

October 2012

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Thought leadership from Atos

***white
paper***

**Open
Innovation**

This whitepaper describes the concept of Open Innovation, first formalized by Professor Henry Chesbrough at the University of California, Berkeley, in 2003. Early adopters, such as Procter & Gamble (P&G), claim Open Innovation results in more innovation for lower costs.

This paper explores the benefits and challenges of Open Innovation, and the inherent Intellectual Property Rights (IPR) issues and opportunities. It concludes that although not a panacea, Open Innovation is rapidly becoming the norm and articulates a vision for the future.

Open Innovation

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About the Atos Scientific Community

The Atos Scientific Community is a network of some 100 top scientists, representing a mix of all skills and backgrounds, and coming from all geographies where Atos operates. Publicly launched by Thierry Breton, Chairman and CEO of Atos, the establishment of this community highlights the importance of innovation in the dynamic IT services market and the need for a proactive approach to identify and anticipate game changing technologies.

Introduction

This whitepaper offers a broad explanation of the benefits and challenges of Open Innovation, including a look at the business and technology context, and IPR challenges and opportunities.

Open Innovation has been around as an idea which companies aspire to for some years. However, there is evidence that new business models and players are appearing in the field of Open Innovation and that IPR issues can, in principle, be satisfactorily resolved, IT tools are also becoming more widely available and adoption is continuing to increase, although some fundamental challenges remain. This whitepaper looks at the real differences in the approaches to Open Innovation between product and service companies, and at how a business technology company fits into this spectrum.

The paper also considers good practice in university-industry interactions and comments on whether Open Innovation will be a disruptive force to this. Finally, the paper illustrates the future mature Open Innovation ecosystem and its significant impact on companies and individuals.

There is evidence that new business models and players are appearing in the field of Open Innovation and that IPR issues can, in principle, be resolved.

Definition and scope

The concept of Open Innovation

Open Innovation facilitates the combination of internal and external resources to address a mutually beneficial outcome.

The concept was formalized by Professor Henry Chesbrough at UC Berkeley in his book, 'Open Innovation'¹ He states that in the knowledge economy, where Wikipedia is used more than Encyclopaedia Britannica, it is time to call on external sources to drive innovation while also making a contribution in return. Joy's law for the high-tech industry states², "No matter whom you are, most of the smartest people work for someone else." Tapping into knowledge that sits outside of the enterprise and having an internal innovation strategy is not only important, but increasingly prevalent in the marketplace.

One part of Open Innovation involves leveraging collaboration between people working with different or unknown organizations, but who are ready to contribute to a common project at any stage, from idea generation to scale up. The other part is the monetization of internal ideas, projects, and patents to the external domain.

What defines Closed Innovation?

Most technology-based organizations have practiced some form of Closed Innovation. This is typified by:

- ▶ Initiatives are internal, occasionally involving suppliers and customers.
- ▶ There is little inflow of ideas from outside the organization and limited outflow.
- ▶ There is a traditional view with regards to the management of IPR.
- ▶ Portfolio Management and Stage-gate processes control resources.
- ▶ Focus is on existing products in new markets and new products in existing markets.
- ▶ There is limited ability to embrace disruptive business models quickly.

The key limitation of Closed Innovation is the lack of leverage of external knowledge and expertise in unknown emerging fields for internal innovation processes.

Chesbrough (2008)³ lists five erosion factors that influence the move from Closed to Open Innovation:

- ▶ Increasingly mobile trained workers.

- ▶ More capable universities.
- ▶ The rise of Eastern economies.
- ▶ Erosion of oligopoly market positions.
- ▶ Enormous increase in venture capital.

Ard-Pieter De Man in his 2009 Atos paper⁴ 'Open Innovation - the consequences for IT' identified the inability to fund traditional research and development (R&D) as a significant additional driver for a move from Closed to Open Innovation, and also pointed out that IT can be either a major enabler or barrier.

Other possible drivers include:

- ▶ Dynamics of a 'flattening world' and globalization.
- ▶ Fast development of technology, particularly IT.
- ▶ More open sharing behaviors from digital natives.

As a result, innovation in the 21st Century is increasingly open, collaborative, multi-disciplinary, and global, resulting in greater opportunities, and challenges for traditional R&D approaches.

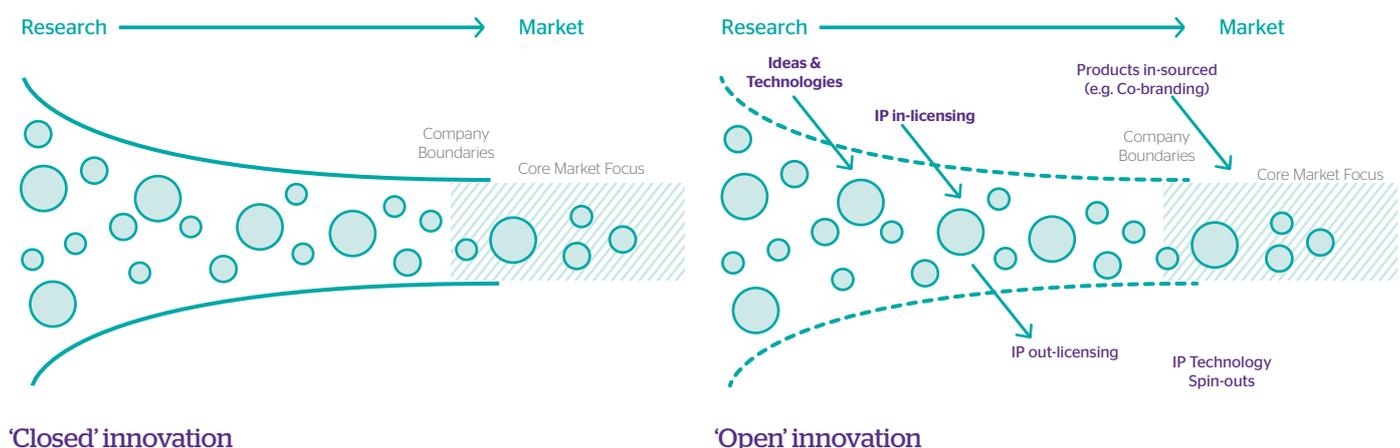


Figure 1: Open and Closed Innovation (after Chesbrough)

