executive briefing

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Open Collective Innovation

The power of the many over the few

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The Advanced Institute of Management Research (AIM) develops UK-based world-class management research. AIM seeks to identify ways to enhance the competitiveness of the UK economy and its infrastructure through research into management and organisational performance in both the private and public sectors.

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about AIM

AIM consists of:

- Over 300 AIM Fellows and Scholars – all leading academics in their fields…
- Working in cooperation with leading international academics and specialists as well as UK policymakers and business leaders…
- Undertaking a wide range of collaborative research projects on management…
- Disseminating ideas and shared learning through publications, reports, workshops and events…
- Fostering new ways of working more effectively with managers and policymakers…
- To enhance UK competitiveness and productivity.

AIM's Objectives

Our mission is to significantly increase the contribution of and future capacity for world class UK management research.

Our more specific objectives are to:

- Conduct research that will identify actions to enhance the UK's international competitiveness
- Raise the quality and international standing of UK research on management
- Expand the size and capacity of the active UK research base on management
- Engage with practitioners and other users of research within and beyond the UK as co-producers of knowledge about management

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AIM research themes

Current AIM research projects focus on:

UK productivity and performance for the 21st century.

How can UK policymakers evaluate and address concerns surrounding the UK's performance in relation to other countries?

National productivity has been the concern of economists, government policymakers, and corporate decision-makers for some time. Further research by scholars from a range of disciplines is bringing new voices to the debates about how the productivity gap can be measured, and what the UK can do to improve the effectiveness of UK industry and its supporting public services.

Sustaining innovation to achieve competitive advantage and high quality public services.

How can UK managers capture the benefits of innovation while meeting other demands of a competitive and social environment?

Innovation is a key source of competitive advantage and public value through new strategies, products, services and organisational processes. The UK has outstanding exemplars of innovative private and public sector organisations and is investing significantly in its science and skills base to underpin future innovative capacity.

Adapting promising practices to enhance performance across varied organisational contexts.

How can UK managers disseminate their experience whilst learning from others?

Improved management practices are identified as important for enhancing productivity and performance. The main focus is on how evidence behind good or promising practices can be systematically assessed, creatively adapted, successfully implemented and knowledge diffused to other organisations that will benefit.

executive summary

Changing contexts

The innovation context is changing. The production of knowledge is accelerating. Knowledge creation is now a globally distributed activity. Globalisation has massively increased the range of markets and segments – putting pressure on innovation search routines to cover much more territory. The proliferation of the internet and emergence of large-scale social networks necessitates the development of new approaches to innovation. The involvement of active users in innovation is accelerating.

As a result of the changing context in which innovation is taking place established organisations need to review their approaches to innovation management.

There is an emerging picture of the type of innovation that is best suited to organisations operating in the modern globalised business world.

More is better

Innovation is essentially about weaving together different knowledge strands – technical, market, financial and so on – to create value. The challenges are how to find good ideas and how to take them forward. Forget any image of the lone inventor in the garage, though. Typically, organisations develop routines to search for ideas using their existing networks, whether that involves employees, knowledge, customers or customers. An extensive range of solutions for a particular problem can be solved this way.

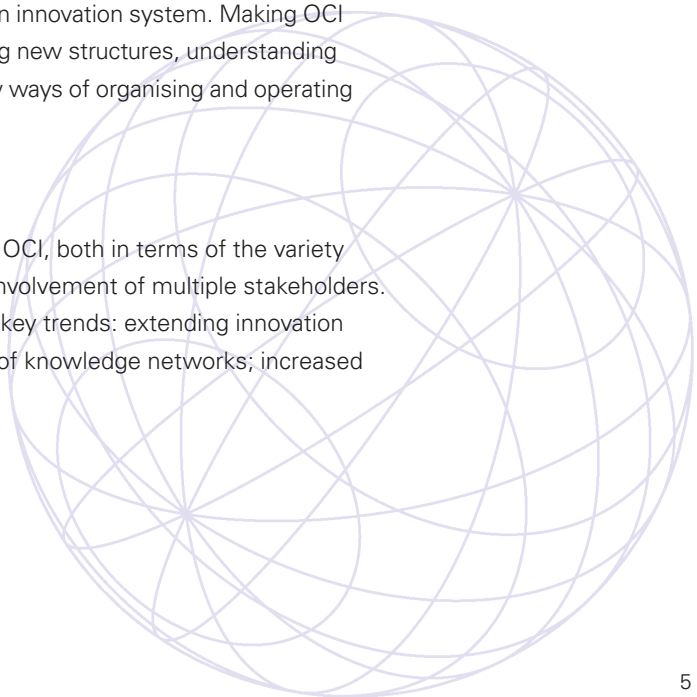
One of the main reasons why innovation happens in an organised form, rather than through an inspired but lone innovator, is that more minds equals more ideas (fluency), and a greater variety of ideas (flexibility). Other reasons that more is better include: the ability to gain different perspectives and fresh thinking; being prompted by someone else's idea to move along new pathways; better testing and revision of ideas; harnessing the power of active users.

