How to Implement Open Innovation: lessons from studying large multinational companies

Letizia Mortara, Johann Jakob Napp, Imke Slacik and Tim Minshall

Centre for Technology Management
Institute of Manufacturing
Department of Engineering
University of Cambridge
Mill Lane
Cambridge
CB2 1RX
UK

A study conducted by the Institute for Manufacturing with sponsorship from Unilever and the Cambridge Integrated Knowledge Centre (http://www-g.eng.cam.ac.uk/CIKC/).

Acknowledgements

We would like to thank our sponsors, Unilever and the Cambridge Integrated Knowledge Centre (CIKC), and the following organisations, which participated in our research:
Akzo Nobel, BAE Systems, BBC, BP, BT, CadburySchweppes, CIKC, Crown holdings, Dow Cornings, EEDA, France Telecomm, Giesecke & Devrient, Goodman, GSK, Henkel/Loctite adhesives, IRC, IXC - UK, Kodak, Mars, MBDA, Mercedes Benz F1, Microsoft, NESTA, NHS Innovations, Nokia, NRP enterprise, Numico, O_2, P&G, PepsiCo, Philips, Rolls-Royce, SA partners LLP, Schlumberger, Shell, Unilever.

We would also like to thank Andrea Shuo An, James Anderson, Tzelin Loo and Dan Schmidt for their contributions and acknowledge the editorial support of Fraser Pettigrew and Sally Simmons (Cambridge Editorial Partnership Ltd).

Contents

Acknowledgements **3**

Executive summary **6**

Part 1: Introduction to Open Innovation **10**

1 About this Report **10**

1.1 What is open innovation? 10
1.2 Aims 11
1.3 Target readership 12
1.4 How to read this report 12
1.5 Methodology 12
1.5.1 The companies and organisations involved 12
1.5.2 What we did and how we obtained our results 13

2 What Does Open Innovation Mean? **15**

2.1 The concept of open innovation 15
2.2 The open innovation environment 17
2.3 Open innovation against different backgrounds 19
2.4 A global OI perspective 20
2.5 Reasons for adopting OI 21

3 Routes to Open Innovation **24**

Part 2: How to Implement Open Innovation **32**

1 Enablers and obstacles to OI **32**

1.1 OI culture 34
1.2 Appropriate changes of procedures and structure 34
1.3 Skills for OI 35
1.4 Motivation for OI 35

2 How to Build an Open Innovation Culture **37**

2.1 Influencing company culture 37
2.2 Sub-cultures of open innovation 40

3 How to Set Up Open Innovation Procedures **46**

3.1 The OI implementation team 46
3.2 Activities of the OI implementation team 53

4 How to Acquire Open Innovation Skills **64**

4.1 Training and skills 65

4.2 Losing skills … a risk in the adoption of OI? 68
5 How to Motivate Employees 70
5.1 General methods of motivating employees 70
5.2 Overcoming NIH syndrome 71
5.3 Rewards systems and career paths 72
5.4 Motivating individuals 73
6 How Does this All Fit Together? A Framework 75
6.1 Top management 77
6.2 Sub-cultures 77
6.3 Individual perspectives 77
6.4 Approaches to OI 78
7 Limitations and Suggestions for Future Research 81
8 Further Resources 83
8.1 Managing partnerships between start-ups and established firms 83
8.2 Looking for opportunities: intelligence 83
8.3 Cambridge Open Innovation Network (COIN) 85
8.4 Links 85
8.5 Further reading 85
9 References 86

Executive summary

This report is the product of two years' research within the Cambridge Open Innovation Network (COIN), a network hosted by the Institute for Manufacturing (IfM) and funded by Unilever and the Cambridge Integrated Knowledge Centre (CIKC). It has been written to illustrate the challenges in implementing Open Innovation (OI) for top managers in companies who are at the starting point of implementing an OI strategy.

OI is a strategy whereby companies allow a flow of knowledge across their boundaries as they look for ways to enhance their innovation capability. In OI company boundaries become permeable and allow for the matching and integration of resources between the company and external collaborators. In the closed innovation model, a company's innovation relies on internal resources only.

The report was compiled from a series of interviews and workshops involving a total of 36 firms, structured to gather understanding of the following questions:

- What does OI mean and why do companies open up?
- What are the routes to OI and what strategies are companies using to open up their innovation process?
- How can a company implement OI and what are the implications for company culture, structure, skills and incentives?

Our study showed that OI is an innovation in itself and therefore has to be managed accordingly if it is to be implemented successfully. It offers different advantages to different industrial sectors and has very different manifestations in corporations around the globe. Employment models, factors influencing the selection of external partners for collaboration, patterns of knowledge transfer, and models of interaction all vary in different countries and these must be taken into account.

The companies reviewed cited no single outstanding reason for the adoption of OI. Reducing the time to market for products, the availability of new technologies, and

access to competencies were of approximately equal importance. Moreover, our interviewees were quick to point out that OI should not be seen as a cure-all and has clear limits, depending on the industry in which business is done.

There are different routes that companies can take to OI, each determined by the strategic origin and location of the impetus to adopt OI within the firm. The approach for most companies is either a top-down strategically driven or a bottom-up evolutionary process. This report focuses predominantly on the former model.

OI activities within a firm are usually either centralised in a core team or distributed throughout different parts of the organisation. From our evidence, a top-down strategically driven approach to OI often relies on the pre-existence of centralised OI services and a core team to develop the OI strategy and support its implementation.

Our analysis of enablers and obstacles for OI reveals four main issues that companies have to tackle on their way to implementation: culture, procedures, skills, and motivation.

OI culture For almost all the companies in our study, the shift towards an open approach to innovation required the direct involvement of top management. This often translated into a shift of culture, whereby working with other companies became accepted and endorsed throughout the organisation.

OI procedures Moving people around within an organisation improves the intensity of internal networks and increases cross-functional working. Independent OI teams working within the traditional company configuration are a very popular choice for OI implementation.

OI skills There is no 'right' blend of skills that is considered a definite enabler of OI, but interestingly, the lack of an appropriate skills blend is an obstacle to its implementation. This suggests that training is essential, rather than merely desirable, when preparing the company for OI.

OI motivation Appropriate shifts of the incentive structure are essential to implementing OI successfully.

A company culture for OI can be influenced through structure, skills, incentives and control, but there is no overall OI culture that can be created at a stroke for the whole company. The starting point for change is most likely to be an OI implementation team, which can seed the OI culture within the company. It is inevitable that different units in a firm will have different sub-cultures of their own but it is possible to make use of these cultures and find ways to support OI within them.

The report uses several case studies to examine how an OI implementation team can establish OI procedures. The OI implementation team has to identify which different functions within a firm need to be connected, and what tools are available or must be found in order to accomplish this.

In acquiring OI skills, companies should not expect to train individual OI 'masters', but should focus instead on individual professionals connected through the interaction of different skills. A company needs internal competencies to be able to assess and review external capabilities and opportunities.

Where motivation is concerned, not-invented-here syndrome—when employees do not value innovations that have not originated within the company—is a common obstacle to OI implementation. This can be overcome by involving people in the decision-making process, improving internal communication, and establishing adequate reward systems. Targets are not always the best approach.

From these four central issues (culture, procedures, skills, and motivation) a framework for implementing OI is presented to show how an OI team could be embedded within a company. The crucial role of top management is discussed. By demonstrating commitment and support, top management holds the key to sway the opinion of those who are less inclined to accept the new approach to innovation.

This report only focuses on issues at the micro or internal level of the company. It should be remembered that there are other issues on a macro level, including partnership management, alliance management, trust building, and IP management.

The report concludes with a discussion of the limitations of the report and suggested sources of further information.

Part 1: Introduction to Open Innovation

The first part of this report aims to give a general overview of what open innovation (OI) means. It highlights the key points to keep in mind when reading the recommendations for implementing OI in Part 2.

1 About this Report

1.1 What is open innovation?

The term 'open innovation' (from here onwards referred to as OI) was created by Professor Henry Chesbrough (2003) to describe the current trend where companies allow both inward and outward flows of knowledge across their boundaries, to boost innovation. There are many reasons for this trend: companies are looking for ways to enhance their innovation capability by shortening product and technology cycles, increasing technology integration, controlling the escalating costs of maintaining effective R&D capabilities, and finding new ways to respond to complex competitive scenarios.

Innovation can be brought into a company in many ways, for example by in-licensing technologies developed by others, but a company can also contribute to others' innovation processes by making available their internal innovation to other organisations through, for example, joint ventures, licensing and spin-offs.

Open innovation differs from the 'closed innovation' approach adopted by companies in the past, where firms relied only on internal resources to generate, develop, produce, market, distribute and support innovation.

1.2 Aims

This report sets out to answer the question, 'I want to implement open innovation – where can I start and what do I do?' It provides an overview of existing approaches to implementing OI, and outlines a starting point for the selection of an implementation strategy to match your company's demands.

We worked on the assumption that OI would be a beneficial approach to company innovation, based on Chesbrough's and other scholars' suggestions and on the evidence of several practitioners' success. However, we did not explore questions such as 'Is OI a "good" approach?' or 'How open should a company be?'

It is important to note that the report focuses on the micro-level of the company dealing only with internal issues (e.g. of structure and culture) and concentrating on how to set up your company internally in order to embrace OI. In particular, we paid attention to the cultural aspects of adopting OI (the inner circle in Figure 1). However, this report does not tackle other cultural aspects, for example, how to work with different partners (such as start-ups, universities or customers). The adoption of an OI strategy has many repercussions, raising issues of intellectual property, partnerships with outside organisations, and so on, but these are beyond the scope of the present document (see Figure 1).

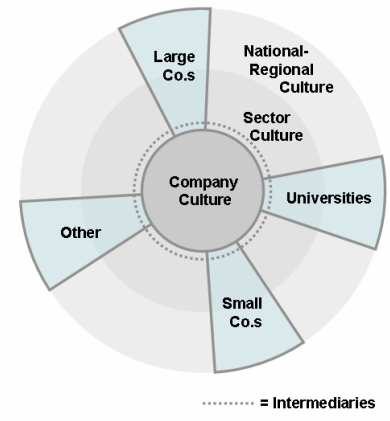


Figure 1: The different levels of cultural issues in the implementation of OI[1]

1.3 Target readership

The report has been written to illustrate the challenges in implementing OI. It will be particularly relevant for top managers (CEO, CTO) and senior managers of R&D and supply chains in companies who are at the starting point of implementing an OI strategy. It will also be useful for senior managers in different roles who have been charged with OI implementation and everyone who has an interest in this subject.

1.4 How to read this report

You can read the report conventionally from start to finish, but sections can also be read individually to provide information on a particular aspect of OI that might be particularly relevant to you.

Each section is prefaced by a blue box (Read this section if…) and concludes with a green box (What does this mean to my organisation?). Case study examples illustrate the findings in grey boxes. These boxes will guide you on ways to apply OI concepts to your own company.

1.5 Methodology

1.5.1 The companies and organisations involved

Our research into open innovation was carried out over two years in 2007 and 2008 and involved 36 companies. The research took place within the Cambridge Open Innovation Network (COIN), a network hosted by the Institute for Manufacturing (IfM) and funded by Unilever and the Cambridge Integrated Knowledge Centre (CIKC).

The participating companies ranged in size and had varying expertise and experience in OI. This mix of experience contributed to the understanding of issues associated with the implementation of OI practice, from beginners ("Where do I start?"), and practitioners

[1] Adapted from Alvesson and Berg, 1992

who felt they were 'immature', to more experienced companies ("How can we improve our OI practice further?").

The principal people taking part in the research were R&D managers, in particular those responsible for implementing OI or actively involved in it. The industries represented included:

- Fast moving consumer goods (FMCG)
- Energy and oil
- Aerospace and defence
- Software and media
- Electronics and telecommunication
- Intermediaries (e.g. knowledge and service brokers)

1.5.2 What we did and how we obtained our results

A series of interviews and workshops were carried out, structured to gather understanding of the following questions:

- **What does open innovation mean?** Open vs. closed innovation: why do companies open up?
- **Routes to open innovation.** What underlying strategies are companies using to open up their innovation process?
- **How to implement open innovation** What are the implications for company culture, structure, skills and incentives when implementing OI?

Figure 2 illustrates the progressive phases of the research process.

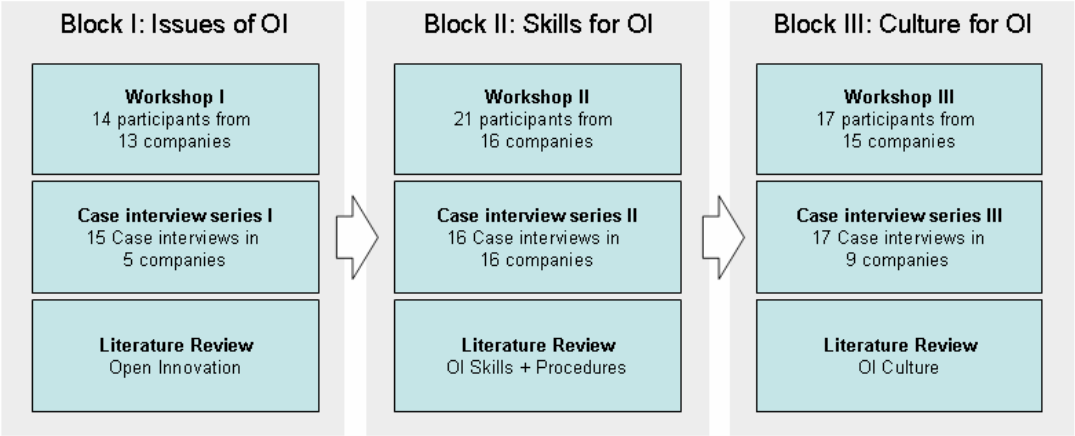


Figure 2: Structure of the research process

Following an initial literature review we hosted a workshop attended by representatives from 13 different companies, from which we captured information on the companies' background, their reasons for adopting OI and the key challenges they faced in OI implementation. This workshop showed that OI skills and the cultural issues of OI adoption were paramount concerns. We then conducted a series of in-depth case study interviews with five companies, which clarified routes to OI, and began to define the required structures and skills.

This cycle was repeated with a further literature review, a second series of case-study interviews and a second workshop involving 16 different companies. This second phase consolidated our understanding of the structures and skills for implementing OI.

A final series of interviews with nine companies, a third literature review and a third workshop concluded the process by defining company cultural issues and incentives in OI implementation.

2 What Does Open Innovation Mean?

Read this section if…

- you want to learn about the basic concept of OI
- you want to learn about varying perspectives on OI in different industrial sectors and different countries
- you want to know why OI is adopted in different sectors

2.1 The concept of open innovation

Open innovation is:

> ... the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. (Chesbrough, 2003)

With OI, and unlike closed innovation, company boundaries become permeable and allow for the matching and integration of resources between the company and external collaborators. In the closed innovation model, companies innovate relying on internal resources only.

OI is characterised by the involvement of all company functions, not just R&D, at different stages of the innovation process. Figure 3 is a representation of what open innovation means. The dotted lines represent a company's boundaries. Whatever lies between the dotted lines takes place within the company, and anything above or below the two lines comes from outside.

The funnel-shaped diagram is a common representation of an open innovation process. Ideas (the grey circles) are investigated in the research stage and the best and more

promising of these make it to development and commercialisation phases. The less promising ideas are dropped.