¹ Open Innovation: The New Imperative for Creating And Profiting from Technology [Chesbrough, 2003].

² Attributed to Bill Joy, co-founder of Sun Microsystems: Lakhani KR, Panetta JA (2007), The Principles of Distributed Innovation

³ Policies for Open Innovation: Theory, Framework and Cases [de Jong, Vanhaverbeke, Kalvet, Chesbrough, 2008]. See also Presentation to CCST February 4, 2010, <http://www.ccst.us/meetings/speakers/presentations/2010/Feb/020410Chesbrough.pdf>

⁴ Atos Boek - Thought Leadership by Prof. Dr. Ard-Pieter de Man. http://www.nl.atosconsulting.com/NR/rdonlyres/4486E347-4302-46E2-8439-312637B48BA0/0/ArtikelThoughtLeadership_ArdPieter.pdf

What Defines Open Innovation?

Chesbrough's Open Innovation funnel is differentiated from Closed Innovation by the ability for ideas to enter and leave the innovation funnel at different stages and via many routes.

Open Innovation recognizes that useful knowledge is widely dispersed and can be leveraged for competitive advantage, but it is equally important to note the presence of egress flows from an Open Innovation funnel. Not all internally-sourced ideas will make it through the 'selective reduction' processes that filter the wide base of initial ideas into actual products or services. Open Innovation is as much about the sharing of unused ideas with others as it is about tapping into external knowledge sources where the benefit of this significantly outweighs potential competitive threat).

The walls of the enterprise are therefore no longer solid; ideas can filter into the innovation funnel via a 'bi-directional, semi-permeable membrane'. The motivation for Open Innovation is similar to that of Closed Innovation, namely the pursuit of larger profit, reduced risk, and faster time to both existing and new markets. If holes are metaphorically drilled in the Closed Innovation funnel, providing for controlled ingress and egress of ideas, there is much greater potential in the innovation cycle. Open Innovation results in attributes not present in Closed Innovation:

1. The ability to leverage significant diversity.
2. The ability to share risk.
3. The ability to monetize knowledge flows into and out of the innovation funnel.
4. The ability to adapt the business model.

Again citing Chesbrough's diagram, the sole focus on core markets also changes: Open Innovation offers the ability to 'aim' the funnel at multiple markets as an additional benefit (in other words, the target market is less rigidly determined than with Closed Innovation). This presents opportunities for alternative delivery and business models. For example, licensing out unused ideas is an income stream which could be applied to the egress flows - this is a business of over a billion Euros for Philips, for example. Spin offs, where separate companies are created to incubate new ideas are viable, as indeed are spin outs (divestment), and even 'spin in'.

Open Innovation is typified by the presence of external collaboration, knowledge communities, and innovation ecosystems potentially comprising universities, research institutes, suppliers, partners, competitors, government, non-governmental organizations, SMEs, and third-sector organizations. In the truest sense, Open Innovation is 'the ecosystem of everything'.

Open Innovation recognises that useful knowledge is widely dispersed and can be leveraged for competitive advantage.

Examples of Open Innovation

Early Open Innovation adopters who claim major benefits include Procter & Gamble, Pfizer, Xerox, Microsoft, GM, and Philips.

Perhaps the most touted example of corporate Open Innovation is P&G. P&G has embraced Open Innovation through its 'Connect & Develop' programs - working with universities, suppliers, and outside inventors, and offering them a share in the rewards. Since then, the company has increased the proportion of new product ideas originating from outside the firm from < 20 percent to around 50 percent and its product hit rate increased to 90 percent in 2003, up from 70 percent in 2001. Its own spending on R&D as a percentage of sales has declined from 5-6 percent to 3-4 percent over five years.

P&G states on its website, "We're very proud that more than half of new product initiatives at Procter and Gamble involve significant collaboration with those outside our walls. We partner with small companies, multinationals, individual inventors, and in some cases, even our competitors, to bring game-changing innovations to market. Connect + DevelopSM is at the heart of how P&G innovates."⁵

One specific product example was the development of a technology to print onto snack foods such as crisps. Posting the problem externally found an Eastern European professor who had inherited a bakery and had already experimented with edible printing.

Pfizer recently announced the formation of a network of academic collaborators to accelerate the translation of basic science into biologics-based drugs. "The concept is to make a transition away from the vertically-integrated R&D model into smaller, decentralized groups of a truly global nature," says Pfizer's Anthony Coyle, who is heading up the program out of the company's Cambridge, Massachusetts, facilities. Organizations participating include Kings College London⁶.

Early adopters who claim major benefits include Procter and Gamble, Pfizer, Microsoft and Philips.