Open collective innovation (OCI)

There is an emerging picture of the type of innovation that is best suited to organisations operating in the modern globalised business world. This type of innovation is **open collective innovation (OCI)**: *open* – involving multiple and distributed players; *collective* – based on the principle that many minds generate a high volume and variety of ideas; and *purposive*, in that it is organised as an innovation system. Making OCI happen may involve learning new skills, developing new structures, understanding and harnessing new technologies and finding new ways of organising and operating at a network level.

Key trends in openness

Increasing openness is an underlying principle of OCI, both in terms of the variety of knowledge sources and the participation and involvement of multiple stakeholders. In particular, it involves the convergence of three key trends: extending innovation search; greater engagement between members of knowledge networks; increased stakeholder participation.



Innovation for all

OCI lowers the entry barriers to participation in innovation massively increasing both the volume and variety of ideas generated and the problem-solving power to work those up into usable form. This engine for innovation does not require the resources of a giant corporation – OCI is becoming widely available as an option for small and resource-constrained players. To realise the full potential of OCI, however, there has to be an emphasis on *configuration* – finding the best ways to set up in order to benefit from OCI.

Advanced internet-based technologies have the potential to create powerful platforms for open collective innovation.

Powerful platforms for innovation

Advanced internet-based technologies have the potential to create powerful platforms for open collective innovation. We have identified five complementary approaches that organisations can engage in.

- *Innovation contests* – call for solutions to clearly defined innovation challenges. They must: be widely publicised and garner significant recognition – usually using the internet, social software features and web 2.0; structure innovation competition problems in a way that motivates competent innovators to enter, and that will produce innovative solutions that benefit the organisation.
- *Innovation markets* – bring together supply and demand for innovation related activity in the virtual world. They use web platforms as intermediaries to connecting innovation seekers (typically organisations) who announce innovation problems, and innovation providers who propose concrete solutions or concepts (typically single or team innovators). Some offer a provider-driven innovation market. Others are led by community principles.
- *Innovation communities* – enable innovators to share and develop ideas, discuss concepts and promote innovations. These Web 2.0 and social software based innovation communities emerge from groups that come together voluntarily and independently to create innovative solutions in a joint effort. As organisations understand how useful innovation communities are for creating innovation, increasing numbers of firm-sponsored innovation communities are emerging.
- *Innovation toolkits* – internet-based innovation toolkits provide an environment in which users develop solutions step-by-step. There are three types of toolkit: toolkits for user innovation; toolkits for idea transfer; toolkits for user co-design. The biggest challenge in setting up any innovation toolkit is to define the solution space it offers: too narrow a focus will restrict users' creativity, while too many options may confuse users and thus demotivate or even frustrate users and equally restrict the range of ideas, designs or innovations that can be expected. The key point – toolkits need a balanced approach.
- *Innovation technologies* – enable progress from the concept level of open innovation of products to open fabrication and manufacturing. Examples include 3D-scanners, 3D-printers or laser cutters. No specific qualifications are needed to profit from these technologies. 3D-printers (i.e. printers that create three-dimensional objects out of plastic powder, for example) allow a fast and immediate construction of prototypes during development and thus enable rapid prototyping. They also enable individuals or organisations to design and produce customised products instantly.

In an innovation frame of mind

Embracing trends in openness and engaging in open networks of innovation is not enough on its own to maximise the chances of effective and successful innovation. Organisations must also be in the right frame of mind to innovate. Our mental models of innovation shape what we pay attention to, what we prioritise, what we organise and manage. If these models are flawed then our approach to managing innovation also risks being flawed.

Innovation today is highly networked, globally distributed, enabled by powerful information and communication technologies and engaging a rich variety of internal and external stakeholders. This massively increases the potential fluency and flexibility available to us as innovators. But it also means learning some new tricks in terms of skills, tools and mechanisms to organise and manage at this level.

Dynamic capability

Innovation management is essentially about *dynamic capability*, requiring organisations to review their approaches and revise their routines and patterns of behaviour, in the face of a constantly shifting environment.

Organisations must also be in the right frame of mind to innovate.

Organisations and individuals must ask three core questions:

- Of our routines, which do we need to do more of and strengthen?
- Which should we do less of, or even stop?
- Which new and different routines do we need to add?

The potential benefits for new and established organisations from using open connected innovation are huge. To realise these benefits, however, organisations must be willing to let go of old routines which have served well but may no longer be relevant, and embrace new approaches.

introduction: innovation – the new reality

Innovation is increasingly important. The search can involve both incremental exploitation – doing what we do but better – and more extensive exploration – doing something different.

Changing contexts

However, the powerful technological shifts around information and communication, coupled with major social changes – in particular the rise of social networking – mean that the context within which innovation takes place is significantly different to even a decade ago.