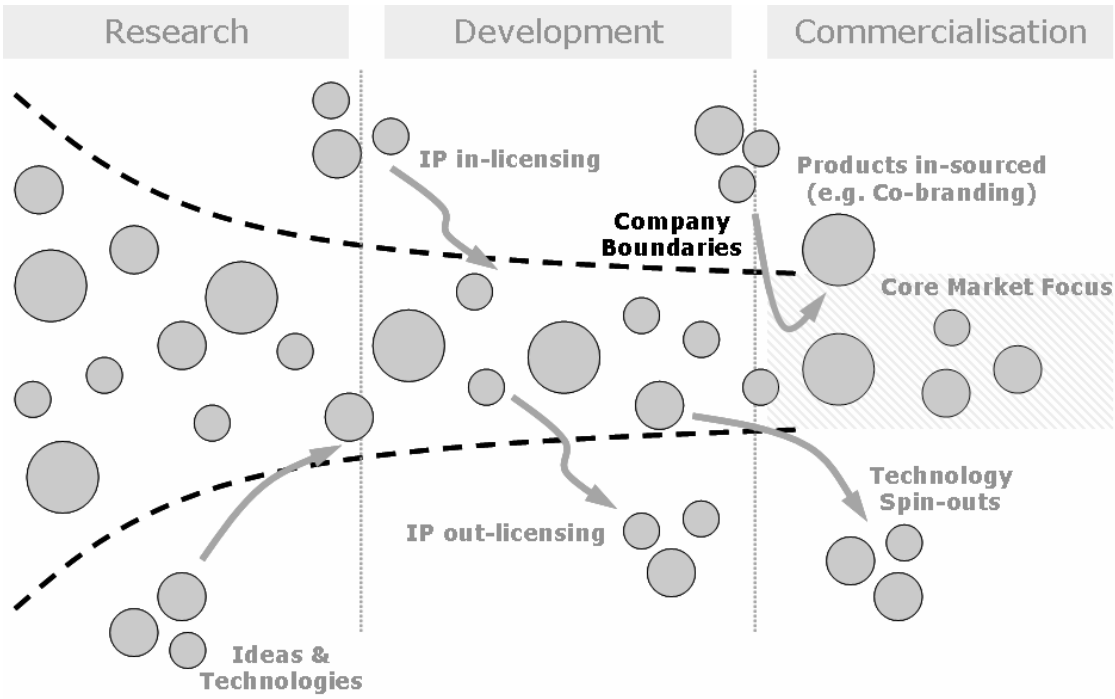


Figure 3: A diagram illustrating an Open Innovation Process. The boundaries of the firm, represented by the dashed lines of the funnel, are permeable and allow ideas and technologies (the grey circles) to pass in and out of the firm. [2]

The key feature of this diagram, and what distinguishes it from a closed innovation process, is that the company's boundaries become permeable (the dashed line in the figure). Whereas in a traditional closed innovation process all the invention, research and development is kept secure and confidential within the company until the end product is launched, with OI the company can make use of external competencies (e.g. technology) and even spin out by-products of its own innovation to outside organisations.

[2] Adapted from Chesbrough (2003) and Docherty (2006).

At the research phase, for example there is a lot of activity (the grey circles) going on within the company. There are also ideas and technologies developed outside, either collaboratively, or perhaps bought in. At the development phase, as research findings are narrowed down to viable projects, it may be advantageous to invest in externally developed intellectual property (IP) licenses for certain technologies to advance these projects. This is inflow: the use of others' capability to innovate.

At the same time other IP licenses that have emerged from the company's own research might be sold to other developers, either because they are of no strategic relevance to the company's own business, or because the company has no capacity or expertise to develop them itself. Alternatively, the company might see the opportunity to create technology spin-off companies to take on some of these projects. This is outflow: contributions made to others' innovation activities.

At the point of commercialisation there will be core products that may have come through an entirely internal route from research to realisation, or with a variety of inputs from outside. Even at this stage, however, the OI company could choose to in-source market-ready products from outside, for example in co-branding exercises where it could use its established brand profile to sell a new product from another company that currently has no presence and credibility in the relevant market.

2.2 The open innovation environment

Our study showed that open innovation is an innovation itself and therefore has to be managed from the beginning if it is to be successfully implemented. Klein and Sorra (1996) suggested that the following steps are needed to achieve an 'innovation implementation climate':

- Provide skills for innovation use, training and additional assistance
- Provide incentives for innovation and disincentives for innovation avoidance, i.e. monitor and measure progress, and reward good use of new practices (OI) but not the use of traditional closed innovation activities

- Remove obstacles to innovation use by allowing ‘time to absorb and learn about the new practices’ (i.e. OI)
- Listen to complaints and concerns

2.3 Open innovation against different backgrounds

Open innovation offers different advantages to individual industrial sectors. Interviewing companies from several industries, it was evident that OI has various interpretations. Our case studies (see Table 1) revealed certain trends.

Table 1: Trends in OI interpretation

	Industry characteristics	**What form does OI take?**
Electronics and telecoms	Strong need to adapt to growing demand from consumers and keep up to date with the rapid pace of technology development. Importance of collaboration to create industry standards. Reducing costs is a priority.	New technologies sought with increasing speed to anticipate competition, follow fast moving markets and reduce costs. Standards are both an opportunity to work openly and a 'constraint' for innovation.
Energy/oil	Business is changing because of sustainability issues (declining oil supplies, global warming)	OI is opportunity for identifying new technologies to improve oil supply and ways to change the industry and increase its sustainability.
Aerospace and defence	Traditional engineering businesses. Long technology lifespan and long lead times for their adoption. Strong confidentiality issues especially for defence. Strong influence of policy makers and government on innovation strategies.	OI is a new concept, especially for defence companies who are wary of information leak. However, OI activities exist in response to technology complexity, and R&D and innovation costs.
FMCG	Need to reduce time to market and to find new ideas to generate new products. Strong marketing influences innovation strategy	OI is an opportunity to innovate and increase competitive advantage. Most FMCG companies are currently developing their OI strategies (more formalised OI).
Software and media	Software companies have almost always been open due to the nature of their technology.	Open source software, and internet 2.0 have revolutionised the innovation processes so that users (customers) can themselves contribute to innovation.

In all these cases OI represents an opportunity to improve a company's innovation capability and to face its business challenges. Hence, all the industrial contributors to this work showed a great interest in understanding and sharing practice about how to implement OI in their business.

2.4 A global OI perspective

Open innovation has very different manifestations in different corporations around the globe. There are issues that are strongly connected with national culture and the ways in which innovation is carried out. Companies from all parts of the world can be good innovators but may have quite different approaches to external collaboration. The following considerations should be borne in mind.

- **Employment models** Typical career paths vary significantly between countries and have an impact on the openness of employees. These issues are often underestimated or even invisible to someone from outside the culture, but they can result in misunderstanding and the wrong expectations being created in OI relationships.

- **Partner selection** There is a strong desire to privilege relationships with partners (e.g. universities) of the same national heritage, even if they are not the best in their field. This was observed particularly in multinationals that have a strong national identity and a very centralised approach to research and development. This attitude impacts on the ability to access innovation outside national boundaries.

- **Knowledge transfer** With partners of different nationality and geographically distant from each other, knowledge transfer can be complex.

- **Interaction models** Working with partners, for example, follows different patterns in different areas of the globe. In the countries of South East Asia it is necessary to build trust between the parties before discussing contract details and formalities. In the West these steps are reversed and people feel more comfortable if the deal is formalised and the terms agreed in advance.

For more on national culture issues, it is interesting to refer to other scholars' work, such as Trompenaars (1998).

Example: the permanent employment model

In some countries there is a permanent employment model: an employee is expected to spend all his or her working life with the same company. Permanent employees are hired as generalists, not as specialists for specific positions. In technology-based companies, people are expected to start their career as young scientists, looking at the fundamental science underpinning the current business. Moving from research to development implies career advancement towards business. In this situation, the mindset of researchers changes progressively and subtly to acquire a more business-oriented character. If the dynamics of applied research do not suit the employee, moving back to a fundamental science role is considered a backwards career step. There are very few examples of mobile careers and people who deviate from the traditional path struggle with their career.

2.5 Reasons for adopting OI

In our workshops we asked companies what advantages they saw in adopting OI compared to the traditional closed model of innovation. Figure 4 indicates the advantages that were cited most often as important by the different companies. A larger number of stars indicates that the advantage was cited by a higher proportion of the companies surveyed.

Figure 4: Advantages of open innovation, based on the responses of 26 managers at one workshop

As Figure 4 shows, there was no clear outstanding advantage. Of approximately equal importance were:

- Reducing time to market for products (particularly important for FMCGs and electronics companies who seem to require the fastest rate of innovation)
- Availability of new technologies (especially important for chemical industries)
- Access to competencies (especially important for FMCGs)

The exploitation of internally developed technologies that are not of strategic relevance is not seen as an important advantage. It is not usually part of anyone's strategic aim, at least from the perspective of those interviewed (R&D managers, in particular those responsible for implementing OI or actively involved in it for supporting the core business). For them, it can be more important if companies are creating an ecosystem or if they want to recover the financial costs of R&D. A more important issue in exploiting technologies (or brands) is to ensure that whoever uses them does so properly. For example, if an FMCG company associates its brand name with somebody else's business,

they want to be absolutely sure that the association is not going to damage their brand's reputation.

According to other studies (Lichtenthaler and Ernst, 2006), cultural limitations, such as the not-sold-here (NSH) syndrome, can impede the finding of alternative paths to market. Few companies think OI is important simply because it influences ecosystems.

What does this mean for my organisation?

- OI can't cure everything and has clear limits, depending on the industry in which you are doing business.
- Think about your own company: where does OI offer an opportunity? What benefits do you expect from implementing OI?
- OI is an innovation itself and therefore has to be managed from the beginning to be successfully introduced.

3 Routes to Open Innovation

Read this section if…

- you want to learn about the routes that lead to the adoption of OI
- you have to make a decision about where to place OI activities strategically
- you want to learn about different enablers of OI and obstacles to it

Many of the activities that constitute OI may not be entirely new to companies, and some of them may have been commonly performed for a long time. Typically, some individual business units within a company might be considered to be very open in the way they operate, while the company as a whole might not.

Open innovation aims at a strategic alignment of existing activities with new approaches to open up the innovation process to the external world. There are different routes to OI, each of which is determined by the strategic origin and location of the impetus to adopt it within the firm.

In defining the routes taken by the companies who participated in our research, we have used a classification derived from the available literature. This characterises companies' OI implementation approach as either a top-down strategically driven or a bottom-up evolutionary process (the vertical axis in Figure 5). The location of OI activities (horizontal axis) is defined as either centralised (e.g. a single team/function/department to look after the implementation of an OI approach) or distributed throughout different parts of the organisation (e.g. functions/departments/activities innovating openly).

These new routes could be decided by the direct intervention of management or because of environmental conditions.

- Management intervention implies a 'conscious' movement towards a new organisational form and a consequent step change where 'management, in view of

environmental factors as well as internal factors, actively "promote" and "experiment" with new organizational forms' (Chakravarthy and Gargiulo, 1998).

- Conversely, companies can evolve their structure over a period of time, pushed by environmental conditions such as market forces, globalization, knowledge-intensive environment, deregulation or customer demands (Dunford et al., 2007).

Organisations can create centralised organisational forms that aim to innovate or look at distributed forms, like, for example, it has happened for many R&D functions (Gerybadze and Reger, 1999; Tirpak et al., 2006).

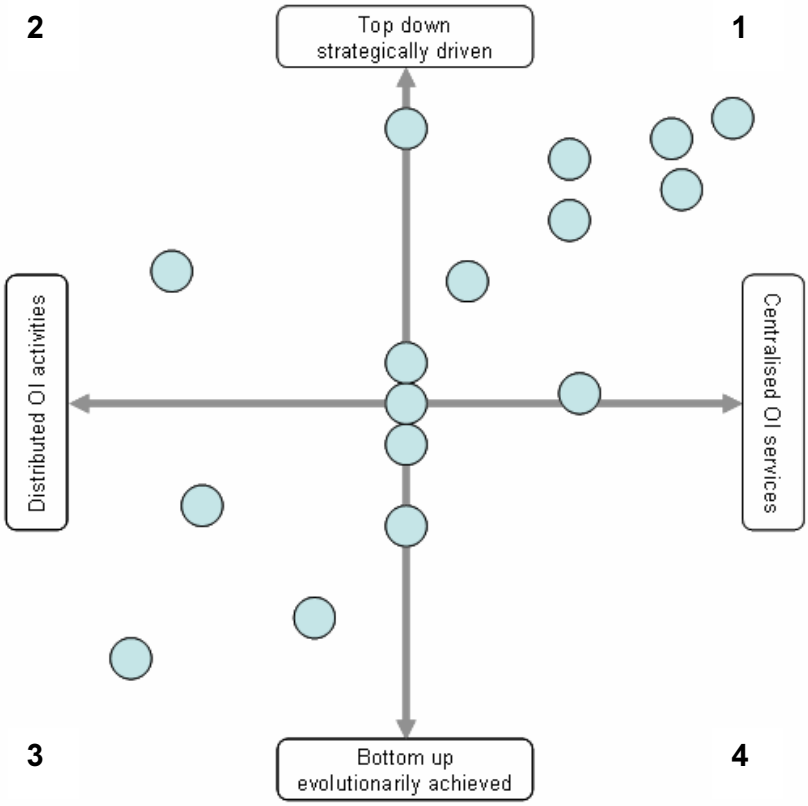


Figure 5: Mapping of companies observed across the spectrum of routes to OI

Mapping the organisations that participated in the third workshop according the criteria in Figure 5, we can see how the companies we researched lie across the spectrum of routes to OI.

The different approaches usually lead to different levels of expertise and characteristics, as shown in the OI strategy matrix in Figure 6.

Some companies (bottom left quadrant) have many, often distributed OI activities that derive from a slow realisation that innovation can also be achieved with the help of external resources. These companies came to OI by an evolutionary route and are now attempting to rationalise the implementation of their activities.

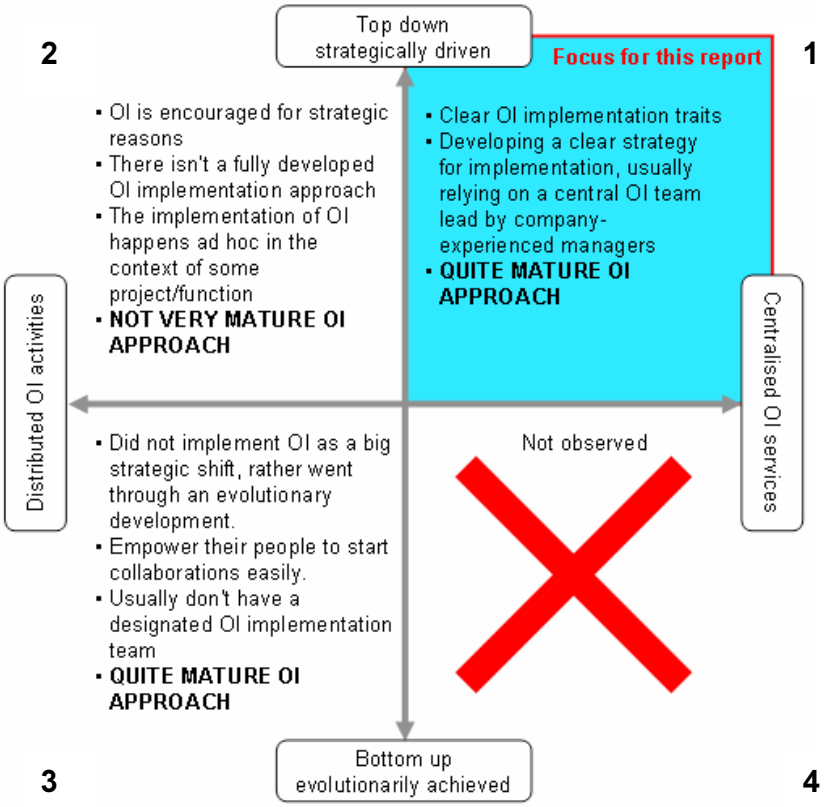


Figure 6: The OI strategy matrix: general characteristics of the approaches taken by companies adopting OI

Other companies (top right quadrant) made a top-level decision to implement OI over a short period, and these companies often set up a dedicated OI unit.