⁵ Procter and Gamble website - http://www.pg.com/connect_develop/index.shtml

⁶ <http://www.bioendeavor.net/CommonData/NewsFiles/Pfizer.pdf>

Business models

Open Innovation Ecosystems

Below is Atos' concept of an 'ideal' Open Innovation ecosystem in which organizations can work together with appropriate partners with full regard to intellectual property safeguards. Brokers bring together partners and the problem network is primed with relevant expertise. This full model does not exist anywhere as yet, to our knowledge, but steps are being taken towards it. It forms part of Atos' vision described later in the paper.

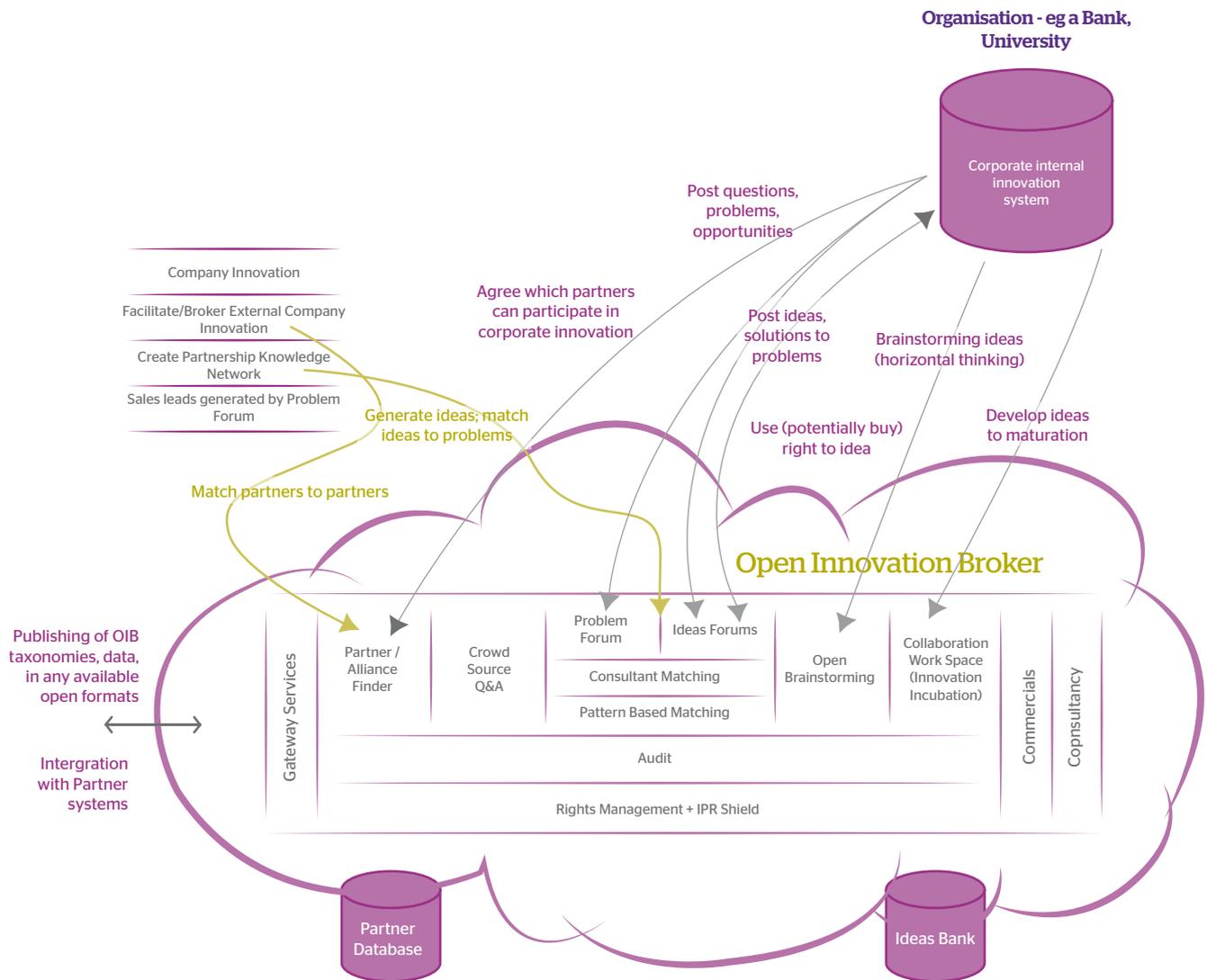


Figure 2: Open Innovation Ecosystem and Broker

Within any business there are different innovation centers focused on specific technologies, markets, and countries, with internal processes in place to enable the right balance between sharing and risk.

The maturity of the processes, culture, global networks, information sharing rules, and leadership to maximize internal knowledge sharing and 'enterprise innovation' will be a key factor in determining how far and how fast an organization can move to an appropriate Open Innovation model.

Key factors to consider are:

- ▶ **Create:** in which circumstances should the enterprise create an ecosystem?
- ▶ **Join:** which existing ecosystems should the enterprise join?
- ▶ **Facilitate:** Are there business models in which the enterprise should take a 'neutral' facilitation role (such as the government in setting up innovation 'clusters')?
- ▶ **Knowledge Brokers:** What are the business models in which the enterprise becomes a broker of knowledge between participants in the ecosystem, or even between ecosystems? This is the business model of some organizations.
- ▶ **Social Networks:** how do you leverage social networks to create and source knowledge and personal capital for an Open Innovation ecosystem?
- ▶ **Alumni Networks:** A potential pattern for the loose retention of corporate knowledge through selective alumni networks.