The production of knowledge is accelerating. The OECD estimates, for example, that $750bn is spent each year in the public and private sector creating new knowledge – and hence extending the frontier along which breakthrough technological developments may happen.

Knowledge production is now a globally distributed activity. Increasingly the production of knowledge involves new players, from across the world, especially in emerging markets like the BRIC (Brazil, Russia, India, China) nations. Consequently there is a greater need for innovation search routines to cover a much wider area.

Globalisation has massively increased the range of markets and segments – putting pressure on innovation search routines to cover much more territory. These are often far removed from traditional experiences, such as the 'bottom of the pyramid' conditions in many emerging markets or along the so-called long tail – the large number of individuals or small target markets with highly differentiated needs and expectations.

The proliferation of the internet as a marketing channel necessitates the development of new approaches to innovation. At the same time emergence of large-scale social networks in cyberspace poses challenges in market research approaches – for example, Facebook currently has over 500 million active users.

User-active innovation is not a new concept, but the active involvement of users is accelerating. In sectors like media, the line between consumers and creators is increasingly blurred – for example, on YouTube in 2010 more than 13 million hours of video were uploaded, and YouTube mobile alone gets over 100 million views a day (www.youtube.com).

The development of information and communications technologies around the internet and broadband has enabled and reinforced alternative social networking possibilities. At the same time the increasing availability of simulation and prototyping tools has reduced the separation between users and producers.

As a result of the changing context in which innovation is taking place established organisations need to review their approaches to innovation management, developing alternative or complementary approaches more appropriate for the changing situation. And new entrants can find opportunities to play the innovation game with changed rules.

Collecting ideas in a way that allows people to hear what others have suggested usually produces a '*yes and…*' effect.

The many over the few

Innovation is essentially about weaving together 'knowledge spaghetti', combining different knowledge strands – technical, market, financial, legal, etc. – to create value. Whatever type of value is being created the challenges are the same – how to find good ideas and how to take them forward.

A common perception of innovation is the lone inventor in the garage, or corporate equivalent of the garden shed, waiting for the moment of inspiration. That is not the way innovation tends to happen, though. Typically, organisations develop routines to search for ideas using their existing networks, whether that involves employees, knowledge, customers, or suppliers. An extensive range of solutions for a particular problem can be developed in this way.

i More means better – for a number of reasons.

One of the main reasons why innovation happens in an organised form, rather than through an inspired but lone innovator, is that more minds equals more (fluency), as well as a greater variety of (flexibility), ideas.

Radical and discontinuous innovation may be constrained by the way that organisations frame their world. Mobilising different viewpoints is, therefore, a powerful way of breaking out of this frame – whether through creativity training, which uses techniques to stretch thinking in new directions, deliberately hiring for diversity, or by employing external consultants to bring fresh thinking to old problems. This is also, of course, the classic role of the entrepreneur – to reframe the problem, identify opportunities, offer fresh perspectives, and develop solutions which allow those opportunities to be exploited.

Collecting ideas in a way that allows people to hear what others have suggested usually produces a '*yes and…*' effect. People are prompted by someone else's idea to move along new pathways. Often it is not the initial brilliant idea so much as its continuing refinement and development, shaping and extending it, which leads to something more robust and useful.

Remember too, that innovation is not like in cartoons – a light bulb flashes on above someone's head and the world changes. Breakthrough innovation is not like that. Translating ideas into reality is a process of problem-solving, removing the bugs from the new system and ironing out the creases before the innovation is ready for widespread adoption. The more minds at work, the more powerful the contribution.

User-led innovation is a powerful force – especially when it engages a large community of frustrated innovators. Users are rarely passive in the innovation process – they are often frustrated with the available solutions and sometimes that frustration drives them to create their own alternative solutions. There is often a class of user whose needs require particular solutions which lie far ahead of the mainstream. Examining the ways in which users approach the problem can identify different solution pathways which have much wider relevance when scaled and developed. Today's extreme users may provide clues for tomorrow's mainstream innovation.

An emerging new way of dealing with the innovation challenge is what we term open collective innovation (OCI).

ii Open collective innovation as a solution

These principles – fluency, flexibility, building on ideas, doing the hard work, harnessing the power of active users – represent key building blocks for the way in which we might choose to organise the innovation process. At their heart is the objective of employing as many minds as possible, and making the most effective use of those minds.

Find ways of tapping into shared creativity which build on these principles and you have a powerful engine for innovation. The growing challenge – and opportunity – comes as executives in organisations realise that not all the smart people work inside their organisation. Spread the net more widely and there is the chance to add creative minds to the innovation process, to increase even further the fluency and flexibility, and shape and develop good ideas into great ones.