From the evidence of our case studies, managers within large corporation are frequently asked to take responsibility for the development of a strategy for the adoption of OI and to manage its rollout. This top-down strategically driven approach to OI often relies on the creation of centralised OI services and a core team to develop the OI strategy and support its implementation.

Although links to all the routes towards OI are made throughout the rest of this report, we will focus on the implementation of OI through a top-down strategically driven centralised approach (top right quadrant). Taking a close view at what these OI implementation teams did to encourage OI adoption in their respective companies has enabled us to gather feedback on the initiatives taken and capture the evolution of the approach over a short period of time.

1 Top-down, strategically driven, centralised activities

Two major FMCG organisations have reviewed their innovation processes in the light of the OI framework. Having relied for a long time on internal resources to innovate, they now see OI as an opportunity to accelerate innovation and continue growing in a sector where revolutionary innovation is very hard to achieve, competition is very high and the market is very demanding.

A large US consumer electronic corporation has seen its business disrupted by new software-based technologies. To maintain a prime position in the market, internal competencies had to be integrated speedily with new and different competencies.

2 Top-down, strategically driven, distributed activities

A company from the energy sector has implemented OI only for its blue sky research group, which selects projects and propositions from different sources, mostly aimed at their core business. These sources are prospective partners, such as start-ups, universities or even private individuals, operating in areas of definitive breakthrough innovation.

Another company in the same sector is interested in new technologies, including those that could lead to new lines of activity as well as those focused on its core business. In order to identify promising technologies, a small group of core managers deals with multiple potential partners to cultivate a range of new business opportunities.

2 Top-down, strategically driven, distributed activities

A company from the energy sector has implemented OI only for its blue sky research group, which selects projects and propositions from different sources, mostly aimed at their core business. These sources are prospective partners, such as start-ups, universities or even private individuals, operating in areas of definitive breakthrough innovation.

Another company in the same sector is interested in new technologies, including those that could lead to new lines of activity as well as those focused on its core business. In order to identify promising technologies, a small group of core managers deals with multiple potential partners to cultivate a range of new business opportunities.

3 Bottom-up, evolutionary, distributed activities

A large telecommunications provider has been evolving for a long time towards an open approach that entails setting up relationships with a series of external resource providers along the whole innovation chain. The transformation happened because of the evolving nature of the main telecommunications technologies and the consequent changes in the nature of their business. The company has selected preferential partners from its customers, priority partners, the major universities and governmental agencies. It has also started working with lead users and start-up companies. In order to enable openness, a portfolio of capabilities and services has been established in the last decade that includes technology intelligence, licensing, technology transfer, spin-out management, suppliers and partnerships services, strategic university partnerships, international standards and working with consumers.

An example of gradual shift towards OI

GSK is the world's second largest pharmaceutical company. Between 40% and 60% of its 100,000 employees use the technologies available in the business, so technology is an important facilitator to the development, manufacture and sale of pharmaceutical products.

The Formulation division is significant within GSK. It employs around 1,600 people based in ten countries. The division is responsible for drug formulation and delivery. The drug delivery element has two aspects – first, how to get the drugs into the patient's body (tablets, inhalers, etc.), and second, to what part of the body.

About ten years ago, Formulation decided to develop some radically different drug delivery systems. This was linked to the fact that manufacturing processes were in need of review – many had been patented as long ago as the 1920s and 1930s.

There were some early challenges. GSK realised that it did not have all the resources in-house to develop the required technologies. Consequently, it chose to form deep partnerships with two outside partners. Early on, however, the limited experience of working with external partners increased costs and relationship ran into severe difficulties.

GSK used this experience and broadened its approach from a limited set of relationships to a more distributed model where the company collaborated in a network with different participants, pursuing various outputs that changed over time. As a result, the approach evolved into one in which GSK put itself at the centre of a web or network of activities. This was also a way of covering eventualities – a kind of risk diversification, minimising the chances that none of the external collaborations would yield benefits.

In the evolved model, partner selection is central. GSK needs to identify what it is that each contributor does best – i.e. what is the clear competitive advantage? While GSK acknowledges that many other companies have great technologies, it does drug delivery

profitably themselves (many partners in the same markets have not had such success and rely on one hugely profitable product to cover the overall investment). The message is that GSK does have something to offer. This includes the ability to push products and technologies through to the market, advice on how the technology should be used, and experience in developing technology in exchange for a limited share in IP benefits.

In order to take advantage of emerging technologies, GSK is now generally happy to look outside and buy in what is needed. This lowers staff costs and often has time benefits. In its collaborative model, GSK varies the types of partnership between the purely transactional and those that are potentially deeper and more strategic (recognising that transactional relationships are often simpler and less costly). Selecting the type of relationship depends on the work concerned. Put simply, the choices are between contracting out a process, doing it internally and licensing out GSK's own technology to another organisation. Each approach has different cost and value benefits but importantly, the selection should be informed by understanding what it is that GSK does best.

The key lessons learned over a 10-year period

1. The GSK approach has evolved.

- A diverse network is important, and GSK now has 60–100 active relationships
- GSK has developed a pipeline of early, middle and late stage technologies (and makes more than it buys in)
- The resource mix has moved to a 50/50 internal/external mix
- GSK has a balanced mix between pure transactional contracts and strategic (high maintenance but potentially high value) alliances
- Alliance management skills have developed significantly (through experience)
- Project and portfolio management tools need to be used actively
- Partner selection requires rigour, evaluation with up-front IP control, and active post-deal management

2. It is easier to apportion exploitation rights (distinguished by field) at an early stage, when they are hypothetical.

3. The work required to facilitate collaboration is often closer to procurement than it is to R&D.

4. Make the best use of financial valuation tools. In the past, instinct pushed valuable projects with bad discounted cash flow (DCF) projections, but GSK has become more sophisticated and now uses probabilities to match financial business cases with related risks.

5. Seek highly capable information brokers to scout for new ideas and welcomes suggestions on how to improve this resource.

What does this mean for my organisation?

- Think about your company: there are almost certainly examples of single OI activities that have been carried out for a long time although not explicitly called OI.
- Determine where your company is placed within the OI implementation approach matrix.
- Decide whether a strategically driven, centralised OI unit is the way forward for your company.

Part 2: How to Implement Open Innovation

The second part of this report builds on the concepts of open innovation introduced in Part 1 and suggests ways in which OI can be implemented in your company.

Read this section if…

- you want to learn about how a company can implement OI
- you are interested in how to realise OI through a dedicated team
- you want to learn more about OI culture, OI structure, OI skills and OI motivation

1 Enablers and obstacles to OI

To determine critical issues when implementing OI, we asked the companies participating in our workshops and case interviews about the enablers and obstacles to OI. The results are shown in Figures 7 and 8, where the higher number of stars indicates that a larger proportion of the companies observed cited that enabler or obstacle as important.

Figure 7: Open innovation enablers, based on the responses of 26 managers at one workshop

Figure 8: Open innovation obstacles, based on the responses of 26 managers at one workshop

Our analysis of enablers and obstacles for OI reveals four main issues that companies have to tackle on their way to implementation (Figure 9).

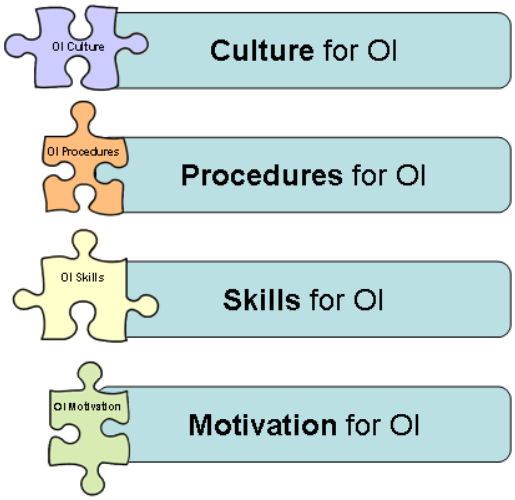


Figure 9: issues in the implementation of OI

1.1 OI culture

Culture change is a major issue in the implementation of OI. This is readily understandable: adopting OI may well mean doing things differently, sometimes in direct contradiction to behaviour that was allowed and endorsed in the past.

For almost all the companies in our study, the shift towards an open approach to innovation required the direct involvement of top management. This often translated into a shift of culture, whereby working with other companies became accepted and endorsed throughout the organisation. For one of the companies surveyed, for example, the intervention of top management had a positive cascade effect throughout the organisation. This experience was shared by another company, where the CEO announced the open innovation policy very publicly ('Everyone realised that things had to change'). However, it was felt by others that important changes had to come from the operational level 'as they are the ones who need to deliver'. It was only after the operational level had been convinced that the intervention of top management became significant and rubber-stamped the initiative, ensuring it was going to happen.

1.2 Appropriate changes of procedures and structure

What procedures enable OI? Many have been observed. For example, moving people around within an organisation improves the intensity of internal networks and increases cross-functional working. This is an extremely important factor for complex organisations where it is difficult for every independent operative to know how to relate to all the different aspects of the business.

Independent OI teams working within the traditional company configuration are a very popular choice for OI implementation. These teams typically include people from R&D, marketing, supply chain management (procurement) and the legal department. To enable it to work more freely, one of our companies suggested ring-fencing the team's budget and separating its finances and management from R&D and the chief technology officer (CTO) – 'There should be the right balance between independence and integration'.

Choosing the appropriate structure is another important step towards an open approach to innovation.

1.3 Skills for OI

There is no 'right' blend of skills that is considered a definite enabler of OI, but interestingly the lack of an appropriate blend of skills is considered an obstacle to its implementation (see Figures 7 and 8). This suggests that training is essential, rather than merely desirable, when preparing the company for open innovation.

1.4 Motivation for OI

As culture is an important element for supporting change, it is interesting to consider what incentives can be put in place to encourage people to adopt open practices.

An executive at one of the surveyed companies where the transition towards OI is still in progress made the following observation: 'Although we generally recognise the importance of getting to know and use what is developed externally, there is not the cultural and practical background which enables and motivates the employees to be completely open. There are no formal ways of career progression for someone who is an OI operative.' Two other companies have recognised and at least in part solved this problem. In the words of one: 'Our entrepreneurial structure recognises the identification and the bringing inside of a technology'. Appropriate shifts of the incentive structure are essential to implementing OI successfully.

As this section has shown, the same issue can be an obstacle or an enabler: if you get it right, it can enable OI; if you get it wrong, it becomes an obstacle. The next four sections deal with each of these issues in detail.

What does this mean for my organisation?

- You should be aware of the different enablers and obstacles to OI implementation.
- Set up a clear action plan to deal with the four main issues – culture, procedures, skills and motivation.

- Analyse where your company stands in relation to each of these issues and decide which to tackle first.

2 How to Build an Open Innovation Culture

Read this section if…

- you want to learn in general about how a company culture can be influenced
- you want to learn about a company culture for OI
- you want to learn about sub-cultures within a culture and their different responses to OI

2.1 Influencing company culture

Nobody knows if it is possible to plan culture change because it is difficult, if not impossible, to demonstrate its effectiveness. Hence, we do not want to suggest any plan for changing organisational culture in order to enable OI. In addition, culture has different levels of depth, and changing the deepest levels (the basic underlying assumptions) is very hard and takes a long time.

As others have done before (Martin and Siehl, 1983), we want to identify and highlight those cultural features at the shallowest level of company culture that can encourage interaction with the external environment for the purposes of innovation. Changing these shallow features is easier than changing the deeper cultural levels.

It is worth noting that changes can be directed from the top only when there is a single culture and norms are changed. Top-down approaches are generally short-lived because they tend to produce over-compliance rather than acceptance.

Many approaches have been taken to study the very complex theme of organisational culture and change. There are a number of models, frameworks and paradigms that could be used to investigate the cultural implications of implementing OI. Pheasey (1993) and Brown (1998), for example, review the pillar theories of organisational culture and from these we have extracted some concepts around which to structure our research.

There are four main archetypes of organisational culture, summarised in Table 2.

Role, *power*, *achievement* and *support* cultures have different characteristics and are typified by certain organisational structures. Groups or companies with a predominant achievement and support culture might be expected to be more suited to the adoption of OI. For these cultures, appreciative methods of behavioural control seem more effective (see section 5.1).

Table 2: Organisational culture types

Culture Type	***Description***	***Structure***	***Internal Control***	***Reaction to External Contingencies***	***Most effective Control Methods***
Role (bureaucracy)	Based on regulation, bureaucracy and logic. Characterised by job descriptions, rules, procedures. Emphasis on conformity to expectation.	'Greek temple' or hierarchy where each function (e.g. finance) is a pillar, controlled by a small group of senior executives (the temple roof)	Hierarchical control via impersonal regulations	Closure Separation	REGULATIVE METHODS
Power (adhocracy)	Regulated by a central power irradiating throughout the organisation. Culture is dependent on politics, trust, empathy, and personal magnetism.	Web or pyramid	Hierarchical control via direction and supervision	Conquest Confrontation	
Achievement (task)	Flexibility adaptability and dynamism characterise this culture. Power resides with expertise. People are interested in the work itself and want to see it completed.	Organisations that focus on specific projects or tasks. Matrix or market structure.	Self-control, personal accountability for delegated achievements	Problem-solving Compromise	APPRECIATIVE METHODS
Support (person)	Individuals feel they have a personal stake in the organisation. Assumes that people contribute out of a sense of commitment and belonging. Satisfaction comes from relationships, mutuality, belonging and connection.	Cluster or clan, with no dominant individual or group	Collaborative control with mutual accountability	Dynamic connectedness Transformation	

2.2 Sub-cultures of open innovation

In our review of the companies involved in this research, we observed distinct attitudes towards OI within the groups of interviewees. They are shown diagrammatically in Figure 10 and described below.