'Innovation clusters', such as Silicon Valley, Cambridge Science Park, and 'Silicon Roundabout' in East London, have a track record of being greater than the sum of their parts for innovation, due in part to shared values, rapid knowledge exchange, and the availability of venture capital. The social networks in East London are illustrated well on the TechCity Map⁷.

'Open Innovation' Commercial Models

The largest industry with the most R&D which is under the most pressure to do more for less is ethical pharmaceuticals. Some companies have scaled back R&D activities as drugs come up to patent expiry. Companies such as Pfizer, are announcing major partnerships with universities and institutions globally. The major global consultancies all see helping this sector move to a more 'open' model as a major opportunity.

The current shift towards Open Innovation initiatives is driven by the problems encountered with two extreme options: to divest most or all R&D activity (and buy interesting results from universities, research centers, or highly-specialized SMEs), or to take all R&D in-house under a Closed Innovation paradigm, which is less effective and less efficient.

The growth of companies operating as brokers and with other Open Innovation services demonstrates how the ecosystem is maturing:

InnoCentive⁸ is an Open Innovation company which was spun off from Eli Lilly and takes on R&D problems in a broad range of domains, such as engineering, computer sciences, mathematics, chemistry, life sciences, physical sciences, and business and frames them as 'challenge problems' for anyone to solve. It gives cash awards for the best solutions to a network of over 250,000 solvers who meet the challenge criteria.

NineSigma⁹ offers Open Innovation services including targeted search, technology landscaping, needs assessment, business and market intelligence, technology trend monitoring, crowd sourcing platform, crowd recruitment, managing innovation portals, 'Linked Innovation', and collaborative assessment. This small firm was established in 2000 and has since helped over 300 organizations worldwide find solutions from an external network of 2 million providers drawn from 16 industrial groups and 115 countries. Since its foundation, it has guided over 1,600 Open Innovation projects and successful technology development agreements, doing US\$10 mil. of business in 2008.

⁷ See www.techcitymap.com

⁸ InnoCentive (an Open Innovation Marketplace) <http://www.innocentive.com/>

⁹ <http://www.ninesigma.com/>

BluePatent is a Berlin-based crowd-sourcing platform offering intellectual property research services to companies and inventors looking for information in order to attack existing patents or looking for evidence showing that rivaling companies infringe intellectual property rights. The 'crowd' at Blue Patent consists of researchers who are globally distributed, proficient in a variety of languages and expertise areas, and hence have access to sources that are not available through common Internet research, like articles in local newspapers or foreign language professional journals. BluePatent¹⁰ just collected €100,000 seed capital from over 160 micro-investors in under a month: through the online crowd funding platform **SeedMatch**¹¹. SeedMatch allows promising startups to collect a lot of seed capital through a large number of small, usually private, investors that commit small amounts of money. **Kickstart**¹² is a crowd-funding platform focusing on creative projects.

Ecosystem Services

The kind of business models used for the above are:

- ▶ Partner membership fees.
- ▶ Per-service membership fees (usage based).
- ▶ Pay-per-transaction (where a transaction is an idea, answer to a question, etc.).
- ▶ IPR Consultancy services (wrapped by a third party).

However, the availability of similar services is large and many highly-renowned universities are not yet creating profit with this activity.

Open Innovation Challenges

In 2008, Atos' Antonio Rodríguez Moral identified the following main challenges at the ecosystem level¹³:

- ▶ How to adapt the company's culture, business processes, and organization to embrace and exploit these new rules.
- ▶ How to manage intellectual property in an open environment.
- ▶ How to integrate internal and external ideas, expertise, and skills, moving research from knowledge generation to knowledge connection.
- ▶ How to catalyze the formation and consolidation of Open Innovation ecosystems.
- ▶ How to find and select the right partners and providers for such ecosystems.

In 2009, from his survey of 100 companies, Ard-Pieter De Man also identified the overlapping challenges for individual companies attempting to implement Open Innovation:

- ▶ The 'mindset challenge' of winning the hearts and minds of people to embrace the new strategy.
- ▶ The 'IP challenge' of how to move unused knowledge (not just patents) outside the company effectively.
- ▶ The 'tools challenge' of using approaches such as crowd sourcing and Web 2.0 in addition to more traditional university partnerships.
- ▶ The 'management challenge' of top managers supporting the use of external ideas, but not implementing supporting management processes.

The above conclusions were based on a survey of real companies which has not yet been repeated, but one can make qualitative comments on more recent developments.

For 'the IP challenge,' the business needs to understand 'what you own,' 'what you need to own,' 'what you are willing to give,' and what you are willing to 'jointly own.' Segmentation is therefore important in terms of what parts

The business needs to understand 'what you are willing to jointly own'.

¹⁰ <http://www.bluepatent.com/>

¹¹ <https://www.seedmatch.de/>

¹² <http://www.kickstarter.com/>

¹³ Open Innovation: New rules, new challenges: Antonio Rodríguez Moral

of the development of a particular idea will be retained under internal control. This is dealt with more in the section on IP challenges which also offers useful concepts to help in making these decisions.

For 'the tools challenge,' there is evidence in for example both Siemens' approach to Smart Networks and in Atos' approach to the 'IT challenge' that online 'competitions' of various forms are becoming more widespread, as is the use of contemporary IT tools to support them. Furthermore, increasing use of Enterprise Social Networking tools is making it easier for companies to develop the outward focus which is a key part of 'Open Innovation'.