An emerging new way of dealing with the innovation challenge is what we term open collective innovation (OCI). Take the following examples:

The business model of Netflix, the online and mail-order film rental business, depends on having a good understanding of what people want, tailoring advertising and offers to their preferences. In 2006, in an effort to improve the algorithm it used to develop these recommendations, it offered a $1m reward – the Netflix Prize – to anyone who could improve the performance of its algorithm by 10% or better. Over 18,000 contestants from 125 countries registered within three months; within three years, there were 51,000 contestants from 186 countries, with 44,000 valid entries. The huge, global – if temporary – R&D laboratory that Netfix created from the competition, produced over 7000 better algorithms.

As the year 2000 approached mining company Goldcorp was wrestling with the challenge of finding new sources of gold. In a radical departure from conventional surveying approaches the firm opened up its geological database and asked for ideas about where it should prospect. Tapping into the combined insights of 1200 people from 50 countries helped it locate 110 new sites, 80% of which produced gold. The business has grown from a market value of $100m in 1999 to over $36bn today.

When Facebook wanted to translate around 30,000 key phrases from the site into other languages, it enlisted the help of its users rather than commission an expert translation service. The Facebook crowdsource project began in December 2007. Within two months 8000 volunteer developers had registered, and within three weeks the site was available in Spanish, with pilot version in French and German also online. Within one year Facebook was available in over 100 languages and dialects, and it continues to benefit from continuous updating and correction via its user community.

What these examples have in common is that they are all typical of an emerging picture of innovation which is:

- *open* – involving multiple and distributed players
- *collective* – based on the principle that many minds generate a high volume and variety of ideas

It is also purposive, in that it is organised as an innovation system. Making OCI happen is not without difficulties, however, and will involve learning new skills, developing new structures, understanding and harnessing new technologies and finding new ways of organising and operating at a network level. This Executive Briefing looks at this emerging pattern of open collective innovation, examines its component elements and explores the ways that some organisations are leveraging the power of OCI to improve their competiveness and performance.

The research

The research that underpins this Executive Briefing is taking place at a number of locations, notably the Center for Leading Innovation and Cooperation (CLIC) at the HHL – Leipzig Graduate School of Management, the University of Erlangen-Nuremberg, and the University of Exeter.

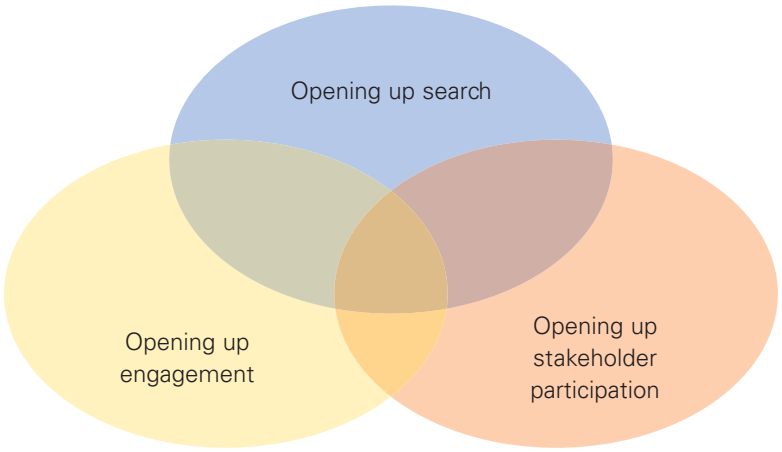
Primarily, though, it is itself an example of open collective innovation – involving a widespread network of Innovation Labs across 15 countries. The underlying idea of Innovation Labs is that they provide a laboratory, a meeting point for sharing experience, trying ideas out and developing new understanding of issues at the innovation frontier and practical tools for managing them.

The Innovation Lab Initiative (see www.innovation-lab.org for more details) was launched in the UK, Denmark and Germany as an AIM Initiative and now involves over 250 public and private sector organisations and 40 academic research institutions. It is supported by AIM (www.aimresearch.org), the Dr Theo and Friedl Schoeller Foundation through the Dr Theo and Friedl Schoeller Research Center for Business and Society (www.schoeller-research.org), the Peter Pribilla Foundation (www.pribilla-stiftung.de) and through various country-level research programmes.

openness 1 – network effects and innovation

Increasing openness is an underlying principle of OCI, both in terms of the variety of knowledge sources and the participation and involvement of multiple stakeholders. In particular, it involves the convergence of three key trends – opening up the fields of search, employee engagement and stakeholder participation (see Figure 1).

Figure 1: Convergence towards Open collective innovation (OCI)



i Opening up of search

Open innovation is founded on the idea that providing access to external inputs enhances an organisation's innovation efforts. It suggests, therefore, that knowledge flows in and out of the organisation should be enhanced as part of the innovating process. Searching beyond organisational boundaries and managing the complex knowledge flows through multiple technological and social channels is essential.

This can happen in many ways. Probably the famous example is Procter and Gamble. In the late 1990s, Procter and Gamble faced a number of innovation challenges. R&D costs were rising rapidly. There were also many instances of innovations which they might have made but passed on – only to find someone else doing so and succeeding. As CEO Alan Lafley explained: "Our R&D productivity had levelled off, and our innovation success rate – the percentage of new products that met financial objectives – had stagnated at about 35 per cent."

