

Title

Research and innovation partnerships in biomedicine: a dynamic perspective on collaboration between hospitals, universities and firms

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Rationale and research problem

Research and innovation partnerships are common approaches to organizing complex R&D and innovation tasks, particularly in the pre-competitive stage of technology development, and are increasingly seen as the key organizational solution for delivering complex and costly health innovations (OECD 2010). Firms seek to reduce risks and costs of innovation activities and to expand the range of exploratory initiatives by pursuing open innovation strategies (Baldwin and von Hippel 2011, Bueno and Balestrin 2012, Chesbrough 2012) by collaborating with other firms and with public research organizations. Universities are expected and stimulated to contribute to innovation processes, by increasing efforts to commercialize research results and to participate in research and innovation partnerships with established firms. Health care organizations are also expected to initiate and support innovation activities in their own organizations, as well as to partner with firms and other organizations to promote health innovation effectively and cost-efficiently. As a consequence there is a push for increased public-private research and innovation partnerships in the bio-medical and health area.

With these expectations as a backdrop, the paper presents an analysis of the following blunt question: *If collaborative research and innovation is ideal for health innovation, why is it so hard to succeed with partnerships in practice?*

The paper will investigate the organization of research and innovation partnerships within biomedicine that encompass firms, universities and hospitals. We will address particularly the roles of the different participants in such relationships and the challenges and tensions involved in such partnerships. The paper uses a dynamic perspective on partnerships, focusing on how partnerships between hospitals, universities and firms emerge and develop over time, focusing particularly on tensions or challenges that arise in partnerships as they develop and the institutional work to overcome them. Exploring network dynamics and understanding how innovation unfolds in the health context, was particularly called for in a recent call for papers on health innovation, as well as a call for how organizational theory could contribute to understanding innovation in the health area (Newell et al 2012). This paper contributes to the emerging literature on health innovation by providing a detailed analysis of the “heralded” organizational format for delivering health innovations – the multi-organizational partnership model, highlighting tensions and how they are dealt with, utilizing an institutional perspective to address these questions.

Brief review of extant research

Collaborations and partnerships between organizations have been said to have the advantage of bringing to the table many different competencies and resources that increase learning and reduce risks in innovation. The idea of open innovation was based on the simple notion that firms should access external knowledge by collaborating with other firms, to strengthen innovation and get access to new markets for their technologies (Enkel, Gassmann et al. 2009). To get access to external knowledge, firms need to share proprietary knowledge and partner with other organizations – particularly with users (Ebersberger and Herstad 2011). Arguments

for the collaborative model is also that collaboration reduces risks and costs, which might be particularly important for very long and costly product development processes in pharmaceutical industries and medical device industries - and other health related sectors. However, the collaborative model of innovation has also been criticized for being too general and not specific enough to be applicable in different sectoral and firm contexts (Hopkins, Tidd et al. 2011), as well as for its downplaying the challenging and even at times dysfunctional aspects of collaborative innovation (Dahlander and Gann 2010). Challenging aspects of collaborative innovation strategies are lack of control over the innovation process and non-exclusive ownership of results, potential lock-in dysfunctional partnerships and projects, attention problems and lack of ability to utilize externally sourced knowledge for innovation (Laursen and Salter 2004, Dahlander and Gann 2010, Hopkins, Tidd et al. 2011).

Empirical studies of innovation in biomedicine demonstrate a complex pattern of collaborative relationships involved in the emergence, development and distribution of medical innovations. Several writers on innovation in biomedicine and health care has observed that prior models of biomedical innovation have been too simplistic and linear, and do not fit the complexity and dynamism involved. Recent theoretical developments on biomedical innovation have formulated an evolutionary perspective of health innovation focusing on the “long waves” of technological developments in the health area, rather than short-term drug development process (Metcalf, James et al. 2005, Merito and Bonaccorsi 2007, Mina, Ramlogan et al. 2007, Ramlogan, Mina et al. 2007, Consoli and Ramlogan 2008, Consoli and Mina 2009, Galbrun and Kijima 2009, Rosenberg 2009, Morlacchi and Nelson 2011, Nelson, Buterbaugh et al. 2011, Barbera-Tomas and Consoli 2012). A path dependent pattern of innovation is uncovered, and these studies of health innovations refute the radical and linear innovation image usually attached to biomedicine and biotechnology (Swan, Goussevskaia et al. 2007; Niosi 2011). Rather they find that innovations in medicine develop gradually and that they require prolonged interaction between users (medical doctors, hospitals, patients) and producers of knowledge (academic science, firms, hospitals).