The 'management challenge' and the 'mindset challenge' are both indications that Open Innovation requires major business change. This classically involves a clear vision of the future, leadership of the change, and implementation of the change. For example, Procter and Gamble (led by the CEO) established 70 global leaders and used a simple metric (fraction of ideas coming from outside). In many US organizations, 'innovation champions' play the role of 'change champions' in lubricating the transition.

The Ard Pieter De Man survey looked at companies who are active in R&D and have processes to bring new offerings to market in a structured way. Many such companies regard Open Innovation as part of a continuous change which started with 'Third Generation R/D' in the 1980s, and progressed through the greater reliance on outside partnerships in 'Fourth Generation R/D' in the 1990s.

In many ways, larger companies in maturing industries have the most to gain from Open Innovation as they want to retain the power of their size yet become agile and innovative like smaller competitors. When industries mature, the basis of competition often changes from innovation capability to operational excellence and customer closeness, bringing with it fairly risk-averse leadership behavior which is hard to change without new blood. Open Innovation can offer a solution to this conundrum.

Larger Companies have the most to gain from Open Innovation.

Open Innovation service companies and the IT industry

Many existing approaches to innovation emerged from business models that focused on product and manufacturing-based thinking. The rise of services means that these approaches must change if companies are to be successful and sustainable.

The rise of services means these approaches must change.

There are significant differences between traditional approaches to innovation for products and services:

Classification	Description	Examples
Focus	Customer experience.	Technology.
Approach	Iterative, agile, pilots.	Stage-gated, waterfall processes.
Duration	Immediate to short term.	Mid to long term.
Embedding	Embedded in customer organization.	Suppliers embedded in own organization.
IP Protection	Uncommon, not standardized, easy to copy	Very common, used strategically.

Table 1: Service Innovation vs. Product Innovation

Chesbrough defines the priorities for service companies starting with Open Innovation as:¹⁴

- ▶ Work with customers on pilot projects and, for example, share the knowledge outcome.
- ▶ Focus on utility rather than the product, e.g. 'power by the hour' for air engines.
- ▶ Embed your company in your customer's organization, e.g. UPS taking over the shipping function of its customers.

This is extremely relevant to IT companies that deliver different types of services, ranging from consulting, to system integration and managed services.

Traditional IT companies searching for new technologies behave rather like product companies, and traditional consulting companies behave rather like service companies. There is an opportunity for a more joined-up 'business technology' approach to Open Innovation, as described below:

	Traditional Consulting company	Traditional Technology company	Business Technology company
Focus	Business outcome	Technology infrastructure and applications	Business outcome and enabling technology
Sources of innovative ideas	Customer, market, points of view	Experience, technology from suppliers	Vision, customers, markets, partners
Approach to development of innovative ideas	Iterative, agile, done with clients and sometimes universities	Stage gated, waterfall processes to bring to market new technologies from suppliers	Pilot game changing ideas with partners
Risk Tolerance	Moderate	Low	Risk sharing with partners
Duration	immediate to short term	Mid to long term	Medium and long term
Embedding	Long-term customer relationships	Supplier partnerships and long-term customer relationships	Partnerships with customers and suppliers
IP Protection	Not common to manage IP	Not common to manage IP	Open Innovation approach with collaborative ecosystem and core IP protected

Table 2: Innovation in consulting, technology, and business technology companies

¹⁴ Chesbrough, Sloan Management Review, vol 52, NO 2, Winter 2011, p85

IPR Challenges & Opportunities

Companies often find Intellectual Property (IP) a barrier to Open Innovation. However, open collaboration does not necessarily mean losing prior background IPR or even losing the chance to benefit from unexploited ideas. To make Open Innovation attractive, all parties should all have sufficient incentive to participate.

A minimum incentive for a participant to actively contribute will be to obtain a non-exclusive license of use on the IPR, preferably royalty-free. Another common arrangement is for all partners to become co-owners 'without accounting', meaning each partner is free to use all the IPR generated as if it were the sole owner, without having to pay anything to the other partners except for a pro rate portion of maintenance costs in case there are patent fees to be paid (so-called 'pooling'). However, co-ownership should ideally be avoided, since it often creates problems when one co-owner does not respect the other co-owners' rights or wishes to exit or become sole owner.

A company's core technologies are traditionally far less likely to be part of collaborative innovation. This can be avoided by applying the 'Millennium-precedent' which uses a groundbreaking yet now widespread method of domain splitting between Open Innovation partners. Millennium licensed out its gene-related IP to many pharmaceutical companies at the same time and offered them exclusivity in their core field of activity (mainly based on their blockbuster candidates in the pipeline of molecules and the specific diseases targeted by those compounds), whilst retaining a general back-license on all improvements made by those companies for all fields outside their core field. This meant that Millennium could benefit from improvements made to its initial background IP in all fields excluding the respective core fields reserved for the other partners.

Due to the large adoption of open source, this can also be applied in the IT arena. Think about a major block of code developed by one company under open-source license terms and out-licensed respectively to a company building data storage platforms, another building mobile

phones, and a telecom service provider. The original company could benefit from flow-back rights on all improvements made on its initial code and offer exclusivity to each of the companies in their core field. In concrete terms, if the mobile phone manufacturer improves the company's code, it can use all improvements freely when servicing clients in any other field. The former describes a so-called Millennium-model. If Open Innovation collaboration goes through a consortium, for all partners to benefit from all respective foregrounds, the sharing mechanism is even vaster.

For companies who have few tangible assets, ownership of their intangible assets is key for survival. However, they can still reap the benefits of Open Innovation if they play the right strategic game. For example, a semi-conductor company which is only active in chip design will have no problem sharing its knowledge with another semi-conductor company that only manufactures chips.

