

# Open Innovation & Intellectual Property Rights

## The Two-edged Sword

By Bronwyn H. HALL

### A Paradox?

Open innovation implies an innovation ecosystem where ideas and knowledge flow across firm boundaries. In the book that introduced this term to the business world, Henry Chesbrough defined open innovation as follows:

“Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology.”

In contrast, intellectual property rights (IPRs) are generally designed to exclude others from using a firm’s ideas and inventions. At first glance the two concepts (open innovation and IPR protection) seem irreconcilable. That is, open innovation implies a willingness to allow knowledge produced within the firm to spill over to others (possibly with the expectation of receiving knowledge spillovers from others in return) whereas IPR protection enables a firm to exclude others from using that knowledge.

In spite of this contradiction, some of the world’s largest patent holders (firms like Philips NV, IBM and Microsoft) have embraced the open innovation model. For example, on the Philips corporate website, one reads:

“This (innovation research) is often best carried out through partnerships. The days of innovating in isolation are over. No one company can be expected to know all the answers. That’s why we regularly work together with a wide network of institutes, companies, universities and hospitals to jointly develop meaningful new breakthroughs.”

The largest patent holder in the world (IBM) altered its corporate policy on the creation and management of patents substantially in 2006, especially in the areas of software and business method patents. Among other initiatives, it established the Open Collaborative Research (OCR) program to support open-source software research between IBM and universities. At roughly the same time it released about 100 business method patents to the public, and pledged to focus its efforts in the future only towards business method patents with substantial technical content, effectively placing any other business method inventions it made in the public domain. In January 2008, IBM created an “Eco-Patent Commons” in partnership with a number of other large technology firms like Nokia and Sony, making a number of environmentally related patents available to the public (<http://www.wbscd.org/web/epc>) in hopes of spurring technology development in this area.

As to Microsoft, a recent book by Marshall Phelps written with David Kline describes the transformation of Microsoft’s IP strategy in the face of the rise of open-source software and open innovation from the point of view of the architect of this transformation. Phelps emphasizes the role played by large customer demand for interoperability of their Linux and Windows systems in encouraging the move. In the case of Microsoft, open innovation takes the form of an

emphasis on collaboration:

“Collaboration is woven into the fabric of Microsoft research projects. Our researchers are collaborating alongside leading academic researchers and scientists, with government and industry partners, and across Microsoft business groups worldwide to advance the state of the art.”

And if we examine the patenting activities of these three firms, we observe that they do not appear to have reduced their patenting activities in response to these strategic shifts (*Chart*). Both Philips and IBM have maintained a constant patenting-R&D rate since 2000 while Microsoft’s rate has increased.

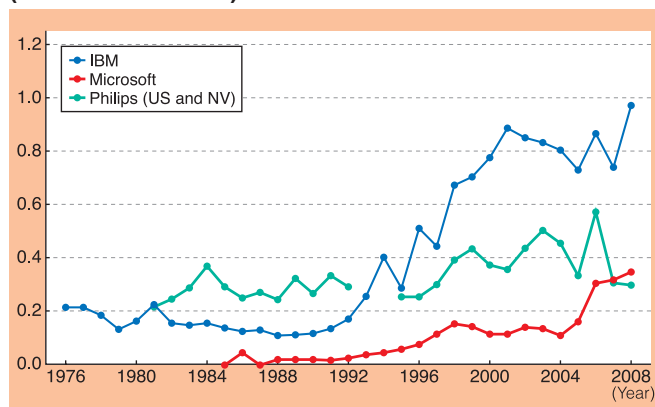
Although perhaps most important in that sector, this is not just a high-technology phenomenon. In the pharmaceutical sector, Chesbrough cites the example of Merck, whose annual report emphasizes its need to tap into knowledge from universities, research institutes and companies worldwide to the extent that its scientists create “virtual labs” incorporating information from outside.

So the natural question is to ask how these firms are using the IP system in light of their engagement with the open innovation model. And why do other firms, such as Siemens and Canon, who are also heavy patenters, not even mention the phrase “open innovation” on their websites?

### Business As Usual?

A skeptic could argue that the IP being given up by these large firms is not very valuable to them, and that pledging allegiance to open innovation is merely a convenient way of saying that they are open to taking others’ ideas without giving up any of their own. In one sense, the skeptic would be right that these firms have not given

CHART  
**US patents granted per \$M R&D**  
(in constant dollars)



Sources: S&P Compustat & US Patent & Trademark Office data, authors’ calculations

up their quest for profits in embracing the open innovation model. Of course, the technology they offer to the public will not be that which is most valuable to them; it will be that which they have no plans to develop but where they think there is a possibility that development by others may ultimately benefit them via knowledge spillovers or increased demand for the firm's own goods and services.

