable in depth analysis; similar to most studies of technology in organizations that follow one organization throughout the process of introducing a new technology (Barley 1986, 1990; Orlikowsky 2007, 2008). This design fits the research question as it tracks a new and complex phenomenon which cannot be controlled in the lab or analyzed with archival data (Yin 1994).

NASA was a great fit as a field site, since my research interest lies at the intersection of open innovation and large and mature R&D organizations. NASA is a large and mature organization that represents an extreme case of knowledge experts. In addition, they are one of the few organizations that experiment with open innovation to a significant extent; they chose to open strategic R&D challenges and therefore their R&D org members were heavily involved in the experimentation. Unlike NASA, many other organizations which use open innovation and crowdsourcing do so in a separate organizational unit that is mainly focused on marketing and the public’s or customers’ engagement. In these organizations, the open innovation model
hardly interacts with the organizational R&D process and the organizational members. Lastly, NASA has less IP concerns which enabled focusing on the effected organizational issues.

In this paper, I analyze the response of 94 R&D organizational members at NASA Space life Science Directorate (SLSD) and related units to open innovation. My primary sources of data are observation, interviews and archival of internal documents. Focusing on the population of NASA’s R&D organizational members as the unit of analysis and not the organizational level makes this field study more representative since the NASA SLSD’s org members’ population is similar to equivalents in leading large and mature technology organizations. In particular, it is similar to many life science R&D organizations that have a mix of scientists and engineers from various fields and trainings (such as physiology, toxicology, microbiology, bio-engineering and medicine). The variation within the R&D org members’ population (role, education background, R&D unit, tenure, age) is sufficient to explore their experience with open innovation. Lastly, investigating the experience of R&D org members within the same organization enabled controlling the field and organizational environment and focusing on the variation of the experience of open innovation.

Findings:

“It [Open innovation] is such an anathema to what they were trained to do and what was modeled to do.”

I find that opening the boundaries of the organizational innovation process to the world, via a web “open innovation” platform, stood in stark contrast to the traditional R&D model. The organizational knowledge boundaries of the traditional R&D model were tight and well defined compared to the open and undefined boundaries of the open innovation model. In the traditional model, the professional role identity of the R&D organizational member was of a “problem solver”, an innovator; whereas; according to the open innovation model the R&D organizational member invite others, outside of the organizations, to solve their problems. This triggered a significant professional role identity threat for the R&D organizational members. In
essence, the open innovation model undermines the traditional R&D model by reviving two main and related fundamental questions of: “Who creates new knowledge in the R&D process?” and “How new knowledge is created?”

Since the open innovation experiment was successful beyond expectations, NASA’s management wanted to integrate it into their processes alongside the traditional R&D model. Consequently, there was a spectrum of knowledge boundary and professional identity work responses among R&D organizational members across the organizational units. On one end of the spectrum, R&D organizational members protected their professional identity; following offensive and defensive protective knowledge boundary work strategies. On the other hand of the spectrum, R&D organizational members initiated a reconstruction of both professional identity and knowledge boundaries of the R&D process and initiated new and open knowledge boundary R&D processes. In the middle, organizational members followed a “hybrid” path of knowledge boundary perforation, a new type of boundary work. The professional role reconstruction was from being a “problem solver”, focused on producing the solution within the organization to becoming a “solution seeker”, focused on how to search for solution, on the problem’s design and selection and integration mechanisms.

“It [the needed professional identity shift] is a deep philosophy change; from being a problem solver to a solution seeker... it is not only about the organizations, this is how we have been trained ever since we are kids- to solve problems! To be the experts of a field and solve!”

I discuss the importance of the new emerging role of a “solution seeker” for scientists and engineers in the era of web mediated processes and increasingly porous organizational boundaries. This study contributes to the innovation literature by supplying a detailed in depth exploration of the influences of open innovation on organizations. In addition, it clears the mist around what is open innovation by describing the knowledge and identity boundary work of adopting open innovation and how it is different from the traditional model of R&D. Lastly, it
sheds light on the important relationship between professional identity boundary work and knowledge boundary work. I found that the technological change could not yield organizational changes without the parallel change in the social fabric of the organization, strengthening the sociomaterial perspective on technology.
References:


