



Open Innovation and Collaborative RTD Projects

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Coined by Professor Henry Chesbrough of the University of California at Berkeley, the Open Innovation (OI) concept provides a new framework for strategizing, organizing and managing the Research and Technology Development (RTD) process. OI thinking ruptures with the traditional view of companies, institutions and policy makers that competitive advantage is attained by funding large vertically integrated research units / laboratories nurturing engineering departments with the raw material for new product development and fiercely protecting new discoveries and innovations. The negative side effects of this traditional approach have been many. Smaller firms, which often are more flexible, focused on core competencies and attentive to technology and market trends, were at disadvantage, as they could not achieve the critical mass of resources to conduct research under these centralized conditions. Cutting edge technologies were hampered in their development due to patent and protection systems designed for the closed and centralized approach or, even worse, new technologies developed in start-ups were sometimes bought up by the big players and put in quarantine.

The resulting "band wagon effect" in RTD was obviously not optimal for stimulating diversity, experimentation and exploration required in an environment characterized by ever-increasing technological complexity and discontinuous changes including a dramatic rise in the number and mobility of knowledge workers, a growing availability of venture capital and emergence of RTD intensive companies in the new booming economies in Asia. In addition, the technological and commercial success of development and use of open source software plays an important role for spreading OI thinking (Gassman, 2006).

Open Innovation can be summarized as trying to combine internal and external *resources* as well as *opportunities* for innovation: "firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market" (Chesbrough, 2003, pp. 36-37). As Chesbrough and other scholars advance, the boundary between a company (or a research institution) and its RTD stakeholder environment (specialized research performers, suppliers, customers and "lead users" ...) is porous, enabling innovations to move more easily between the two. More precisely, when guided by OI principles, companies can commercialize ideas outside its internal development and market pathways, as well as using those pathways for bringing externally generated ideas and inventions to the market.

Open Innovation is not a panacea for all industries (Chesbrough, 2003; Gassman, 2006). Most likely, different industries will be located on a continuum between closed (e.g., nuclear and military) and open (e.g., open source software development and exploitation). The more the following five development trends are relevant to a particular industry, the greater the benefits from an OI approach (Gassman, 2006):

- o **Globalization**, which lowers entry barriers (cost barriers) and gives fast and flexible innovators an advantage,
- o **Technology Intensity**, which requires specialized knowledge in deep but narrow field of expertise, making vertical integration impossible even for the largest companies,
- o **Technology Fusion**, which means that traditional discipline barriers are erased, c.f., e.g., mecatronics, optronics, bioinformatics... The more the need for cross disciplinary knowledge input in RTD, the more the need for broad development alliances,
- o **New Business Models**, which bring together firms active in various sectors, e.g., in the development and exploitation of multimedia products and services,
- o **Knowledge Leveraging**, which means the need of organizations for tapping into a broad and volatile base of expertise, and act as knowledge brokers rather than recruiters and internal developers of competences.

Hence, in industries where the above factors are important, some of them even considered as "permissions to play", there is an imperative need for developing more of Open Innovation strategies and approaches to RTD.

Building Blocks

The Open Innovation framework has evolved from observation of practice, hence its principles and modus operandum are grounded in new emerging practices of leading RTD performers including Apple, Cisco, IBM, Intel, Microsoft, Nokia, Genetech and Genzyme. Its fundamental building blocks are a set of principles that are summarized and contrasted in table 1 to those of "closed innovation".

Closed Innovation Principles	Open Innovation Principles
The best people in our field work for us	Not all smart people work for us so we must identify and tap into expertise outside our company
To profit from R&D, we must discover, develop, market and follow up on it ourselves	External R&D can create significant value; internal R&D is needed to claim some portion of that value
If we discover ourselves, we will have a first-mover advantage	We might profit from research generated elsewhere, the most important is to build a better business model than our competitors'
If we create the most and best ideas in the industry, we will win	If we make the best use of internal and external ideas we will win
We should control our IP so that competitors don't profit from our ideas	We should make sure we profit from others' use of our IP, and we should buy others' IP if it advances our business

Table 1. Comparing principles of closed and open innovation. Slightly adapted from Chesbrough, 2003, p. 38.