Open Innovation can be reconciled with the need for IPR protection using the specific means made available by standard operating principles and tailored to specific circumstances at hand. IPR schemes may be developed on a project-specific basis to match all participants' requirements. In cases where their concerns trespass the framework offered by the standard operating principles, domain-split licensing, appropriate back-licensing, co- and cross-licensing terms agreed between the partners can then constitute the basis for collaboration. Obviously, complex legal issues may eventually still arise, but will mainly depend on the level of trust and proximity between partners.

It is now much easier for corporations to engage in Open Innovation without having to worry about IP barriers, since these can be set aside following agreement on a prior set of basic legal rules before entering into the open collaboration.

Open Innovation
can be reconciled
with the need for IP
protection.

Open Innovation with universities

'Good Practice' for University-Company Interactions

Universities operate on long term time scales and often select partners on a similar long-term basis in order to develop trust. How will that change in the world of Open Innovation?

A recent study by Dr. Bill Lucas of MIT and colleagues looked for the first time at what makes collaboration with universities beneficial to companies, not just in terms of project 'deliverables', but real business impact.

They found seven things that must be got right:

1. Define the project's strategic context as part of the selection process.
2. Select boundary-spanning project managers who can network effectively within the company.
3. Share with the university team the vision of how the collaboration can help the company.
4. Invest in long-term relationships.
5. Establish strong communication links with the university team.
6. Build broad awareness of the project within the company.
7. Support the work internally, both during the contract and after, until the research can be exploited.

In a recent blog, one of the authors recorded a conversation with Dr. Lucas looking at these success criteria in the context of social networking software. The conclusion was that all the above would still be very important, but that social networking could help by making it easier to find boundary spanners, making it easier to maintain contact before, during, and after the project itself, and raising awareness of the project.

How do the above conclusions fit with Open Innovation? Traditional university-company interactions involve long timeframes to define and deliver a university project, whereas some forms of Open Innovation' involve almost

instantaneous problem solving for money and may even run the risk of upsetting existing long-term and valued commercial arrangements with strategic partners. Universities are under growing pressure to find funding for their work, can these two models ever be reconciled?

Below is an example of 'good practice' for university interactions before further discussion of this question.

Best Practice University Cooperation - Siemens

Siemens, which has a mature program for working with universities, sometimes uses Open Innovation techniques to find new partners in truly new areas. Partnerships with leading universities are indispensable for the company's R&D activities. More than 600 universities in 70 countries around the world are involved in producing a significant innovation yield and gaining deep insights into the latest results in academic research.

Siemens has set up a three-layered partnership program with outstanding universities and research institutes around the world:

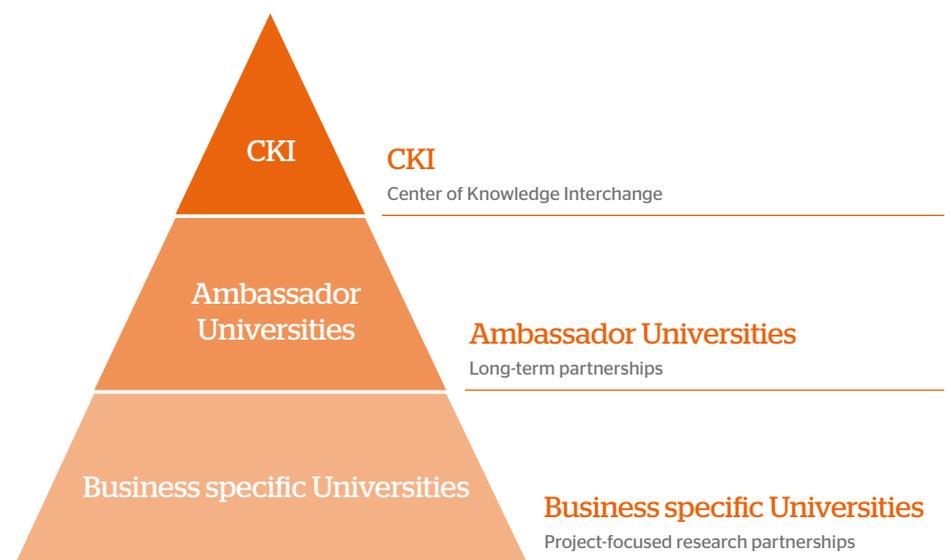


Figure 3: Siemens University Model¹⁶©

¹⁵ Best Practices for Industry-University collaboration; Julio A. Pertuze, Edward S. Calder, Edward M. Greitzner and William A. Lucas; MIT Sloan Management Review Summer 2010 Vol 51 no 4

¹⁶ Source: Siemens <http://www.siemens.com/innovation/en/cooperations.htm>

Cooperation with **business specific universities** is targeted at specific faculties and/or specific topics.

The Ambassador Program strengthens long-term collaboration with academic institutions that are of strategic importance for Siemens. According to the collaboration topic, Siemens and the partner university can choose from a variety of cooperation models, such as contract research, joint research, PhD scholarships, research lab, expert lecturing, etc.

The **Centers of Knowledge Interchange (CKI)** program, which is its most intensive means of collaborating with universities, aims to foster a long-term relationship and intensive knowledge transfer. The eight global CKIs are run by one or two fulltime Siemens employees who act as points of contact and have a Master Research Agreement.

Siemens' CKI approach was recently recognized by the German CHE (Centrum für Hochschulentwicklung/ center of university development) with a 'Best Practice Award'.