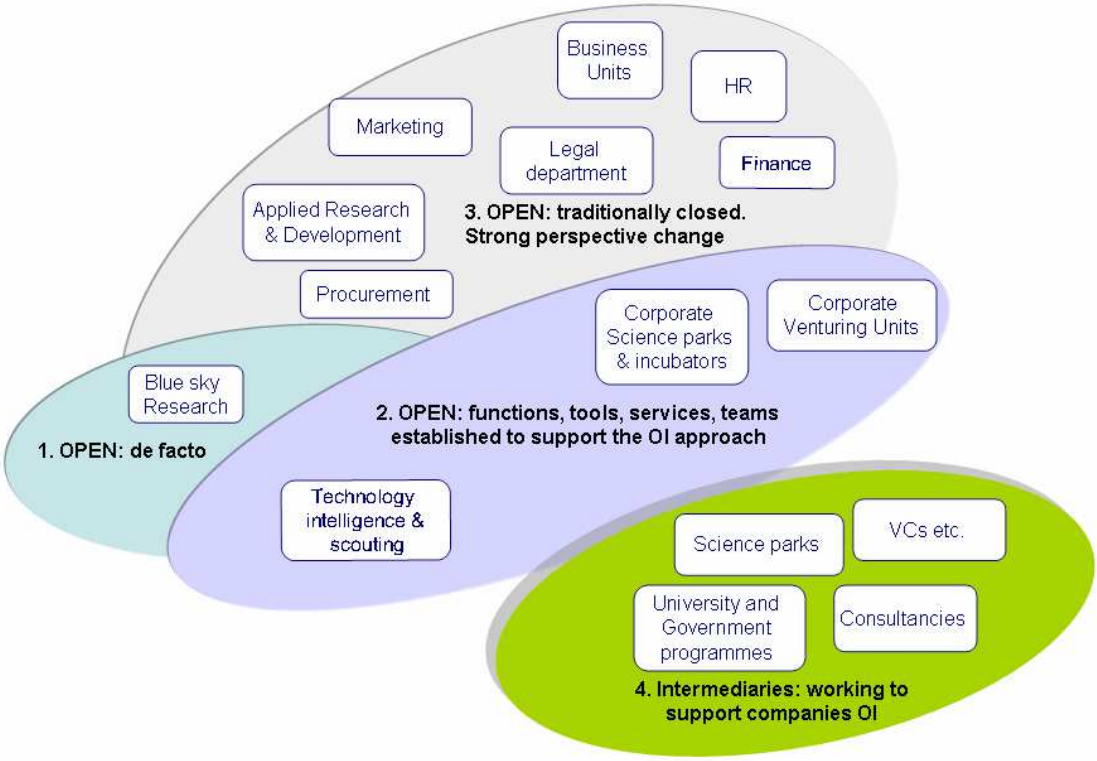


Figure 10: OI sub-cultures

1 De facto – working with an OI approach

The blue sky research facility exists only in some companies. People within these functions assert that they have not recently changed their way of working: it has always been open, e.g. they are already working with partners in universities and research centres.

2 Functions, tools and services for OI

These functions are intrinsically open since their role is to support OI activities where people have been recruited specifically to promote and foster the interaction with external partners in some way.

Examples:

- Formalised technology intelligence and scouting activities for monitoring technological developments
- Corporate venture capital functions to support innovation activities
- Infrastructure to nurture a fertile ecosystem (e.g. science parks)

3 Traditionally closed functions

These departments experience the strongest cultural clash with the OI approach, as it means a considerable change in practice. For example, in one company, the role of the procurement department has significantly shifted from providing raw materials in response to R&D directives, to taking a more active part in the innovation process. This change has in some cases made the R&D departments feel threatened by a perceived reduction in their political influence over decisions. In some cases the R&D department also fears becoming redundant if innovation and new technologies are imported from the outside.

4 External intermediaries – actively working to support companies' OI practice

Intermediaries range from consultancies, governmental agencies and university technology transfer offices to venture capitalists and lawyers. However, it was evident from our sample of interviewees that external intermediaries often have different views from the companies themselves on how to help companies in their OI efforts.

Since the R&D function seemed to be the most heavily involved in the implementation of OI, our interviewing focused on understanding how people within these departments feel about looking outside for resources to feed their innovation processes. We also asked for examples of practical initiatives taken to stimulate R&D to embrace OI.

We found that there are even differences between groups of R&D individuals. People in blue sky research units were held together by a predominantly supportive culture, while we recognised the traits of an achievement culture in the departments working closer to market. These differences are reflected in the initiatives taken by the second group (the OI implementation team) to support the efforts of the two types of R&D to become open.

According to Badawy (1988), research units with a more blue sky focus are predominantly staffed by scientists, rather than by technologists. Collaborating with other individuals with similar passions motivates scientists, and they appreciate access to new stimuli. In these facilities the atmosphere was described as friendly and people were mainly organised in teams. Their interest in research is one of the primary motivators for the scientists but they also appreciate professionally oriented motivators such as greater freedom, equipment, participation in professional associations and seminars (Badawy, 1988; Hebda et al., 2007).

Even when the company has not formally embraced OI, people in blue sky facilities interact with scientists working in the same domains outside the company. They often visit universities, participate in conferences, contribute to scientific projects with university research groups, support academic research, and publish their own findings. Hence it seems that a certain degree of openness is intrinsic to these types of research facilities. However, barriers to openness can exist and scientists can sometimes be discouraged from talking to people from outside for fear of compromising future intellectual property (IP).

Applied R&D units typically focus their efforts on less speculative research and technologies that are closely linked and bound to products and markets. These technologists look at potential new products or solutions to current product or process problems. They are usually more structured in their research and often organised in project teams led by managers who have targets, deadlines, plans, budgets and constraints stronger than those of colleagues in blue sky research units.

Applied R&D units reflect the characteristics of the achievement culture. Technologists are motivated by meeting targets and goals and appreciate monetary and career compensation in return for their efforts (Hebda et al., 2007). These groups are less prone to discuss their innovation activities with external parties unless it is strictly within a 'safe' context. Examples of typical interactions are contract research with universities or suppliers.

Table 3 shows that even within R&D, differences in cultures can be observed among groups of employees, while specific examples of how the OI implementation team sees these different groups in five companies is shown in Table 4.

Table 3: Attitudinal differences within R&D

R&D	
Research	**Applied R&D**
• Mid- to long-term outlook • Blue sky • Scientists • Enjoy technology • Supportive culture • Motivated by appreciative methods • Friendly environment • Satisfaction in the technology itself and achieving expert status • Team-oriented people • Less career driven	• Short- to mid-term outlook • Focus on incremental research • Experts in technology • Problem-solving approach • Market/product focus • Achievement culture • Motivated by appreciative and some regulative methods • Motivated by reaching targets, gaining rewards and achieving an expert status • Career driven

Table 4: Observations from our interviews with different OI implementation teams

	Cultural characteristics and obstacles encountered when supporting OI	
	How would you describe the culture in your company's research function?	How would you describe the culture in your company's development function?
FMCG1	• Technology focused • Motivated by challenges • Technical career path • Not such good communicators • Ideas people	• 33% of time invested in career planning • Career motivated, results driven • Generalists rather than specialists • More superficial than research people • Good communicators
FMCG2	• Culture was transformed from supportive and relaxed to a more achieving one • Maximise serendipity (based on reputation) • Keeping options open • Not aiming for failure • Get deals done whatever the costs • Understand the issues • Long-term business need	• Focused on growing and building existing businesses/brands • Validation, pressure testing, due diligence of technology and relationship management with the provider
FMCG3	• Underlying science research: mid to long term is the underlying culture of employees, but managed more and more by power culture regulators	• Source external technology and products that in short term speed up or enable delivery to market • Enter longer-term collaborations in order to develop new products, introduce co-developed products into market, or develop or improve equipment
Electronic1	• People do not discuss a topic before it is covered by patents • Do not have much time pressure so enough time for evaluation	• Prefer not to hand projects to a different unit, but want to take it to the end • In USA, prefer working with important brands whereas in Europe they just want to work with the best • Work with supplier in joint and co-development
Electronic2	• History of openness • Do not consider IP carefully • Need support to put agreements in place • Long time span • Not used to working with other companies • Often too relaxed	• Only open with suppliers • Some resistance to openness (not-invented-here syndrome) • Faster time scale (months) • Can be resistant to help

These results indicate that different groups need to be supported in a specific way. The evidence does not suggest that there is one overriding open innovation culture that can be created at one blow and applied to the whole company.

For this reason an OI implementation group can be in a good position to identify differences and to judge how best to seed an OI culture within different company functions. Such a group can be established as a dedicated unit with a specifically open culture from the beginning. It can then connect to and link the different sub-groups within the company and introduce the culture to them.

What does this mean to my business?

- Company culture can be influenced through structure, skills, incentives and control – discussed in more detail in the following sections
- There is no overall open innovation culture that can be created at a stroke for the whole company
- The starting point for change could be the OI implementation team, which should seed the OI culture within the company
- Accept that different units will have different sub-cultures and make use of these cultures within an OI approach
- Identify groups with particular sub-cultures and find different ways to support OI within them

3 How to Set Up Open Innovation Procedures

Read this section if…

- you want to learn about how other companies have set up and located their OI teams
- you want to learn about OI activities and functions linked by the OI team

3.1 The OI implementation team

The role of the dedicated OI implementation team varies according to the perspective of the different sub-cultures identified in the previous section. The OI unit typically performs the functions shown in the squares in Figure 11.

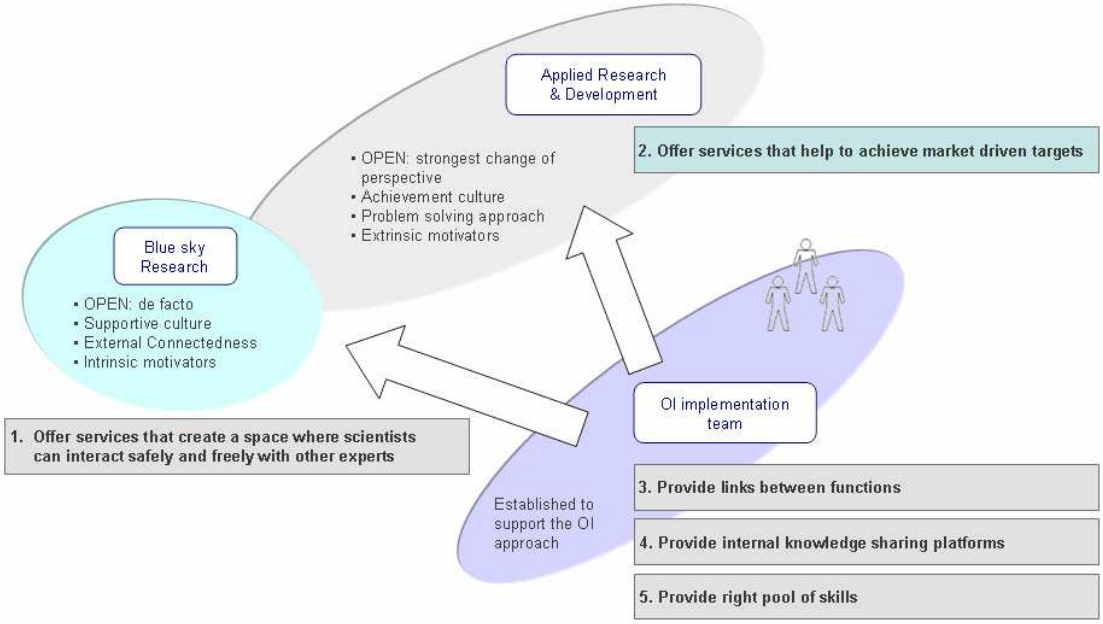


Figure 11: The role of the OI implementation team

The OI implementation team is usually drawn from R&D managers who have a strong technical background and business mindset coupled with a deep understanding of the company. They are enthusiastic about embracing OI and provide the link with other company functions that can support it. In most cases the companies observed have created an implementation team that supports R&D units in becoming more open and

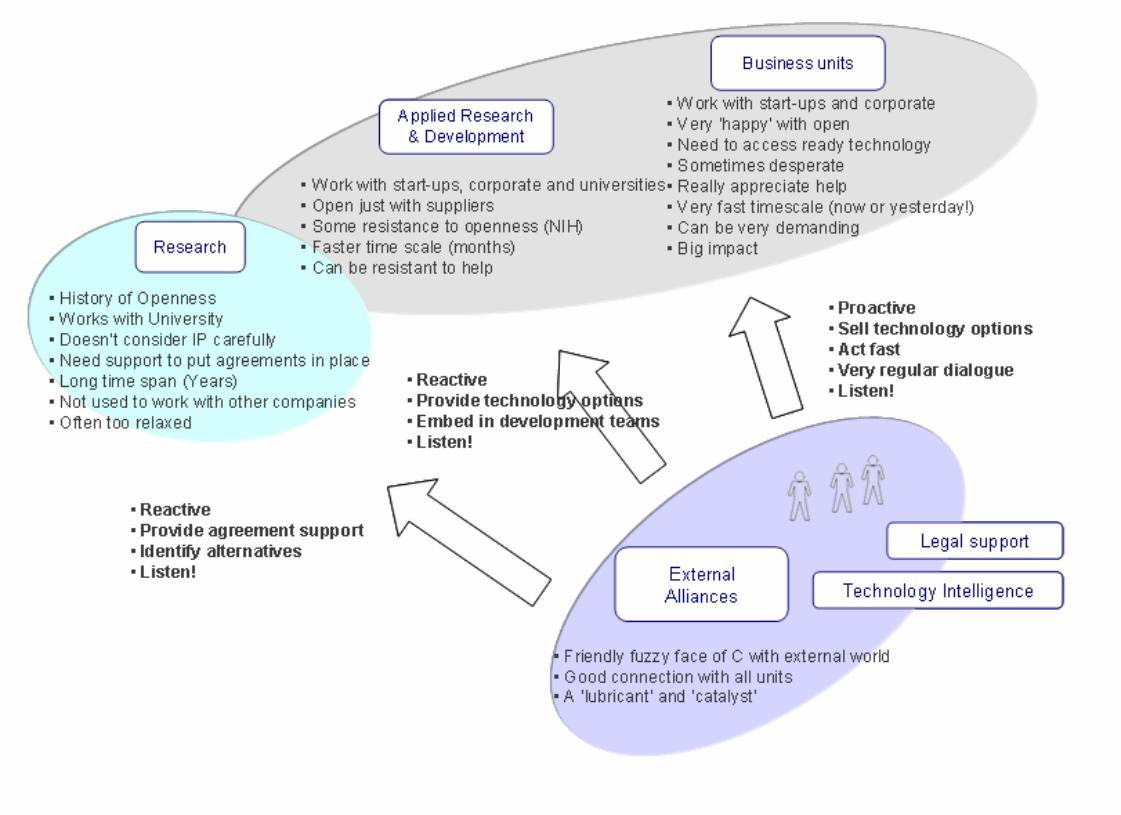
designs the OI implementation rollout. These individuals or groups ensure support is provided for the company's interactions with the external world.

They also provide links within the groups and facilitate the access to tools, skills and resources (such as corporate venture funds).