In response, Procter and Gamble implemented 'connect and develop' – an innovation process based on the open innovation principles. The original target was to get 50% of innovations coming from outside the company. By 2006 over 35% of new products had elements which originated from outside. R&D productivity has increased by nearly 60% and the innovation success rate more than doubled. Innovation increased, R&D spend reduced from 4.8% of turnover in 2000 to 3.4%.

A number of organisations such as the BBC, Lego and Ordnance Survey, for example, are increasingly extending their networks to engage communities of software developers, sharing source code and inviting them to "use our stuff to build your stuff". This is the highly successful open model that Apple used in building the Apple Developer Connection, an online community allowing thousands of developers to create applications which make the core product more attractive.

Crowdsourcing is another variant of open innovation, where companies open up their innovation challenges to the outside world, often in the form of a web-enabled competition. Swarovski, the crystal company, has deployed crowdsourcing approaches to expand its design capacity, whilst Audi and BMW use it to prototype and explore new features. The model has been applied in a variety of settings including public sector and social enterprise.

Recombinant innovation is another variant of open innovation, using ideas developed in one world to good effect in another.

Leading lighting manufacturer OSRAM initiated a user idea generation platform. Designers and interested persons worldwide were invited to join the 'LED-Emotionalize your light' community to create innovative light solutions with the latest LED technology. The goal of the contest was to involve interested users, developers, designers and engineers in the innovation process in a new and exciting manner. Within only eleven weeks 909 participants from nearly 100 countries joined the lighting community to showcase their talent and submit their ideas including designs, technical solutions as well as application scenarios of LED solutions. In total, they created 568 LED ideas and concepts in different segments such as 'lamps', 'living', 'furniture', 'bathroom', 'outdoor' or 'toys and children'.

Participants evaluated the submitted ideas using a three-stage evaluation scheme: an intuitive evaluation; a detailed criterion based evaluation; and a comparative evaluation where it was possible to rank ideas in comparison to others. The 10,793 evaluations made were used by the jury in order to select the winning ideas. The participants spent several thousand hours of their spare time on the platform. These results are an impressive demonstration of how OCI can be realised within an open web-based setting.

Open innovation is not simply about casting a wide net. It may also involve a more intimate exchange of ideas, requiring a high degree of trust between new partners who may be able to share ideas and intellectual property but who would not normally have made such a connection. Third party agencies – innovation brokers – often act as intermediaries that bring parties together and enable the sharing of ideas in a controlled and high trust fashion. Models used range from online dating agencies through to more people-based approaches, such as the trusted intermediary model used by the Innovation Exchange which places skilled individuals within companies and then enables those individuals to regularly share information under high trust conditions.

Recombinant innovation is another variant of open innovation, using ideas developed in one world to good effect in another. Cross-sector learning throws some unlikely partners together and opens up new ways of looking at old problems. For example low cost airlines like Ryanair and Easyjet learned about rapid turnaround in airports by watching pit stop teams in Formula 1, whilst the UK National Health Service is learning powerful lessons about patient safety from oil rigs, chemical plants and aircraft cockpits.

Open innovation of this kind shifts the emphasis from knowledge creation to knowledge flows and requires increasing connectivity across the innovation system. Characteristic of the move towards open innovation are the growing roles of intermediaries and the significant increase in the use of advanced networking and communication technologies.

ii Opening up engagement

"If only x knew what y knows," is a statement that resonates with most large contemporary organisations as they wrestle with the paradox that although they have hundreds or thousands of knowledgeable people spread across their organisations, there is comparatively little interconnectedness between them.

Apart from occasional formal project activities which connect the pieces, many of these knowledge elements remain unconnected. This issue was the catalyst for the creation of the knowledge management movement in the late 1990s. A popular response at the time was to make extensive use of information technology in order to try and improve connectivity. The trouble was, although the computer and database systems were excellent at storage and transmission, they didn't necessarily help make the connections that turned data and information into useful – and used – knowledge. A spaghetti model of innovation was needed – ensuring that people get to talk to others and share and build on each other's ideas.

Increasingly, firms realise that what they really need are improved knowledge networks inside the organisation. So, for example, Procter and Gamble's successes with 'Connect and Develop' owes much to mobilising rich linkages between people who know things within P&G's giant global operations and outside it. It uses communities of practice, internet-enabled clubs where people with different knowledge sets can converge around core themes, and deploys a small army of innovation scouts licensed to act as prospectors, brokers and gatekeepers for the knowledge that flows across the organisation's boundaries.

Building better knowledge networks may be relatively easy in a three or four person business, but it gets much more difficult across a typical sprawling multinational corporation. Today, though, there is greater understanding about how to build more effective innovation networks within such businesses.