A particularly important aspect of medical innovations is the “pervasive role of science-industry interfaces” and collaboration between research organizations and small high tech firms in the commercialization of knowledge, as impetus to medical innovations often comes from different part of the science system – but not necessarily from the life sciences. But as Metcalfe, James & Mina (2005) and other authors highlight, health care providers and clinical knowledge and clinical practices are equally fundamental components of the health innovation system. Much of the writings on biomedical innovation has focused on the networks and modes of interaction between universities and firms but has ignored the context of use of biomedical innovations – the clinical domain – and actors within the clinical domain (hospitals, health care providers, medical doctors) and their role within innovation processes. Also the present literature on research innovation partnerships does have not looked very much into how hospitals act as research and innovation partners, when they collaborate with firms and universities.

Collaborative models are as seen core to medical and health innovation, and partnerships with multiple organizations are often seen as a solution to the risks, resource needs and complexities of health innovation, it is in itself a complex and uncertain solution with many

potential problems or challenges. Since innovation partnerships in the biomedical and health area are made up of participating organizations or organizational sub-units who are very different in their mission, size, resource base, core activities and organizational structures, challenges identified in collaborative innovation models in general might be exacerbated in research and innovation partnerships in medicine and health. On the other hand, since the participating organizations, and particularly the small R&D intensive firms, have quite strong incentives to collaborate with public partners to get access to resources and infrastructure necessary for R&D and innovation activities (Drechsler and Natter 2012), one could expect that that over time participants find solutions to increase the learning potential and output of innovation partnerships. Also since many firms who develop and sell medical equipment, drugs or services, and particularly biotech firms, are spin-outs from universities or hospitals, they might have close affinity and common cognitive and social resources stemming from their prior “familial” relationships, which are resources also considered to be instrumental in making inter-organizational partnerships successful and particularly for promoting inter-organizational learning (Nahapiet & Ghosal 1998).

Methods, data and preliminary results

The paper present qualitative data from a comparative case study of research and innovation partnerships; all involving multiple firms, universities and hospitals. The case study followed three multi-party consortia involved in bio-medical research and innovation over a period of three years, and involved collecting data by interviews with all involved participants at several instances, as well as collection and analysis of available documentary and statistical data on each consortium. Two of the consortia were involved in drug development and one consortium was involved in development of medical imaging technologies. The case studies developed rich details and a nuanced picture of the emergence and development of research and innovation partnerships in biomedicine.

Based on this broad qualitative material detailed analysis of transcripts from 45 qualitative interviews with representatives from firms, universities and hospitals involved in the three consortia will be presented. Utilizing the qualitative analysis software Nvivo 7 all instances where informants described an incidence in the partnership as either challenging/problematic or as positive/beneficial were recorded and coded. The result of this mapping exercise was a large set of statements about synergies and tensions in partnerships, which were then classified with respect to “stakeholder perspective” and “phase” in the partnership. In this part of the analysis we wanted to see whether the different stakeholder groups (universities, hospitals and firms) had different or similar experiences of synergies and tensions, and whether the experiences changed over time, and whether this was a response to purposeful actions undertaken by consortia and their participants to overcome tensions or challenges.

The results of the analysis indicates – as expected – that the stakeholders have very different perspectives about the challenges and tensions involved, but quite similar and less nuanced perspectives on the synergies. The experienced tensions for academic researchers are connected to the practical details of setting up and running a large and complex consortium and producing results, but they also experienced commitment problems and fragmentation as challenging. Firms tended to focus on risks, lack of control, time and resource needs as

challenging in collaborative innovation, and the hospitals on the integration of research and innovation activities in the hospital structure, lack of leadership attention and resource needs as challenging their contribution in collaborative research and innovation centers. The experienced synergies tended to be more connected to the idea of collaboration (such as pulling resources together, long term strategic knowledge development, utilizing different strategic assets etc) and was often more visible in the early, set up phase of the partnership than in the later stages. In all three cases, synergies is experienced between some but not all partners, or stated differently, more tensions are experienced between some partners than others, and not all participants experience the same level of tensions. The participants with the most vested interest in the partnerships tend to experience higher levels of tensions, and the participants with the least vested interest usually report few tensions but also fewer synergies.

In terms of the time dimension, it does not seem that experienced tensions lessen over time. Rather, differences in roles and commitment to the partnership become sharpened over time, leading to increased visibility and openness about tensions and differences between the stakeholders. In the three cases investigated, there are relatively few efforts to overcome tensions and the structures and tools that are implemented seem to reinforce the good relationship that exists between some of the involved stakeholders, but do not seem to be able to overcome tensions.

The paper finally discusses the implications of the results in terms of management of public-private partnerships in health and policies intended to promote further collaboration between partners in distributed health innovation systems.

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