Table 5: How different companies' dedicated implementation teams promote OI culture

	Task	Examples
Blue-sky R&D	1. Offer services to create a space where scientists can interact safely and freely with other experts	▪ Create safe spaces for their researchers to work with external partners. For example, one company set up 'master agreements' that created a legal umbrella protecting scientists and researchers within certain universities. Other examples include providing insurance liabilities for working with start-ups, and guaranteeing that IP remains with the start-up while the technology evolves. ▪ The OI implementation team often provides scouting and due diligence services for researchers to identify potential partners. ▪ Personal development and assessment schemes can use modified personal targets: in some cases external collaboration is explicitly identified as a criterion for bonuses. Bonuses can be team-based to support team spirit and reduce personal competition. Also, criteria can be adapted to link blue sky research to market needs, obliging blue sky researchers to make links and connections with other company functions. Career development paths can offer the possibility of sabbaticals in universities, or experiencing the entrepreneurial spirit through temporary secondments in spun-off businesses.
Applied R&D	2. Offer services that help to achieve market-driven targets	▪ Adapt criteria for personal rewards, such as delivering on time, helping reduce time to market and costs. Promotion of external collaboration from the top by communicating new values. ▪ Create conditions to encourage use of external resources, e.g. cutting R&D budget to encourage outsourcing of research. ▪ Infrastructure that helps achievement of personal targets. ▪ Create service function that identifies needs and scouts for external solutions. ▪ Small intrapreneurial, cross-functional teams that are empowered to do 'everything' as long as they achieve their targets.
In general	3. Provide links between functions	▪ Act as internal gatekeepers who listen to problems, connect the right people, facilitate and lubricate the internal cogs of innovation. ▪ Be the friendly face of the company (internally and externally). ▪ Career paths include business unit-hopping to enhance knowledge sharing.
	4. Provide internal knowledge sharing platforms	▪ Reference Framework, which helps to create a common OI language. ▪ Exchange technical ideas in problem-solution sessions. Online facilitation of knowledge exchange (e.g. through virtual meetings attended by people in different locations on democratically chosen themes). Disseminate positive examples of success where a solution has been found through such exchanges and personally credit the people involved. These platforms are typically initiated by natural leaders who can involve others and communicate their enthusiasm.
	5. Provide right pool of skills	▪ Training: what to do and when, what to avoid. What does OI mean for the company? And what does it mean for you/your job? Who can help you? ▪ Training is delivered in seminars, as part of personal development schemes, through mentoring and tutoring, and with practical examples. Access to experts who can mentor at each stage.

OI in a multinational consumer electronics company

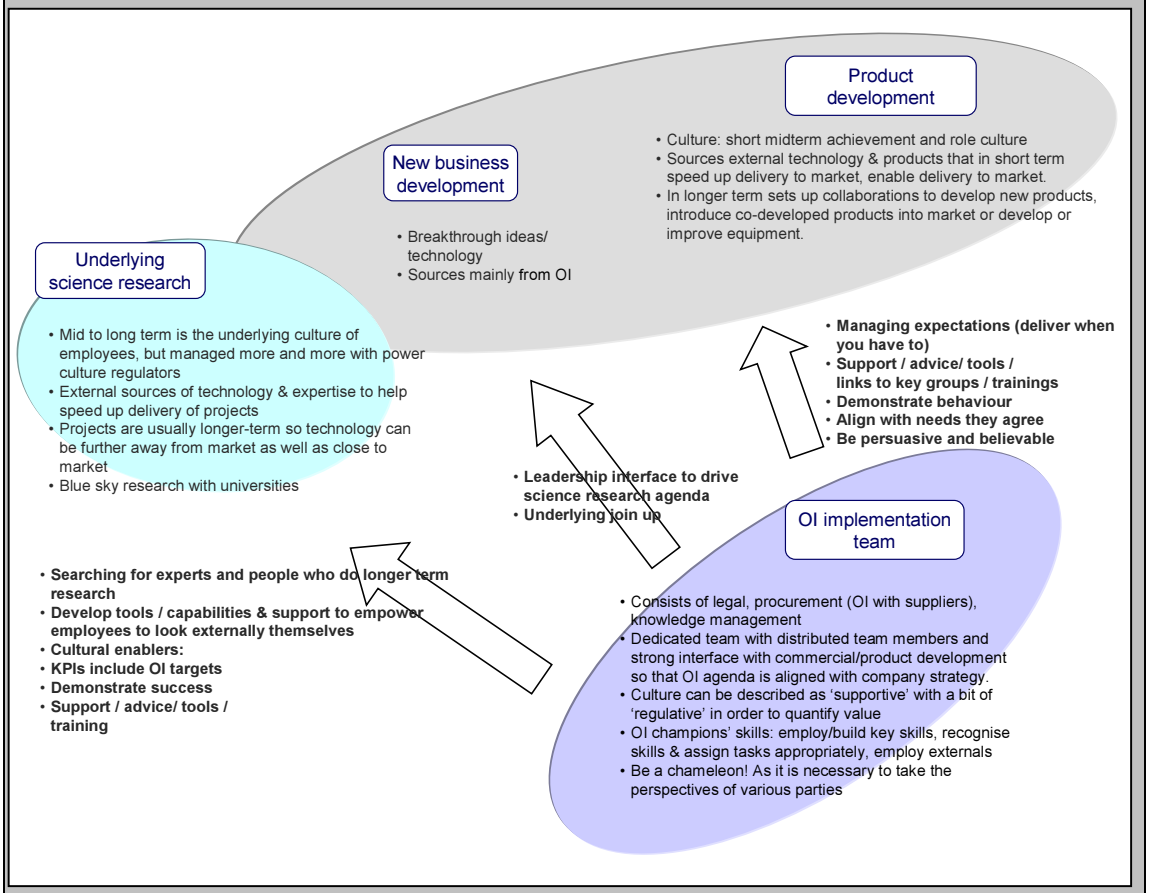


A multinational consumer electronics company has created a group of eight experienced business managers, all highly qualified technically, who are responsible for supporting external alliances with universities, private companies, research institutions and government. This external alliance group is the designated door for access to the company: a clear point of entry, accessible, and well connected internally. The group maintains relationships internally and externally, acting as a catalyst to enable relationships and collaborations to flourish. It has access to a broad set of skills and services, including business and legal intelligence. Support from top management has been fundamental to the creation and functioning of the OI implementation team, whose first suggestion on how to operate was 'Do not spend too much time buried in your office!' Listening to the needs of all the functions and adapting behaviour to suit each different group has been of primary importance.

The research function in the company is quite separate from the applied research function, and scientists have a passion for technology. They have a history of openness with university groups but because of their often relaxed attitude towards IP, the external alliance group has to provide legal support for putting any agreements in place. To support the researchers the external alliance group provides technological alternatives as well as legal advice. Because of its longer-term perspective, contact with the research function is less intense than it is with the applied research and development group where the technologists can be more resistant to external contributions. To assist the applied research group, external alliance managers spend significant time with them to encourage trust and to understand their needs better.

With both the research and applied research functions the external alliance team has to be reactive and respond to specific needs that arise. At the same time, they also take the initiative by actively offering external solutions to challenges in the business units. Such help is greatly appreciated, given the pressures on the R&D functions, especially if it is timely and easy to implement. These groups can be very demanding, but the support is worthwhile because of the dividends it can yield.

OI in a food firm



The adoption of OI in this company was strongly motivated by general trends in the food industry. The starting point for the OI initiative was the long-term R&D function, which was traditionally separated from the company's production processes. The new CTO wanted to encourage this R&D unit to link its research more closely to the overall needs of the business.

Two employees were financed from the R&D facility budget and made responsible for starting the OI implementation. The aim was to introduce OI practice into each stage of the innovation process, developing best practice before the final OI rollout. The team of two was responsible for the identification of researchers' needs (both blue sky and applied R&D) and scouting internally and externally for solutions. At this stage, they managed the entire process, from selecting collaboration partners and involving internal

experts to evaluate technology, to setting up non-disclosure agreements or signing contracts via the legal department.

Knowledge sharing networks led to the rationalisation of work and the exchange of information. R&D teams in different regions were no longer in competition with each other. The OI managers discussed specific benefits with each group in order to generate acceptance and to convince them of the merits of the open approach. The blue sky R&D site maintained a friendly, non-competitive and team-oriented attitude. They were happy to contribute to the knowledge sharing networks out of the sense of personal satisfaction conferred by the recognition of their expertise.

In contrast, staff working in the short-term R&D units were more competitive and career driven. Initially sceptical about looking for technology outside, they warmed to the notion after the first positive outcomes illustrated the potential for reducing time to market and solving problems. The two OI managers relieved the R&D staff from tasks linked to collaboration management (e.g. assessment of potential partners, negotiating agreements, managing IP). They carried out scouting activities to find solutions to identified problems. They were a clear focal point on all OI issues for both internal and external contacts. The knowledge sharing networks facilitated an internal openness that led in turn to an awareness that helpful ideas could in fact be found outside one's own research group.

Drivers of culture change

For blue sky:

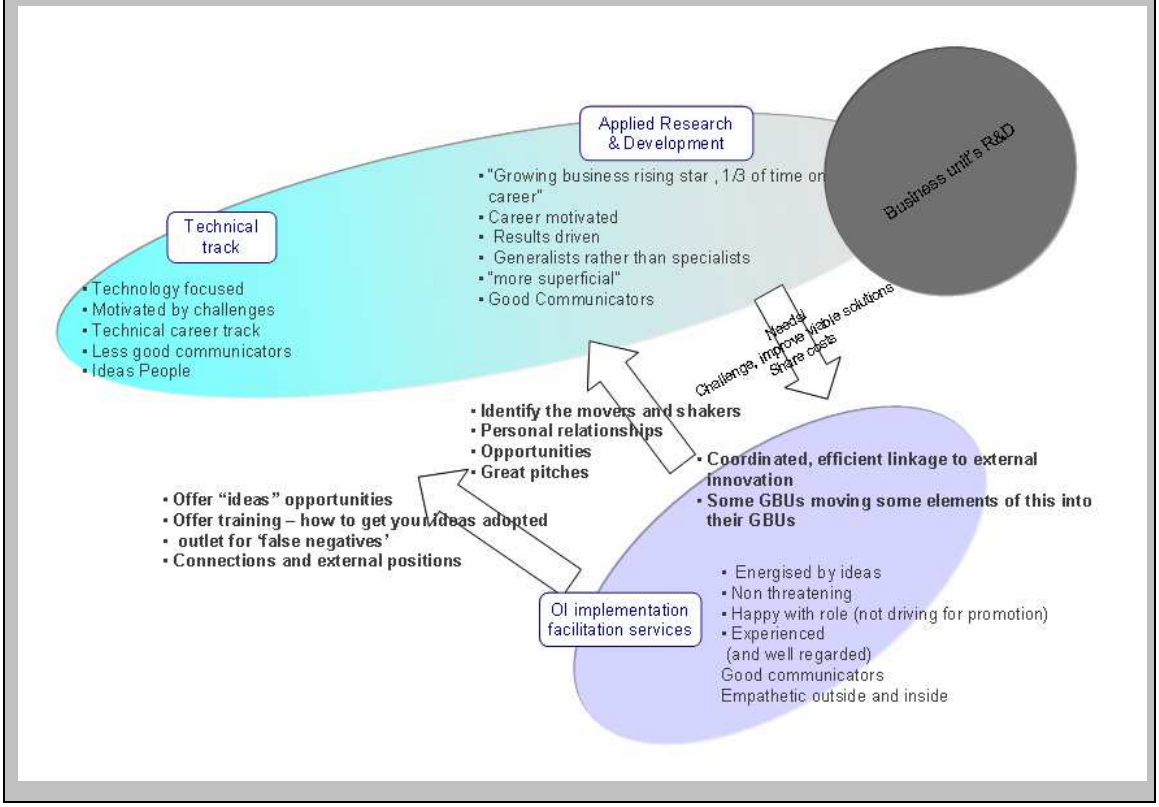
- Introduction of new indicators for performance measurement on which the whole department's bonuses are based
- New performance indicators induce a more market driven culture:
    - technology delivered on time
    - technology implemented in products
    - efficient knowledge sharing
    - collaboration with external parties.

For global R&D:

- Promotion of internal communication by introducing knowledge sharing networks. Researchers worldwide have regular telephone conferences on problems and ongoing research. When problems are solved with the help of the network, the contributors are acknowledged in company newsletters.

OI in an FMCG company

In this company, the OI implementation team has to be adaptable and able to gear its offering to two different types of group, each of which needs different kinds of help. The focuses, skills and motivations of each group are varied and contradictory. The OI implementation team must have the flexibility to guide and respond to both groups: for example, alerting the technical group to its tendency to dismiss 'false negatives' – ideas that seem unimportant but are quite the opposite – and making sure that the career-oriented R&D group is exposed to opportunities.



3.2 Activities of the OI implementation team

The OI implementation team must link many functions together. From our workshops and interviews we identified which internal groups were most important to the implementation of OI. The number of stars reflects the proportion of companies who said each group was important to the process.

Figure 12: Important internal links for open innovation, based on the responses of 26 managers at one workshop

Involving multi partners at BP

BP applies science and technology to its three core businesses (Exploration and Production; Refining and Marketing; Gas, Power and Renewables) to derive measurable value as quickly as possible. In response to changes in the R&D environment (from largely in-house R&D pre-1990 to the present state of collaborative networks) and the energy marketplace, BP has set up an ecosystem of innovation partners to bring in complementary external skills and resources.

This ecosystem typically comprises corporate partners, venture capital firms, universities, government institutes and industry players. Different partners are involved at different points along the commercialisation funnel and gaining maximum value requires these

collaborative links to be managed effectively (regarded as a key skill). Particular emphasis is placed on long-term partnerships with leading universities worldwide as a key method to gain access to world-class knowledge and networks and to stimulate thinking.

Moving to a wider network approach to innovation is not without problems. Resistance was encountered from those who prefer to work with traditional partners, and the need for dedicated expertise to manage partnerships was an internal challenge. Additionally, organising exposure to new technologies outside BP's focus and working with future (and culturally very different) energy innovators required new skills of relationship management, development and commercialisation. In particular, working with innovators outside the oil and gas industry (such as technology start ups, entrepreneurs and government departments) necessitated a deep understanding of each partner's needs and culture, and significant time was needed to develop an honest and open relationship. Partnering is a key capability in itself.

Innovation is regarded as the key to creating new business and is also a key component of the Alternative Energy and Biofuels division. This has a similar ecosystem with external partners outside the traditional oil and gas industry.

Key capabilities in this area are the need to understand and assess business value, developing new types of collaboration, and engaging in experimental technologies and business models. BP has looked closely at best practice in forming partnerships, particularly with respect to people issues, and encouraging more entrepreneurialism. A mix of new and familiar people is the most effective strategy, together with a mindset change towards a new way of operating.

The OI implementation team helps foster different activities to open up the innovation process. Figure 13 shows the results of our survey of OI activities among the companies we studied. No reliable conclusion about the scope of a company's OI activities can be

drawn from these results. For example, a company might illustrate its claim that it participates in successful joint ventures with one example. However, this could be the sole example of a joint venture in that company, demonstrating that while OI is working in one discrete area, it is far from being part of the company's overall strategy.

Figure 13: OI activities, based on the responses of 26 managers at one workshop

The company can use different tools and functions to focus on external activities, often linked by the OI team (Figure 14). Again, a challenge for the OI team is to identify the scope of utilisation of these tools. How effectively are they being investigated and used? Are they being deployed throughout the organisation?