However, the skeptic would be wrong in supposing that the advocacy of "open innovation" is hollow. These firms have simply recognized two things. The first is that no single firm is able to develop all the technology it needs internally. The second is that the products they produce need to work well with those produced by other firms, even including direct competitors and firms with very different business models, for example, open-source software providers. In this setting, it is essential that firms develop new ways to ensure that they retain some of the profits accruing from "open innovation" projects and development.

Managing IP carefully is one of the ways firms can achieve this. IP can be used in a number of ways to assist in the management of open innovation. First, the necessary codification of an invention or technology that takes place when a patent is successfully applied for helps to structure collaboration agreements. There are invariably uncertainty and imprecision in the definition and scope of any particular piece of knowledge or technology that is to be licensed to another party, but this imprecision can be mitigated if the description is already subject to the standards imposed by patent offices. In addition, because the patent is a legal document, in principle the language used is already suitable for use or can be referenced in a different legal document such as a licensing agreement.

Second, IP rights can be used defensively to negotiate cross licenses with others in the industry that hold complementary technologies, thus avoiding mutual litigation. It is well known that this strategy is pursued by a large number of firms in the semiconductor and computing hardware/software industries. Finally, owning the rights to certain inventions allows a firm to write licensing agreements that encourage the development of a technology that might otherwise languish "on the shelf" or "in the attic," to use the words of Kevin Rivette and David Kline.

Besides the selective release to the public of patents that are not being used by the firm mentioned earlier, there are also other IP management strategies used by participants in open innovation that are tailored to the specific context. For example, Intel funds university research actively without specifying the goal or area of the research precisely, something that would be anathema to university participants. However, as Chesbrough reports, it protects itself by requiring a royalty-free license to any university patents emerging from the research that it has funded. Millennium has been creative in licensing gene IP to pharmaceutical firms for specific applications, while retaining the rights for all other applications.

## Markets for Technology

So as we look more closely at the open innovation process, we see that there is no paradox – in fact the increased attention paid to IP management and the increased skill with which it is managed by companies has assisted them in developing open innovation strate-

gies. The way in which open innovation operates in a commercial firm is the outgrowth of the need to access resources from a variety of partners and to ensure the necessary compatibility of the firm's products with those of others. IP ownership enables firms to conduct the trade in technology that accompanies an open innovation strategy without destroying any competitive advantage they might have.

Thus, the open innovation model is coincident with the growth in what Ashish Arora, Andrea Fosfuri and Alfonso Gambardella have called the "markets for technology." In a recent book, they documented the growth of these markets and showed that this growth has been accompanied by the tendency for firms in some sectors to become less vertically integrated as the specialized producers of technology no longer need to be housed within large vertically integrated firms in order to protect and market their assets. For example, these include such firms as semiconductor companies that are engaged only in chip design and not in manufacturing, and biotechnology firms that sell the output of their research to a range of pharmaceutical firms, depending on the potential applications.

Technology firms like these semiconductor and biotech firms produce inputs to the open innovation model, and for them the IP system is essential. Because they have few physical or tangible assets, ownership of their own knowledge assets is crucial for securing finance and ensuring that they can keep at least some of the returns to the joint innovative activity. Without some return to the product of their innovation and R&D investments, they would find these difficult to undertake. Hence, it is probably not an accident that we see the simultaneous increase in open innovation, markets for technology, and the importance of IP in firm strategy.

A final caveat is in order, however. There are limits to IP as a tool for organizing open innovation, just as there are limits to the effectiveness of markets for technology. The most successful similar model of this type is the open science model described by Partha Dasgupta and Paul David in 1994. This model is essentially nonpecuniary in exchange (although clearly it requires money for production). Historically, in the early stages of several industries, a similar model involving the free exchange of ideas and improvements has been operative. Examples are the development of the Bessemer steel process, the technology evolution of the steam pumping engine for mining in Cornwall, and the silk-weaving industry in Lyons.

Even today the Web 2.0 sector is characterized by a relative lack of attention to IP issues and a great deal of effort devoted to interoperability. The developers of social networking sites, blogging tools, search tools, and content aggregators spend a considerable amount of time ensuring that "cross-posting" and recombination operate smoothly across their sites, even those operated by direct competitors. Success in this sector depends to a great deal on increasing returns from a large user base, which means that allowing and encouraging all kinds of access are important. So open innovation is the norm, and it is somewhat less mediated by IP licensing agreements than in more mature industries. **JS**

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