Extensive research on high involvement innovation, engaging employees in organised innovative activities across an organisation, has repeatedly demonstrated the value of this approach in terms of productivity improvement. Until recently this emphasised incremental improvements – kaizen. Recent work enabled by corporate intranets and social networking trends, however, has shifted focus on to more radical innovation, tapping into internal entrepreneurship through innovation competitions, for example, dragging the traditional suggestion box scheme into the 21st century and adding the important dimension of interactivity.

Munich Airport, for example, is regularly rated as the most innovative airport in Europe and one of the leading innovators worldwide. As a strategic innovator, it has a clear innovation strategy, dedicated innovation budget, impressive history of innovation successes, and an impressive pipeline of future innovations. It also explicitly engages employees across intra-organisational boundaries in focused innovation initiatives.

Models of this kind are finding widespread application not only within the private sector but also across large public sector organisations.

As part of the Germany-wide project 'Open-I: Open Innovation within the Firm' (www.open-i.eu), for example, the airport ran focused innovation projects with employees that traditionally had no responsibility for innovation activities. On the topic of hassle-free parking, for instance, ideas were collected, discussed, and further developed into a set of well-defined business plans for innovation investments. The process was run online and offline with the support of the 'Open-I Tool', an online community platform with distributed whiteboard facility, and dedicated open innovation process support for employees across the boundaries of business units, roles and responsibilities.

Within these kinds of systems there is the possibility for sharing and building on ideas, and voting and mobilising support for strong ones – a feature which appears to engage and motivate employees.

Models of this kind are finding widespread application not only within the private sector but also across large public sector organisations. Mobilising internal entrepreneurship, especially around social issues, is becoming a central element in the innovation strategies being deployed in the search for both efficiency savings through incremental innovation and more radical service development.

Another important variant on this theme is the growing use of formally constructed learning networks – groups of organisations that converge to improve some aspect of their performance. Examples of these include supply chains, sectoral and regional clusters, and topic networks bringing together organisations with shared interests in product or process development.

With each example there is a commitment to building a network within which shared, co-operative activity takes place and through which emergent properties can be generated. For example, active management of supply chains through various kinds of supplier development programmes are a well-established feature of many sectors. They arise from a recognition that the performance of large organisations embedded in a supply chain depends on their ability to orchestrate improved performance from all the links in that chain, including small and managerially inexperienced players. Therefore, it is worth investing a variety of development resources in order to upgrade performance across the entire network – as doing so can generate system effects in which the whole becomes greater than the sum of its parts.

Small firm collaboration

The dominance of Japanese motorcycle manufacturers, including Honda, Yamaha, and Suzuki, which is built on offering high quality, reliable, low cost models, is being challenged by Chinese firms.

The competitive edge of the Chinese firms is based both on price but also a broad range of non-price factors including time to market, new designs, and high quality. This advantage is being achieved through an emergent network model which builds on process networks of collaborating small firms.

A core principle of this collaborative process is localised modularisation which mobilises specialised companies across many levels of an extended business process. Entrepreneurial and privately owned motorcycle assemblers such as Dachangjiang, Longxin, and Cixi Zongshen Motorcycle orchestrate the networks. They work by outsourcing components and subassemblies to independent suppliers. Unlike conventional supply chains, however, the assemblers do not specify in detail but only indicate the broad outline specifications of components and sub-systems which they require. Detailed design is done by suppliers who innovate extensively within these broad parameters – and contribute to the impressive competitive advantage the whole network is able to offer.

Proximity is important. The motorcycle cluster is around Chongquing and makes similar use of family and informal social networking as a backbone to the formal co-ordination. Bringing different people together from diverse backgrounds but effectively linked via social networks enables a highly innovative system.

China now accounts for 50% of all motorcycle production. The average export price is several hundred dollars less than equivalent Japanese models, and has fallen from around $700 in the late 1990s to less than $200 today. And the philosophy is not one of copying but of 'copy and develop' – harnessing significant local innovation to improve upon original ideas and models.

Learning networks do not emerge by accident – the process of forming and then enabling performance requires active management. The conditions under which effective networking takes place are less clearly identified, but on their own, simple factors such as proximity do not explain the complexities of networking. Key issues include the mechanisms through which trust is developed and maintained, and the central role of network brokers who facilitate and enable shared learning to happen.