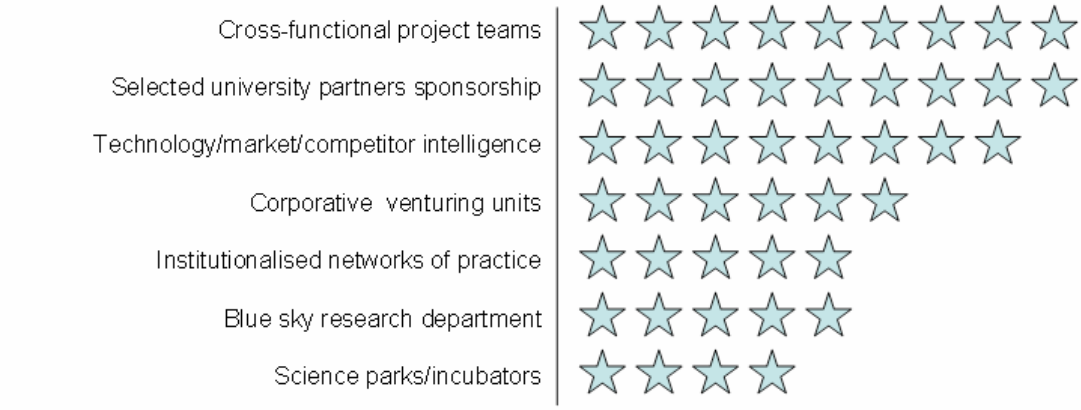


Figure 14: OI tools and functions, based on the responses of 26 managers at one workshop

Cross-functional teams: examples from two FMCG companies

Company 1: The initial thinking behind the OI implementation was led by a partnership between R&D and procurement. Afterwards the technical and brand teams worked independently.

Company 2: A structured OI approach started from the R&D department, before completion of the design phase. Marketing and sales are now included in the process, which signals the growth of better internal communication, progress towards internal strategic alignment and cross-functional development. Cross-functional teams are needed in order to bring all the necessary qualities to the process. Examples of cross-functional activities include:

- *Building relationships with suppliers*: the company can demonstrate directly how being more innovative can improve service, quality, commercial capability and flexibility. Working together, procurement and research can leverage supplier innovation and direct it to fulfil the company's needs. Tools have been developed to facilitate this approach.

- *Technology push process*: this is cross-functional, with decision makers at all levels in the organisation and varying from case to case. The process is as follows:
  Identification of opportunities → Identification of internal sponsor/business owner for the opportunity→ Identification of stakeholders (i.e. people with relevant expertise) → Technical feasibility evaluation → Business case in this specific area → Opportunity evaluation.

Partnership with universities and others

- A defence provider has established a small number of very well resourced centres bringing together the firm's own researchers, university research groups and selected other companies to focus on broad themes such as systems engineering.

- A leading European supplier of industrial power generation systems faces a challenge to continue delivering new products to all its target market segments cost effectively, given the intensive level of R&D involved in their production. In addition, the company's revenues are increasingly drawn from services associated with the core product. To ensure the efficiency and effectiveness of its R&D spend, the firm has implemented a number of OI initiatives, including the establishment of laboratories embedded in universities, the formation of regional competence centres to draw together expertise around a particular theme, the management of a range of risk/reward sharing partnerships with suppliers, and the formation of a corporate venturing unit.

Open incubation at Philips

Founded in 1891 as an electric light bulb manufacturer, the Philips company has gone through several periods of expansion and streamlining in its product portfolio and areas of interest. Over the years it has divested itself of many traditional product lines to concentrate on growing markets. Paring down since 2000, Philips has also followed the pattern of many traditional technology driven companies by becoming more market oriented, designing its products and solutions around people – giving an accessible and rewarding user experience that leverages Philips strong brand promise.

The company has progressively rationalised its core areas of expertise to reflect its brand strap line, 'sense and simplicity'. It currently focuses on three main areas: Health Care,

Lighting and Consumer Electronics. Within these core areas, Philips concentrates on worldwide brand development and emerging markets through internal and external innovation and acquisition.

Internally its view of innovation and incubation has been changing over the years and its three incubator centres are now considered an important strategic catalyst for growth. This strategy guarantees a continuous stream of new product introductions, which accounted for 56% of the company's growth in 2006. The three incubator funds (one for each core business area) finance new business ventures within the company – that is, new ideas that cannot find a place within existing businesses. These units report directly to the main board of management in line with the three core sectors.

Process example within one line of business

The Consumer Electronics incubator focuses on fundamental market needs and trends that are aligned with consumer growth and lifestyle strategies. The incubator makes use of knowledge across the entire organization. Using a traditional Stage-Gate[3] process, the incubator gathers ideas internally (about 70%) and externally (about 30%) and selects potential new business ideas using investment criteria that mirror those of global venture capital companies. Criteria include:

- Unique technology and/or application with clear market insight
- Adoption of the solution at the end user's discretion
- Recurring revenue business models – e.g. B2B, B2C[4]
- Clear discriminator and control points
- Intrapreneurial team
- Substantial attainable market
- Consistency with Philips' consumer strategy values

Initial ventures capitalised on internal R&D and developing intellectual property rights (IPR) off the shelf, turning old 'things' into new businesses and creating additional value.

[3] 'A conceptual and operational process for moving a new-product project from idea to launch'. www.stage-gate.com; http://www.ifm.eng.cam.ac.uk/service/events/info/roadmapping.html

[4] Business-to-business, business-to-consumer.

More recently, ventures have been concentrating on organic growth. If they are successful they may be 'spun up' and become new businesses within Philips, receiving 100% of their funding from the sector from which they originate. If they do not contribute to growth or are not consistent with Philips' core areas they may be 'spun out' by looking for external funds or trade sale.

Entrepreneurial and intrapreneurial spirit is a key part of this process. Philips believes that managers should be willing to take personal risks by going into the incubator, requiring their commitment when there is no guaranteed route back into the corporation. On the other hand, they are personally rewarded with share equity when ventures are successful. To make the incubator system more attractive, managers are given high degrees of freedom and mentorship.

Philips has to date created about 20 millionaires through this process – a good incentive for corporate employees who feel like trying their hand at entrepreneurship with rather less risk than in the real world.

Philips' incubation organisations have been able to adapt and reorganize themselves to support the overall company strategy for growth. Elements were addressed that reflect not only internal organisational tradeoffs but also the framework in which Philips interacts with the outside world to foster open and closed innovation.

Setting up a Science Park to enable the creation of an ecosystem

Company A has reorganised its research infrastructure as a tool for OI. Its former R&D campus has become a Science Park where individual high-tech companies, either spin-offs from the business itself or independent companies from outside, can share the premises and the sophisticated technical infrastructure.

The list of residents is continually expanding, including some who could be seen as direct competitors of the parent company. However, the site accommodates only small and start-up companies, and does not include manufacturing facilities.

The design of this OI tool took shape progressively. Initially the company planned to move its R&D facility, but after some thought concluded that the site provided an opportunity to blend in with the local infrastructure. This was also the view of the local authority, which saw the status of the company as an opportunity for the local development of business and innovation.

The campus needed a new operational business model and this was created by virtue of strong links with the local authority, the university and the local infrastructure. The process of reorganisation began with the involvement of a charismatic leader who had strong links in the region, high networking capabilities and who knew the company very well.

Currently the ecosystem is monitored through periodical reviews of the campus residents carried out by an external consultancy.

- **Infrastructure management** An independent organisation is in charge of running the campus infrastructure, including the construction of new buildings, facility and park management, and attracting new residents. It is also responsible for promoting interaction among the campus residents. This is encouraged both informally, through the technical and recreational infrastructure shared by all residents (e.g. sports facility, shops, canteens, nursery, etc.), and formally, through internal technical colloquia and conferences. A business club supports companies in the presentation of their technological offers with a commercial perspective. An external venture group specialises in corporate spin-outs.

- **Measurement of the park's performance** The infrastructure managers are currently evaluated mainly on their capacity to manage the buildings (i.e. how

much of the park is occupied). Other suggested measures of performance are the amount of venture capital invested in the area and an assessment of the park's effect on regional development of science and innovation.

Setting up technology intelligence outposts at Kodak

Creating the eyes and ears for identifying opportunities and threats

Kodak's business has changed dramatically in recent years. As well as migrating from traditional film-based technology to new digital methods, it also diversified into a variety of imaging related markets, including consumer and commercial printing and display technologies. Kodak embraces an open approach to innovation and set up Kodak European Research in Cambridge (UK) to identify opportunities and possible partners of strategic importance in the European, African and Middle Eastern Regions (EAMER).

Primarily, KER's mission is to:

- Search out differentiated and relevant science and technology of excellence, and other opportunities emerging from universities, institutes and industries in the region
- Identify and investigate user preferences and aspects of consumer differentiation in the region
- Identify and establish relationships with strategic regional partners
- Participate in local, national and regional research funding opportunities

Kodak's information searches focus on three main streams of intelligence:

- Achievements in science and technology
- Business opportunities
- Customer needs

Kodak is most interested in the space where these streams converge, where an identifiable technology could spark a new business opportunity as it meets a customer

need. Cambridge was chosen as the best location to position the technology outpost because of its networking potential and convenience.

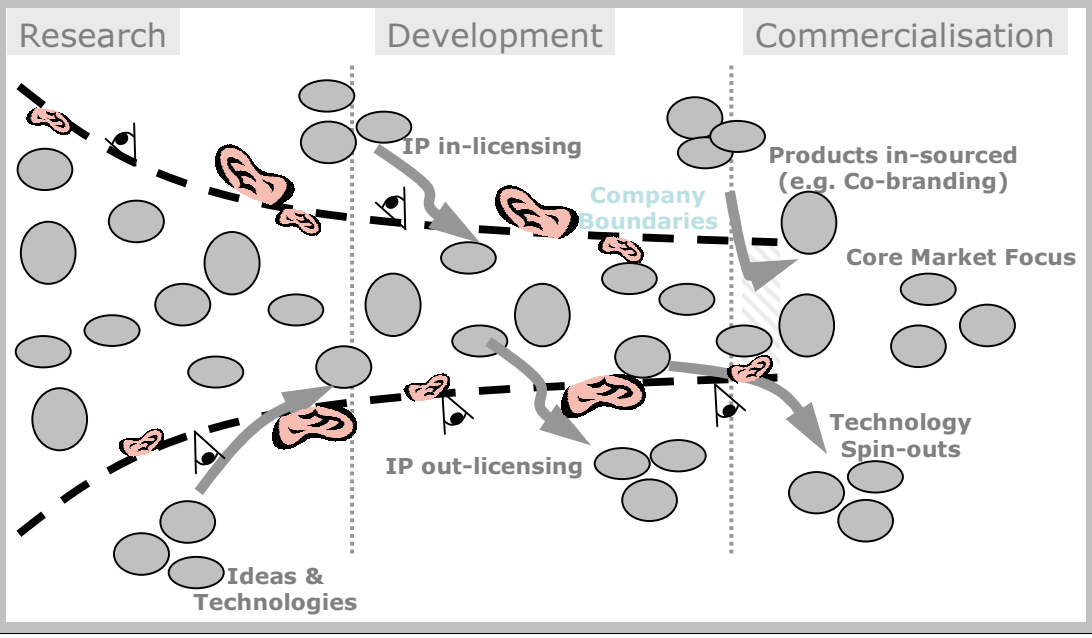
KER staff were chosen according to scientific skill sets in order to create a community with complementary technical expertise and with sufficient technical depth to be able to progress the work of the centre and interact with external experts. Experience working with external groups was also considered, but more important was the attitude and enthusiasm for working in an open innovation centre.

It was evident that every country in EAMER had to be approached independently. The method of approach moves in four steps from 'scan' (looking for previously unidentified information) to 'target' (focusing on information of identified relevance). Tools have been produced to support each of the phases.

KER decided to develop a series of documents that would act as 'country guides to technology and innovation' in collaboration with visiting international students recruited through IAESTE – an international association that supports the professional technical training of undergraduate students by seconding them to companies in countries other than their own. The guides were assembled with a 'scan' perspective (searching beyond already identified technologies and interests) entirely through Internet searches, following a clear set of aims, objectives and templates (see figure below).

KER also decided to connect to intermediaries (e.g. services, associations, consultants, venture capitalists) in order to grow the number of contacts exponentially. This strategy allowed them to be selective and to deploy a limited amount of resources in identifying key intermediaries in the external environment.

A scouting trip was organised with the scope of capturing information as well as setting up social networks and links. Follow-up with interesting research contacts was then organised.



What does this mean to my business?

- Think about activities within your company: which of the tools already exist and how are they currently connected?
- When you think of setting up an open innovation unit, define the functions that should become connected and the activities that the unit should be responsible for.
- If you have outlined the functions and the activities, decide which tool-set the OI unit needs to perform their activities. Which of them do you already have and which of them will you have to create?

4 How to Acquire Open Innovation Skills

Read this section if…

- you want to learn about what skills are needed for an open innovation approach
- you want to learn about the distribution of skills within companies
- you want to learn more about how companies train their employees to open up their innovation process

It is a rare, if not non-existent, person who possesses all the ideal skills for OI. However, skills can be pulled together by creating cross-functional teams to which different members contribute all the required attributes.

One skill that it is possible and advantageous for all team members to have is 'skill zero' – the skill of knowing where all the relevant skills reside. In other words, team members should be aware of who possesses which skills, and how to outsource them. Technological skills are of relatively lesser importance when it comes to obtaining the right technology. The OI unit should be centrally responsible for linking different skills together and for providing training to fill gaps or improve certain skills.

From our case studies we compiled a set of skills that fall into four categories: introspective, extrospective, interactive and technical (see Table 6).

- **Introspective skills** allow for the organisation's assessment of the value of each gap or opportunity coming from inside
- **Extrospective skills** allow the assessment of the value of each interaction from the perspective of the other party and review capabilities and opportunities coming from outside
- **Interactive skills** are communication skills that convey internally and externally the value of any relation with the external world

- **Technical skills** include all the technological, marketing, financial, commercial, management and business skills and tools needed to support the three categories above.

We also identified a broad set of personal attributes, including motivation, the ability to learn, sociability, a techno-business mindset, systems thinking, leadership, balance between ego and empathy, an entrepreneurial mindset, lateral thinking, vision, adaptability and flexibility.

Table 6: The OI skills set

Introspective	Extrospective
Strategic insights e.g. understand fit with internal strategies. **Legal/IP skills** e.g. understand IP implications, ability to draw up contracts	**Behaviour analysis** e.g. analytical, personal. **Strategic insight** e.g. understand fit with partners' strategies.
Interactive	
Communication/collaboration e.g. communicate needs internally and to partners, resolve conflicts, language skills, network building **Negotiation** e.g. understand buying and selling tactics.	
Technical	
Technological e.g. understand principles of technology being exploited. **Portfolio management** **Financial** e.g. understand and set budgets. **Analytical** e.g. evaluation of risk, financial analysis, problem solving	

4.1 Training and skills

Delivery of training and skills is often made easier by a clear framework that clarifies what OI is and what it implies. One of the most popular choices is the WFGM process adopted by Air Products and described by Witzeman et al. (2006). Although not the only possible solution, this simple process – Want→ Find→ Get→ Manage – clarifies communication and enables differentiation of the stages through which each project passes. Training is made easier and confusion avoided by relating specific examples to

the phases. Table 7 relates different skills and training to the WFGM framework. Each set of questions could be used to guide the creation of teaching materials and learning objectives for a tailored training course.