In 2011, a crowd-sourced approach for new university cooperation on the topic of 'Smart-Grid' was launched involving a marketing campaign and a competition with a two-stage selection process. From 200 universities, 10 partners were selected. This process was initiated by the Chief Technology Office and has found new centers of expertise in new areas.

It may well be that for companies who have strategic partnerships with universities in place, participation in an Open Innovation process is still possible. However, for companies who have not developed these partnerships, it will take a long time to develop the necessary levels of trust.

How will Open Innovation change university - company relationships?

Companies with long and deep relationships with universities have always been able to leverage these for short-term 'favors', such as running a sample through the university's specialist equipment.

What is interesting from the Siemens example though is that in areas where technology developments are happening quickly, the Siemens global brand is powerful enough to draw out new and potentially valuable university partners on specific projects.

Generally, the larger well-known universities are unlikely to participate in third-party innovation broker models as the risk to their brand would be great, unless they had some control and intellectual property protection. They may however evolve into high level strategic brokers in their own right, if they have long term industry wide trust to build on - enabling even competitors to work together effectively against a long term understanding of technical and business trends.

And at the lower level there are already problem-solving networks of specialist consultants out there solving problems. Academics under financial pressure or at less well-funded universities may well join such networks anonymously to supplement their income.

For companies who have not developed these partnerships it will take a long time to develop trust.

Open Innovation at Atos

Atos is a business technology company which practices examples of Open Innovation as described below

Innovation Pilots & Scientific Community PoCs

Atos funds pilots and proofs of concept, where innovative business ideas are developed and checked with customers (usually, one customer participates in each pilot or PoC). The main goal is to innovate in areas of business processes, services, or models. Technological innovations are a key ingredient of such pilots, as drivers or enablers of business innovation.

Innovation Workshops

Atos holds innovation workshops with customers and partners. The workshops may be bilateral or multilateral, and have different aims: to explain or debate aspects of innovation or to put innovation into practice in order to address a customer's or industry's challenge. In the latter case, Atos organizes the workshop and Atos experts take part in order to contribute alongside participants from other organizations.

Workshops delivered to date include:

- ▶ Those in which Atos acts as a facilitator which typically trigger consultancy work.
- ▶ Those in which there is preparation and Atos also injects possible technologies and their application. These are often part of a larger outsourcing contract.

Workshops explore industry-specific challenges as part of Open Innovation, for example gathering an ecosystem to look at a common industry concern, such as safety.

Ascent Look Out

Ascent Look Out is a foresight program that started in 2007. It brings together insights about Macro (Social-Cultural, Economic and Political), business and technology trends from all of Atos' geographies, business lines and industries.

It is produced in a highly collaborative, community based fashion, and contribution is open to anyone. Under supervision of an international editorial board, knowledge and insights are brought together to analyze emerging trends and to develop a picture of market needs. It provides an in-depth analysis of emerging trends, business opportunities and

obstacles and technologies that will be driving innovation. It that way it supports Atos and her clients to make key strategic decisions about their businesses and anticipate new challenges created by the emergence of new technologies now and in the future.

Since 2007, four editions have been published on the web (<http://www.ascentlookout.atos.net>) and distributed in book form.

INnovautas (Atos Iberia's annual innovation event)

At these events, Atos showcases its most innovative activities and results to key customers in all markets. Customers who have taken part in Innovation Pilots present them together with Atos to other customers. The events provide ample time for networking and interaction among customers and Atos staff, and represent an opportunity to talk in a relaxed atmosphere about innovation and challenges, as well as to receive formal and informal feedback from customers. The seventh INnovautas event took place on March 22, 2012.

Relationship with innovation associations

Atos actively participates in numerous forums and organizations related to innovation and R&D.

Bilateral Open Innovation

Atos engages in bilateral Open Innovation initiatives with customers who want to call on Atos' power for their own innovation activities. These initiatives involve jointly addressing certain innovation challenges by creating new ideas for pioneering services, and business models and processes, and making them happen via joint pilots, projects, or business offerings.

¹⁷ <http://www.atositchallenge.net/>

FISH (Fresh Ideas Start Here)

FISH is Atos' idea management platform that allows both internal and external Open Innovation via the creation of challenges or contests that focus on customer and market needs. FISH enables top-down idea generation (challenges proposed by the company to employees) and bottom-up idea generation (capturing ideas that are proactively proposed by employees). FISH is also used for the management of ideas pertaining to bilateral Open Innovation activities. FISH is a proposed component of our Open Innovation Broker platform.

IT Challenge

In 2011, Atos launched the IT Challenge; a global contest focused on the collaboration and participation of students from a number of universities around the world. The first central theme was Smart Mobility, specifically: "Which applications could leverage smart mobile devices, smart phones, tablets, etc.) to enhance people's lives through real-time contextual information?" The winner, 'MultiLens' from Fontys Hogeschool Eindhoven, received the award in June 2012.¹⁷

Supplier-driven Client Innovation

As an IT services company with highly innovative suppliers, a lot of innovation work takes place within service lines and is aimed at determining offerings and additions to Atos' portfolio around new technologies or more recent versions of old technologies, and how to take these to market to generate sales. These processes are often aligned with the portfolio process and have, in the past, been largely national with the Global Key Offerings as an overlay.