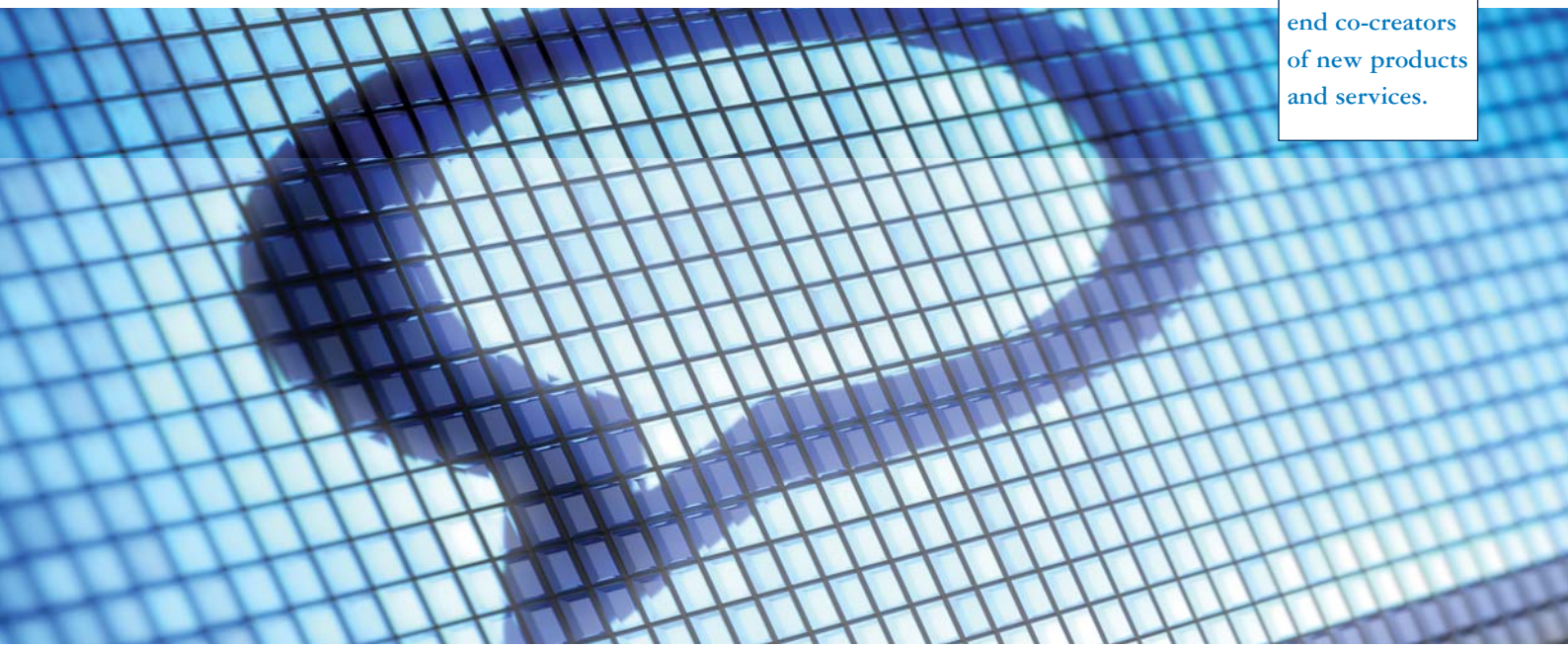
iii Opening up stakeholder participation

A third trend towards increased openness is stakeholder participation. Product and service users are also active initiators of change through the user-led innovation. This is facilitated by the development of powerful communication technologies which enable the active co-operation of user communities in co-creation and diffusion of ideas.

Companies like Lego, Threadless, Adidas and Muji, for example, engage with users as front-end co-creators of new products and services. In the public sector too there is growing use of these approaches to create innovative and more successful public services. Hospitals increasingly focus on patients as a source of experience-based design input, while innovative partnerships, like Nokia's Living Lab, work closely with users co-developing services for long-term care.

Companies like Lego, Threadless, Adidas and Muji, for example, engage with users as front-end co-creators of new products and services.

Innovation of this form often takes place entirely within the user community as a co-operative enterprise – the examples of Linux, Mozilla and Apache software projects underline the potential of such emergent properties as an alternative to R&D centred on the firm.



At the limit this involves communities creating innovation amongst and for themselves and the resulting innovations only then being appropriated by the traditional corporate agents in public and private sector – a significant reversal of the traditional innovation model. Much public sector innovation is driven by the needs of particular groups in society and finding ways of engaging their creativity and entrepreneurial drive to co-create new approaches to delivering those services offers a powerful alternative innovation model.

openness 2 – OCI, innovation for all

OCI lowers the entry barriers to participation in innovation massively increasing both the volume and variety of ideas generated and the problem-solving power to work those up into usable form. This engine for innovation does not require the resources of a giant corporation – OCI is becoming widely available as an option for small and resource-constrained players.

…an innovation contest required significant resources to be able to offer a prize, publicise the challenge, filter and judge the submission and eventually arrive at a solution.

In the past, for example, an innovation contest required significant resources to be able to offer a prize, publicise the challenge, filter and judge the submission and eventually arrive at a solution. Now they are open to anyone who wishes to organise or participate in them.

The problem for small enterprises has often been their isolation. Open innovation, however, has led many large players to expand their search and in the process discover rich potential amongst small enterprises they would previously not have noticed. Tiny businesses are now able to access global markets from anywhere and build links and partnerships which give them access to the resources they need to grow – without necessarily owning all those resources.