Table 7: Training and skills in the WFGM framework

	WANT	FIND	GET	MANAGE
Introspective	▪ What would my organisation innovate in? ▪ What wouldn't fit the innovation processes? ▪ What are the current innovation processes? ▪ Who are the people involved in innovation in my organisation? ▪ Where can I find information? ▪ Are there tools in my company to support innovation? Are there people in other functions who could support us?	▪ Who could have already acquired information on external ideas? ▪ Where can I find internal repositories and tools for discovering new options in technology and the market?	▪ What would this deal mean for our organisation? What does the proposed partnership mean for our organisation in strategic and financial terms? ▪ Are there legal implications for us? ▪ Are there people/tools to help in negotiating deals? What are the 'preferred ways' for our organisation to deal with external partners (e.g. licensing in, co-operating in long term research projects)?	▪ What are the problems for our party in respecting the agreement?
Extrospective	▪ Look for external trends in market and technology (tools and techniques to review the state of the art) ▪ What ideas seem to work in current and future scenarios? Are there gaps that could offer an opportunity for our company?	▪ How to scan for new opportunities in technology and marketing ▪ How do I learn more about interesting development? How can I evaluate who will be a 'good partner'?	▪ What would this deal mean for the other organisation? What does the proposed partnership mean in strategic and financial terms? ▪ How to understand the other people's motivation and drivers from their behaviour	▪ What are the problems for our party in respecting the agreements? ▪ Who is responsible in that centre?
Interactive	▪ How to contribute to other colleagues' innovation processes ▪ How to develop creative ideas with others in your organisation, bringing together market and technological aspects How to communicate our ideas to the rest of the organisation? (e.g. writing a proposal, business idea)	▪ How to acquire the needed information during our social activity (e.g. at a conference, meeting) ▪ How to communicate the value of the scouting findings	▪ How to negotiate ▪ How to communicate with the party ▪ How to communicate the value of the deal to the rest of our organisation and gain support	▪ People and relationship management
Technical	▪ Preparing business cases for new ideas ▪ Strategic insight ▪ Market insight ▪ Technical Insight	▪ Scouting briefs preparation ▪ Scouting for identified needs ▪ Preparing scouting reports to highlight the value of the scouting finding	▪ What legal knowledge is required for each type of deal? ▪ How to manage IP ▪ Financial valuation tools ▪ Business models	▪ Portfolio and project management ▪ Public relations ▪ Problem solving

Knowledge of the company is a valuable asset. Moving employees around to acquire experience of different functions also improves the intensity of internal networks and increases cross-functional working. This is an extremely important factor for complex organisations in the FMCG sector where it is difficult for every individual to understand how they relate to all the different aspects of the business.

OI skills training

One of the companies we surveyed has organised an internal 'OI academy' for training employees in all functions, particularly those in R&D and supply chain operations. Training is delivered in a variety of ways: in e-learning format, at residential seminars, through personal development schemes, via mentoring and tutoring, and through specific examples of how the theory applies to them.

Residential courses provide an opportunity for experts to mentor trainees on specific problems encountered in adopting an OI approach. They also enable the OI implementation team to get to grips with the diverse realities of a multinational organisation, increase their understanding of other perspectives, and perfect their own training programmes. Simply by meeting other employees at the courses the trainees are encouraged that they are not alone in their attempts to embrace a different way of innovating, and that colleagues in other groups and the OI team itself are there to lend support.

Another option is to offer secondments to other organisations, such as technical consultancies or university research institutes, where trainees can gain first-hand experience of the world outside their own company.

4.2 Losing skills … a risk in the adoption of OI?

Companies are often pushed to think that OI can be an opportunity to outsource research to SMEs and universities. The companies who attempt such a radical change usually restructure, ask people to move department, change their working practices and make some researchers redundant. The decision to reduce R&D capabilities might save costs in the short term, but in the long term, the loss of internal skills and technical capability might jeopardise the company's ability to access external technology and to appreciate its value for the company.

What does this mean to my business?

- Do not expect to train only individual OI masters
- Focus instead on individual professionals connected through the interaction of different skills
- Be aware that a company needs internal competences to be able to assess and review external capabilities and opportunities

5 How to Motivate Employees

Read this section if…

- you want to know how companies have tackled not-invented-here (NIH) syndrome
- you want to know more about motivating employees for OI
- you want to find out about incentive structures for OI

5.1 General methods of motivating employees

There are two main methods of motivating employees, regulative and appreciative. Table 8 examines the pros and cons of each.

Table 8: Motivation methods – pros and cons[5]

Regulative methods: i.e. setting a rule and a measurement for judging a behaviour	**Appreciative methods: i.e. giving a sense of what behaviour is/is not considered positive and acceptable**
Pros • Performance is measured. Measures must be 'people-proof' and targets difficult, with rewards tied to them	**Pros** • High sense of total accountability that precludes game playing. Large flow of information
Cons • There is no such thing as 'people-proof' measures. People use numbers to cover their back; loss of valid information and unwillingness to take risks • Predetermined plan – management seeks to impose it • Management is seen to be focused on goals • Narrow specialised purpose is emphasised • Management relies on techniques and extrinsic motivation • Development is seen to require more sophisticated techniques and greater rationality	**Cons** • Little control over subordinates; goals are difficult to access; low-growth-need employees will not respond; risk of losing track • Situations are met as they arise. Management is a mutual adjustment between organisation and situation • Management is seen as a process focused on maintaining balance in a field of relationships • General values or norms inform behaviour • The source of control is seen to be within people; intrinsic motivation • Development is seen as a process of increasing understanding of the context, extent and depth of the situation

[5] Adapted from Cammann and Nadler (1976).

5.2 Overcoming NIH syndrome

The companies in our study were all very much in agreement that not-invented-here (NIH) syndrome generates strong resistance to open innovation. NIH is defined as the 'overemphasis on internal technologies, ideas or knowledge' (Clagett, 1967; Katz and Allen, 1982). That is, people do not value ideas or technologies that are not generated from within their own company.

One contributor to our research survey said: 'Over-protecting the work done internally implies not doing thorough due diligence work on what others have achieved. It implies a poor analysis.' Past studies (e.g. Cohen and Levinthal, 1990; Lichtenthaler and Ernst, 2006) confirm that people can be suspicious of anything coming from external sources because of previous negative experiences, lack of experience or motivation, or an incentive system that focuses on and strongly rewards internal technological development.

NIH can also be the result of people striving for cognitive organisation and reduction of insecurity, or for positive individual and social identity. Diffuse NIH syndrome often results in faulty evaluations of external opportunities, neglect or less thorough use of external resources, and exaggeration of the potential of internally developed ideas.

Our interviewees suggested that setting a good example and demonstrating with facts that other people's technologies, opportunities and ideas have potential and practical benefit could reverse the distrust of external assistance. Involving people in the decision-making process and informing and integrating them early are effective ways of fighting NIH syndrome, according to past studies (Lichtenthaler and Ernst, 2006). For example, one company held a workshop to devise a strategy for innovation that involved a mix of employees, some resistant to change and others with more enthusiastic views. The direct participation in the process contributed to a higher degree of success in the implementation of the changes, and even the less progressively minded participants became infected by the new ideas.

The traditional approach to innovation and resistance to open ideas can be the result of education. 'People like to be in control', said one company. They have learnt to be good project managers, but they 'think in project, not in portfolio terms'. OI might provide alternative ways of completing projects and reducing times, but it might entail compromise of other elements (e.g. quality). Some find it difficult to compromise on original aims and objectives.

There is an analogous form of cultural limitation when companies have already established external partnerships – not-invented-there (NIT) syndrome – referring to the difficulty of introducing and trusting new collaborators when there are long-established relationships with others.

Cultural limitation can affect not only OI but also innovation itself, where people are used to dealing with 'tidy' operational approaches such as 'lean manufacturing' or Six Sigma[6]. It is difficult for such organisations to play and try to innovate when so much has been invested in rigorous standardisation processes. 'A cultural identity cannot change quickly,' said another of our contributors. 'Our corporate culture tends to assume that A + B = C. The business of innovation is not really like that. It is more iterative.'

5.3 Rewards systems and career paths

The usual company approach to rewarding, promoting and motivating is based on closed innovation practices. For example, people are usually judged (and promoted) on the basis of how many patents they file. In the same 'closed' mindset, going round establishing networks and collaboration leads can be seen as having a 'jolly good time' while others are 'working hard in the lab'.

'Although we generally recognise the importance of getting to know and use what is developed externally,' said one interviewee, 'there is not the cultural and practical background which enables and motivates the employees to be completely open: there are no formal ways of career progression for someone who is an open innovation operative.'

[6] Six Sigma, is a strict quality-driven business management system that involves lengthy implementation.

Tackling the problem of rewarding openness

Company 1 'Our entrepreneurial structure recognises the identification and the bringing inside of a technology. The incentive/reward system used to be regulated by the number of patents filed. Not everyone could be a 'superstar' because it meant patenting a lot. Now, the new OI culture and structure provide the opportunity for everyone to be a superstar because no one cares anymore where the innovation comes from.'

Company 2 has a two-year management training scheme for research staff during which researchers are seconded to a strategic technology venture for a six-month spell. This is recognised as a visible step in their career progression.

5.4 Motivating individuals

- Making employees feel part of a group is a positive motivator towards accepting OI approaches.

- Try to present OI as a 'cool' and positive development, not threatening or likely to complicate people's working lives. The OI team's role should be seen to be improving people's work and performance rather then making things more difficult.

- Success stories should answer the question, 'What's in it for me?'

- There may be conflict between OI-adopters and non-adopters.

What does this mean to my business?

- Overcome NIH through
  - the involvement of people in the decision-making process
  - improvement of internal communication

  - setting a good example
  - establishing adequate reward systems
- Sometimes targets are not the best approach
- Always think about the other side of the coin when looking for appropriate motivators

6 How Does this All Fit Together? A Framework

Read this section if…

- you have read the previous sections and you want to see the complete emerging picture
- you want to see how an OI team could be embedded within a company

In the previous sections we have discussed four separate aspects of the implementation of open innovation: culture, structure, skills and motivation. In each section we present specific findings that are relevant for companies implementing an OI strategy (Figure 15).

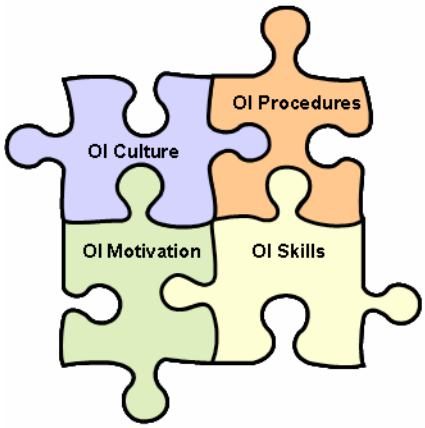


Figure 15: The OI puzzle

This report focuses on implementing OI through a dedicated OI unit for organisations that have moved towards OI with a top-down, strategically driven, centralised OI approach (see Part 1, section 3, Routes to Open Innovation). The four aspects in Figure 16 together build an integrative framework for implementing OI.

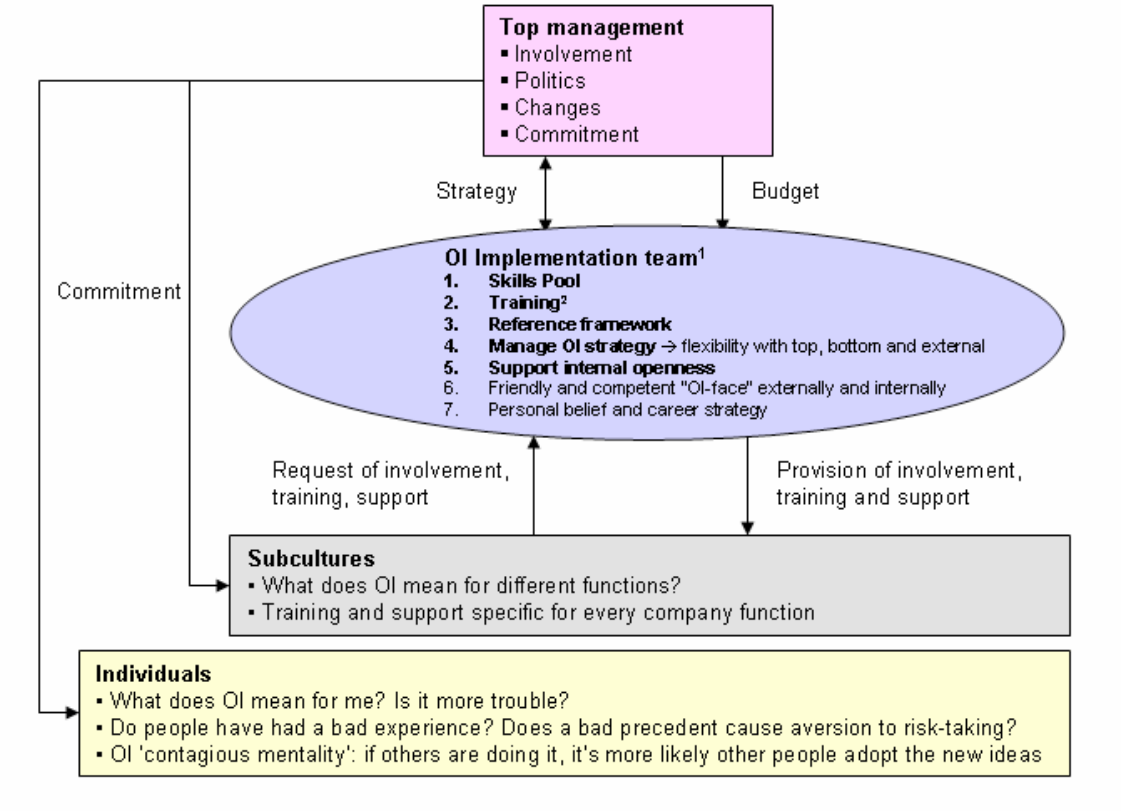


Figure 16: An integrative framework for implementing OI

The oval in Figure 16 represents the OI team, which is made up of experienced managers who have been asked to take charge of the implementation strategy. These managers have a strong technical background and business mindset coupled with a deep understanding of the company. They are enthusiastic about embracing OI and they provide the link with other company functions that support it. These managers realise that a change of mindset and of company culture is needed if the company is to embrace OI.

The framework diagram depicts the organisation of the OI team's overall activity. It also captures the relationship of the OI team with the rest of its organisation, including top management, different group subcultures, and individuals' personal perspectives. Cultural influences relative to the specific groups are listed in the boxes. We will now look in more detail at each group within the organisation.

6.1 Top management

Top management gives the fundamental push to establish an OI implementation team, and its support is instrumental in achieving OI rollout across the whole organisation. Often, by demonstrating commitment and support, top management holds the key to sway the opinion of those who feel less inclined to accept the new approach to innovation.

OI teams have to balance their relationship with top management. They can be involuntarily affected by power games, politics and changes at the top. In situations of political turmoil, the OI team may need to review its strategy frequently, win more support and balance relationships with key senior individuals in order to guarantee continuation of funding and corporate commitment to their programme of action.

6.2 Sub-cultures

Many sub-cultures can exist within large multinational companies (Martin and Siehl, 1983; Badawy, 1988; Hebda et al., 2007) and different perspectives can be seen even within the same function (e.g. R&D). In order to support change and motivate people within diverse groups – for example, scientists and engineers – different approaches need to be adopted. See section 3.2 in Part 1 of this report.

6.3 Individual perspectives

Change will inevitably impact on individuals. Personal preferences, career history and trajectories can all influence an individual's attitude towards the adoption of OI. Sometimes, where there is not enough encouragement to take risks, there can be a simple fear of failure. All these issues could manifest themselves in not-invented-here syndrome (NIH) (Lichtenthaler and Ernst, 2006). On the other hand, the feeling of not being alone can give a sense of community and a new drive for individuals to be part of the project.