In order to lead to something operational and generative of competitive advantage and wealth, however, these principles need to be coupled to specific strategies, organizational configurations and procedures. Gassman (2006) list six factors, in from his point of view seen as research streams, but from an applied RTD perspective (Brown and Eisenhardt, 1995; Schilling and Hill, 1998; Gupta et al, 2000) could as well be seen as strategies and processes for conducting projects:

Global Innovation Structure. With the use of modern ITC, teamwork on a global scale, including advancing projects around the clock, has become a standard practice in many industries. Local RTD units are also a way of absorbing local knowledge and competence as well as catering to the need of personal communication in innovation processes.

Outsourcing of RTD. Collaborative RTD is a useful means by which strategic flexibility and the access to new technology can be leveraged. Breakthrough thinking can be enabled when in-house culture, values, practices and "not-invented-here" syndromes are challenged. **Early Supplier Integration.** Suppliers are an important source of innovation, especially in a context of increased outsourcing, and their early and continuous integration in the innovation process has a documented positive effect on performance. Suppliers contribute their specialized capabilities and are also important for ensuring high levels of quality and time discipline in new product development.

Non Supplier Integration. The role as RTD partners of non-suppliers from high-tech sectors outside the traditional disciplines of an industry is still a neglected, but increasingly important source of positive spill-over effects in terms of new knowledge, new concepts and new problem-solving perspectives.

User Innovation. The importance of user involvement as a source of innovation is increasing and the integration of lead-users in the RTD process is a subject of intensive study (c.f., e.g., Von Hippel, 2005). Especially in IST development, where open source software is leading the shift towards open innovation, lead users are not "simply" involved in the specification and front-end stages of development, but in the entire development process of products that they themselves desire.

External Technology Commercialization. The value of patents remains incontestable. What changes in the OI context is the exploitation of patents where internally generated IP is being exploited more systematically outside the firm. One way of optimizing the external commercialization of technology is through corporate incubators which are independent entities devoted to developing the specific conditions needed for exploiting specific new technologies, thus gaining flexibility, focus and commitment compared to commercialization through established one-fit-all structures.

To sum up, the implementation of some or all of the above six factors coupled to a cultural shift integrating the OI principles enable the leverage of the positive outcomes of Open Innovation.

Open Innovation and Collaborative Institutionally Funded RTD Projects

Collaborative institutionally funded RTD projects aim at integrating:

- o Partners from a variety of sectors (industry, academia and institutions),
- o Partners from organizations of different size and structure (SME focus, Start-up/Venture focus in combination with participation of large companies and research

- institutions),
- o Partners from different geographical regions within the EU (sometimes with an objective to leverage spatially dispersed competences by a focus on innovation regions and their interconnected development).

Thus, such projects are by definition "open" in nature and might benefit significantly from a better understanding and application of Open innovation principles.

The objective with collaborative institutionally funded projects is to advance in the front line of new technology and knowledge development. This requires an "open minded" exploration logic with respect both to the *definition of research agenda* and to the *processes through which the research is carried out*. This would be a strong driver for participants to search for ways of both integrating ideas from outside and using networked resources for the exploitation of RTD results. RTD projects characterized by high uncertainty as to the commercial value of the technologies involved and a comparatively low level of transaction costs, call for governance modes that are reversible and involve low level of commitment (Van de Vrande et al, 2006). **OI might provide a framework for such a governance structure.**

A second important objective of such projects is to enhance the innovation performance by focusing on the actual transformation of RTD results into innovative products, processes or services that contribute to a sustainable value and ultimately wealth creation. This "implementation focus" makes it important to test and evaluate alternative models for achieving a tangible and sustainable innovation impact from RTD efforts. **OI, with its focus on complementarity between different players involved, particularly emphasize the use of specific dedicated commercialization channels for RTD outcomes.**

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