Research & Development and Academia

Atos has strong R&D activity the results of which serve as input to innovation activities. Because of Atos' extensive expertise in R&D, the company also provides R&D-related services to customers (the organization and management of R&D activities). In addition, Atos has built an impressive collaboration network with universities, research centers, and innovative companies all around the world. The main R&D poles of Atos are ARI in Spain¹⁸, AtosWorldline in France¹⁹, and C-Lab in Germany, where employees from Atos and the University of Paderborn team up.²⁰

TechnoWeb

Within Atos, the ten years' of experience in the development of TechnoWeb²¹, which supports 1,500 knowledge networks in 37 countries, represents an extremely valuable learning opportunity around Open Innovation. Although TechnoWeb is internal, it enables the sharing of ideas across global boundaries and, in many ways, helps the cultural journey required for Open Innovation.

The approach to TechnoWeb is summarized as:

- ▶ Network-centered.
- ▶ The right balance between bottom-up and top-down.
- ▶ The right balance of openness vs. security.
- ▶ High usability and low entrance barriers.
- ▶ Win-win situation motivates employee participation and management support.
- ▶ Strong commitment of top management.

Atos has built an impressive collaboration network with Universities.

¹⁸ <http://www.atosresearch.eu/>

¹⁹ <http://www.atosworldline.com/en/27/Innovators.html>

²⁰ <http://www.c-lab.de/en/index.html>

²¹ Gerhard Käfer, Prof. Dr. Michael Heiss 'Knowledge Networking for Enterprise 2.0' Vienna 2009

Open Innovation vision

In the future, there will be a mature ecosystem for Open Innovation which will enable companies to benefit and change culture more easily. This ecosystem will consist of a constellation of Open Innovation players and enablers. For small and young companies, this will enable them to maintain the innovative thrust longer, before it gets swamped by 'large company culture'. For large companies, it will enable them to maintain the parts of their culture that clients value whilst becoming more innovative.

Characteristics of the ecosystem will be as shown in Figure 2:

- ▶ It will be easy for any organization to participate and there will be guidance and advice.
- ▶ There will be a choice of brokers to meet different risk/reward profiles and industries.
- ▶ The brokers will provide a series of services:
 - Alliance finding.
 - Crowd sourcing.
 - Forums for problems.
 - Moderated collaborative workspaces.

The role of individuals will change considerably. Within organizations, they will operate across company boundaries comfortably guided by high-level principles as to what to share, rather like the professional guidelines journalists and policemen have to adhere to when using social networks. Outside organizations, people will increasingly be able to find problems they can solve to earn money from any location in the world, spawning a global community doing intellectual piecemeal work.

Currently, there is real tension between the immaturity of Open Innovation techniques, as everyone is still learning, and the considerable benefits they have already shown. This tension can be expected to reduce in the future as learning increases and Open Innovation becomes more mainstream.

For Atos as a business technology company, Open Innovation is increasingly important. As described above and in Table 2, Atos is taking on more of a double focus of business and technology, sourcing innovation from inside and outside the company and piloting game-changing ideas with partners, often in a risk-sharing, long-term relationship. Atos believes that this will position it extremely well in the developing global ecosystem as it matures.

Conclusions

In 2009, a survey by Ard-Pieter De Man found that Open Innovation was increasingly being adopted as a strategy by companies, but there were still major challenges to adoption. These challenges included management support, hearts and minds, moving internal know how outside the company, and the tools (including IT) to support it.

The early adopters of Open Innovation have continued to champion it and have developed 'good practice' on how to define the future and lead change, including, for example, 'innovation champions'. A good deal of this change is towards a better approach to global long-term partnerships with, for example, universities, something which has been developed by many companies over decades. However, there is evidence that new business models and players are appearing, including innovation brokers and companies that facilitate patent challenge by crowd sourcing. There is also evidence that Open Innovation thinking in service companies can be improved by a 'business technology' model.

The 'Millennium Model' provides a useful framework for the management of IPR issues, even in sectors such as IT where protection has traditionally been less strong, which can in principle be satisfactorily resolved. IT tools to support Open Innovation are becoming more available and adoption is continuing to increase, although some fundamental challenges remain.

Based on best practice in university-company interactions, Atos believes that companies and universities with strong brands and long-term relationships will most easily develop the trust needed to work in an open way. However, the increasing use of crowd sourcing will pose a change threat to universities with weaker brands and the rising brand recognition of Open Innovation brokers will play a large role in forging partnerships between smaller players in the future.

Whilst Open Innovation is not a panacea, it is becoming a mainstream approach due to the twin pressures of internal cost and rapid external technology development. New business models are emerging and new companies are setting up to support them, providing a maturing ecosystem. IP problems can largely be solved by appropriate forethought, and Web 2.0, Enterprise Social Networking, and multimedia are likely to be key enablers to achieving the ultimate vision outlined in this paper.

Open Innovation is becoming a mainstream approach due to the twin pressures of internal cost and external technology development.

²⁸<http://www.digitalsmiths.com/parks>

About Atos

Atos is an international information technology services company with annual 2010 pro forma revenues of EUR 8.6 billion and 74,000 employees in 42 countries at the end of September 2011. Serving a global client base, it delivers hi-tech transactional services, consulting and technology services, systems integration and managed services. With its deep technology expertise and industry knowledge, it works with clients across the following market sectors: Manufacturing, Retail, Services; Public, Health & Transport; Financial Services; Telecoms, Media & Technology; Energy & Utilities.

Atos is focused on business technology that powers progress and helps organizations to create their firm of the future. It is the Worldwide Information Technology Partner for the Olympic Games and is quoted on the Paris Eurolist Market. Atos operates under the brands Atos, Atos Consulting and Technology Services, Atos Worldline and Atos Worldgrid.