Individual perspective

In one of the FMGC companies observed, project managers like to be 'in control' of their development project. They have developed over time as project managers with targets and deliverables: 'they think in project terms not in portfolio terms.' They are also carrying the legacy of a previous mentality change from the 1970s when the company's R&D strategy was open but too chaotic and was consequently changed to a closed approach in which each project needed to be managed from A to Z. For these managers OI means abandoning old projects on which they have worked for a long time and which should deliver innovation in the long term. R&D-staff, who are supposed to develop and implement an OI strategy, are afraid of losing their jobs because they fear that their competencies might be replaced by outside innovations.

The OI team has to balance all these perspectives in the development of an OI rollout strategy. The team itself should be able to count on a full set of skills and provide access to the right skills at the right time in its function as a support group.

6.4 Approaches to OI

The various approaches observed in our case studies and workshops are summarised in the following key points (see also Figure 16).

Provide the right skills pool To enable successful interactions with the outside world, a particular set of skills is required. It is very unlikely that all these skills will be found in single individuals. Within modern multinational companies, however, the OI implementation team is likely to have a well-stocked pool of senior managers to draw on. The skills required fall into four categories, introspective, extrospective, interactive and technical (detailed in Table 6 in section 4, Part 2).

Provide training on what to do, when to do it, and what to avoid. Teach new ways of thinking about what OI means for the company, while spelling out what OI will mean for each person and job.

Reference framework The delivery of training is often assisted by a framework that clarifies what OI is and what it implies. A good example is the Want→Find→Get→Manage model (see section 4.1 in Part 2 of this report).

Manage OI strategy Frequent reviews are needed to update the OI rollout strategy and adapt it to the needs of different groups. In particular, alignment with top management is required to ensure commitment, budget and support.

Provide support and internal openness Act as internal gatekeepers who listen to problems, connect the right people, facilitate and lubricate the internal works of innovation. Create knowledge-sharing platforms typically initiated by natural leaders who can involve others and communicate their enthusiasm.

This approach also follows psychological theories, which state that those who perceive new practices as congruent with their values are likely to take them on board and become enthusiastic about them. If the change is imposed through regulation and punishment, adoption is not substantiated by real cultural change. A good fit with the users' values is needed (Klein and Sorra, 1996). It is important to recognise that the same implementation methods might not fit or suit all organisations.

One of our interviewees said that OI implementation consultants often seem to ignore the cultural characteristics of the company when suggesting new approaches. This supports what Schein (1992) suggests: some organisational devices will be countercultural for some organisations, but not for others.

Personal belief in OI and career strategy Change management needs leaders and champions who can enthuse others about the importance of change (Tushman and O'Reilly III, 2002). This requires a strong personal belief in the benefits of adopting OI. The path for OI adoption can be long and difficult with many obstacles along the way. In order to provide consistent support, OI team members need to find personal motivation in the task and see it as part of their own overall career strategy.

The friendly face of the company Internally, OI teams show that there are real and successful people behind OI implementation. Externally, they are the brokers of relationships with prospective partners.

What does this mean to my business?

Next steps

- There will be different issues with different partners (universities, start-up companies, customers, etc.)
- This report only focuses on issues at the micro or internal level of the company, but there are other issues on a macro level: partnership management, alliance management, trust building, IP management, etc.
- Suggestions for further reading and resources for OI implementation are in section 8.

7 Limitations and Suggestions for Future Research

The companies participating in our study came from different sectors and the interviewees themselves were of different nationalities. In this study we did not consider any cultural issue beyond the company itself. For example, we did not take into account national and industry influences, the importance of which is acknowledged in the literature. From our interviews across sectors, it was clear that OI means different things to different industries. However, common to all the companies was recognition that OI represents an opportunity for them to improve their innovation capability and confront their business challenges. All the contributors to our study showed a great interest in understanding and sharing practice about ways to implement OI in their business.

According to one participant, 'collaborating with others is intrinsically challenging as it is somehow contrary to our nature'. Typically, collaborations and alliances need mutual understanding and compatibility between each party's culture and approach. Lack of trust between prospective partners has been mentioned numerous times as the main reason for the failure of relationships. As one of our interviewees said: 'Speaking about IP is often overemphasised: for most this means that there is no trust'. It is important to maintain a balance and guarantee a fair share of benefits to all the collaborators. This can be difficult if the parties have very different metabolisms, for example, when large and small companies engage in any form of alliance (Minshall et al., 2008). One approach to managing relationships is to involve third parties, such as brokers, intermediaries who might evaluate each party's specific contributions, or lawyers, etc.

Another aspect that we have not examined in depth in this report is the role of OI within the innovation processes of the firm; for example, we have not distinguished between radical and incremental processes. Every company has a business focus on which most decisions depend. Open innovation could represent an opportunity to test and enter new business trajectories (i.e. expanding current businesses or finding new ones). Companies can often produce examples of when this has happened, but in general these remain exceptions rather than the norm, as most resources are directed towards the core business

focus. Resource allocation processes should distinguish between incremental and breakthrough innovation to avoid the risk of overlooking important technological opportunities and threats. There is a tendency to allocate resources towards short-term innovation relevant to existing business. However, companies should be 'ambidextrous' (Tushman and O'Reilly III, 2006) and support both innovation types through a diversification of innovation paths.

8 Further Resources

8.1 Managing partnerships between start-ups and established firms

http://www.ifm.eng.cam.ac.uk/ctm/research/projects/alliances.html

As companies face pressure from increased competition, shorter product life cycles and growing product complexity, many find they need to change the way they develop new technologies, products and services. In many sectors there has been a trend away from a largely closed to a more open model of innovation as companies realise they can no longer afford to rely solely on their own R&D and need to acquire ideas from others.

Within this environment start-ups can be an important source of ideas for larger companies. Technology-based start-ups typically lack the strategic and operational rigidities that sometimes stifle innovation in established firms. On the other hand, start-ups have limited resources and often struggle to access the complementary assets they need to bring their ideas to market.

Bringing together start-ups and established firms in mutually beneficial partnerships seems an obvious solution. Research shows that making such partnerships work can be problematic. However, there are ways to increase the chances of success. This website provides access to resources that support the development of successful partnerships.

8.2 Looking for opportunities: intelligence

http://www.ifm.eng.cam.ac.uk/ctm/intelligence.html

Intelligence helps to shape the technology strategy of firms, influencing areas such as development and technology acquisition.

Technological information has become an increasingly important advantage for technology-based companies facing shorter technology life cycles and a more globally competitive business environment. Companies have dedicated progressively more resources to the development of bespoke technology intelligence systems, realising that intelligence activities are important assets for business success.

Intelligence comes from external sources but it may also be contained within the organisation – explicitly or tacitly – if it has already been acquired by an internal party. Firms need to be able to find and use this information quickly and easily, as well as acquiring the information they need from external sources.

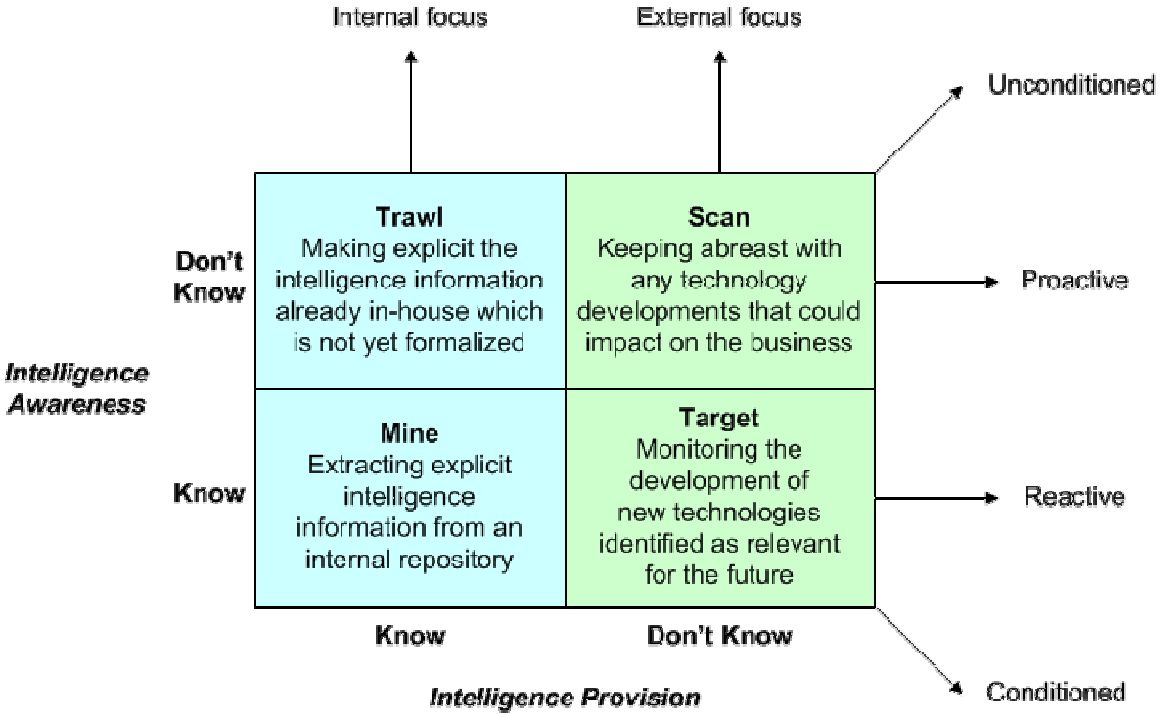


Figure 17: System model for technology intelligence[7]

Researchers created a three-level model comprising the framework, system, and process of acquiring technology intelligence (TI). The model was tested through case studies of technology intelligence systems in technology-based companies.

[7] Adapted from Kerr et al., 2006.

Technology intelligence systems include the four modes described in Figure 17. Each mode needs to be supported by the appropriate people, processes and infrastructure.

Recent work (Mortara et al., 2009a and 2009b) has been directed to understanding how to implement and to expand the coverage of TI activities.

8.3 Cambridge Open Innovation Network (COIN)

http://www.ifm.eng.cam.ac.uk/ctm/teg/openinnovation.html

Access to this site is restricted to firms collaborating on our research projects.

8.4 Links

- http://blog.openinnovation.net
- http://www.openinnovation.eu/
- http://www.openinnovation.net/
- Centre for Open Innovation, Berkeley: http://openinnovation.haas.berkeley.edu/Home_COI.html

8.5 Further reading

- Chesbrough H. (2003): *Open Innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press, Boston, MA, USA.
- Chesbrough H. (2003): The Era of Open Innovation. *MIT Sloan Management Review* 44(3): 35–41.

Three articles describing concepts for the **implementation** of open innovation:

- Witzeman S, Slowinski G, Dirkx R, Gollob L, Tao J, Ward S, Mirtaglia S, (2006): Harnessing External Technology for Innovation. *Research Technology Management* 49(3): 1927.
- Kirschbaum R. (2005): Open Innovation in Practice. *Research Technology Management* 48(4): 24–28.
- van de Vrande V, Lemmens C, Vanhaverbeke W. (2006): Choosing Governance Modes for External Technology Sourcing. *R&D Management* 36(3): 247–363.
- Docherty M. (2006): Primer on 'Open Innovation': Principles and Practice. *Vision* PDMA (Product Development and Management Association) (April): 13–17.

9 References

Alvesson M, Berg P O. (1992): *Corporate culture and organizational symbolism*. Berlin, de Gruyter.

Badawy M K. (1988): How to prevent creativity mismanagement. *Research Management* 29(4): 28–35.

Brown A D. (1998): *Organisational Culture*. London, Pitman.

Cammann C, Nadler D A. (1976): Fit your control systems to your managerial style. *Harvard Business Review* 54(1): 65–72.

Chakravarthy B, Gargiulo M. (1998): Maintaining leadership legitimacy in the transition to new organizational forms. *Journal of Management Studies* 35(4): 437–456.

Chesbrough H. (2003): *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, Harvard Business School Press.

Clagett R P. (1967): *Receptivity to Innovation – Overcoming NIH*. MIT.

Cohen W M, Levinthal D A. (1990): Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly* 35(1): 128–152.

Docherty M. (2006): Primer on 'Open Innovation': Principles and Practice. *Vision* PDMA (Product Development and Management Association) (April): 13–17.

Dunford R, Palmer I, Beneviste J, Crawford J. (2007): Coexistence of 'old' and 'new' organizational practices: Transitory phenomenon or enduring feature? *Asia Pacific Journal of Human Resources* 45(1): 24–43.

Gerybadze A, and Reger G. (1999): Globalization of R&D: recent changes in the management of innovation in transnational corporations. *Research Policy* 28(2–3): 251–274.

Hebda J M, Vojak B A, Price R L. (2007): Motivating Technical Visionaries in Large American Companies. *IEEE Transactions on Engineering Management* 54(3): 433–444.

Katz R, Allen T J. (1982): Investigating the Not Invented Here (NIH) Syndrome – a Look at the Performance, Tenure, and Communication Patterns of 50 R&D Project Groups. *R & D Management* 12(1): 7–19.

Kerr C I V, Mortara L, Phaal R, Probert D R. (2006): A conceptual model for technology intelligence. *International Journal of Technology Intelligence and Planning* 1(2): 73–93.

Klein J K, Sorra J S. (1996): The challenge of innovation implementation. *Academy of Management* 21(4): 1055–1080.

Lichtenthaler U, Ernst H. (2006): Attitudes to externally organising knowledge management tasks: a review, reconsideration and extension of the NIH syndrome. *R & D Management* 36(4): 367–386.

Martin J, Siehl J. (1983): Organizational Culture and Counterculture: An Uneasy Symbiosis. *Organizational Dynamics* 12(2): 52–64.

Minshall T H W, Mortara L, Elia S, Probert D. (2008): Development of practitioner guidelines for partnerships between start-ups and large firms. *Journal of Manufacturing Technology Management* 19(3): 391–406.

Mortara L, Kerr C I V, Phaal R, Probert D. (2009a). A toolbox of elements to build technology intelligence systems. *International Journal of Technology Management* 47(4). (forthcoming 2009)

Mortara L, Kerr C I V, Phaal R, Probert D (2009b). Technology intelligence practice in UK technology-based companies. *International Journal of Technology Management* 48(1) (forthcoming 2009).

Pheasey D C. (1993): *Organizational Cultures: Types and Transformation*. New York, Routledge.

Schein E H. (1992): *Organizational Culture and Leadership*. San Francisco, Jossey-Bass Inc.

Tirpak T M, Miller R, Schwarts L, Kashdan D. (2006): R&D Structure in a Changing World *Research-Technology Management* 49(5): 19–26.

Trompenaars A. (1998): *Riding the waves of culture – understanding diversity in global businesses*. Burr Ridge, IL, Irwin Professional Pub.

Tushman M L, O'Reilly III C A. (2002): *Implementing strategic change. Winning through innovation: a practical guide to leading organisational change and renewal.* Boston, MA, Harvard Business School Press.

Tushman M L, O'Reilly III C A. (2006). *Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change. Managing Innovation and Change.* Sage Publications Inc.

Witzeman S, Slowinski G, Dirkx R, Gollob L, Tao J, Ward S, Mirtaglia S, (2006): Harnessing External Technology for Innovation. *Research Technology Management* 49(3): 1927.