Opening up access to mobile communications and computing liberates creativity across previously disadvantaged groups. So fishermen in Kerula, India, no longer have to work hard to catch fish and then sell them at prices fixed by local merchants – now they use mobile internet access to work out where to fish, what to fish for, and where to sail to in order to sell at the best price. Mobile banking has emerged bottom–up in dispersed population areas like the Philippines or rural Africa and the co-creation of new applications for mobile communications is opening up other rich and socially valuable possibilities.

Convergence also allows for networking the networks, bringing together vibrant local communities and achieving economies of scale. Talks of a spectacularly priced IPO for Groupon, and interest in LivingSocial from Google and Amazon, highlight the potential of co-ordination across small user communities.

Table 1 summarises some of the key changes in thinking about and operating the OCI innovation process.

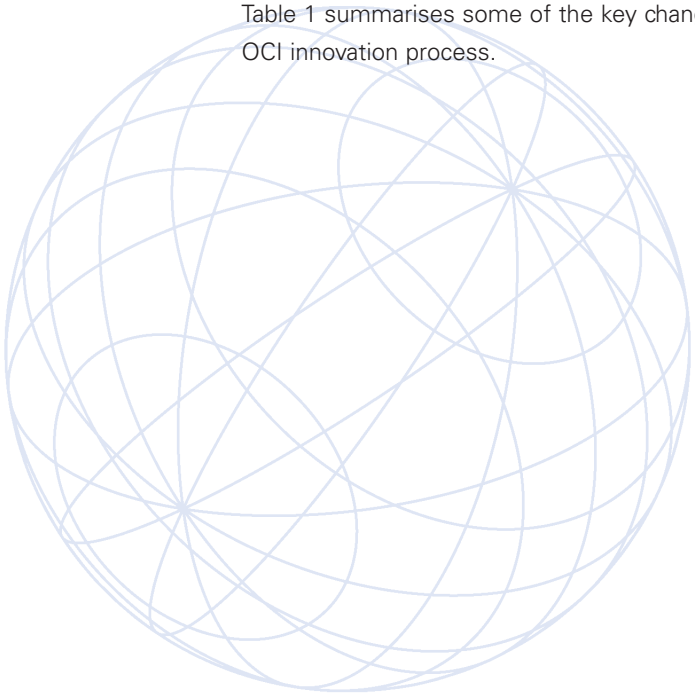


Table 1

Emergent property – resulting from OCI convergence	Examples
Lowering of entry barriers – widespread cheap communications allows democratisation of innovation, bringing many more players into the innovation game.	Innovation contests – fast and easy to set up, low cost so available to anyone wishing to host one, robust platforms on which specific contests can be configured, high reach in terms of volume and variety of contributors
Increasing reach – OCI enfranchises many more people, giving them access to the process of innovation and the tools to enable it.	People at the base of the pyramid – the five billion on very low incomes who have traditionally been excluded – are now able to access goods and services and use OCI tools to co-create solutions for their needs. Mobile access to internet allows distributed local solutions and access to global networks.
Increasing involvement – it is quick to build communities around key themes and if these achieve critical mass there is a degree of long-term sustainability.	Collaborative communities like Linux, Apache, Propellerhead and Wikipedia provide powerful and continuing engines for innovation. Significantly, this community building is often driven by non-financial motives and enables extensive social enterprise and innovation.
Increasing range of ideas – OCI spreads the net more widely and the resulting flexibility offers more different starting points for development of ideas and new insights and inspiration across different worlds – recombinant innovation.	Cross- sector learning projects – e.g. DOME – and third party agencies like IDEO.
Co-creation with users takes the user-led model further, because it is now cost-effective to bring multiple users into the process. Extent of user-involvement is deepened – moving from cosmetic customisation to deep design involvement.	LEGO, Ponoko.
Networking the networks – as small local level communities of innovation evolve it becomes possible to link them, or to mobilise their creation and co-ordination. Scale effects and emergent properties across such meta-networks.	Groupon, Momax, LivingSocial.
Accelerating diffusion – innovation markets, communities and other groupings are simple to establish and quickly reach a scale of connectivity with significant effects in terms of idea generation, idea development – and rapid viral spread across communities	Online communities can be quickly mobilised, for example, Facebook users enabled the website to be put into multiple languages in a period of weeks. ALNAP provides a networked community for fast sharing and diffusion of best practice in humanitarian emergency aid.
Extending reach to previously uneconomic solutions – OCI facilitates managing the long tail problem.	Amazon with books, music, etc. New approaches to dealing with rare diseases by mobilising communities, etc.

Horses for courses – configuring competitive advantage through OCI

Too often innovation opportunities are poorly exploited because we have a tendency to frame new opportunities through old lenses and remain constrained by old mindsets. Much of what has been done with the internet so far is *substitution* innovation, online shopping is still shopping, online banking, still banking. But the combination of internet technology and social networking technology offers us opportunities to do something completely different.

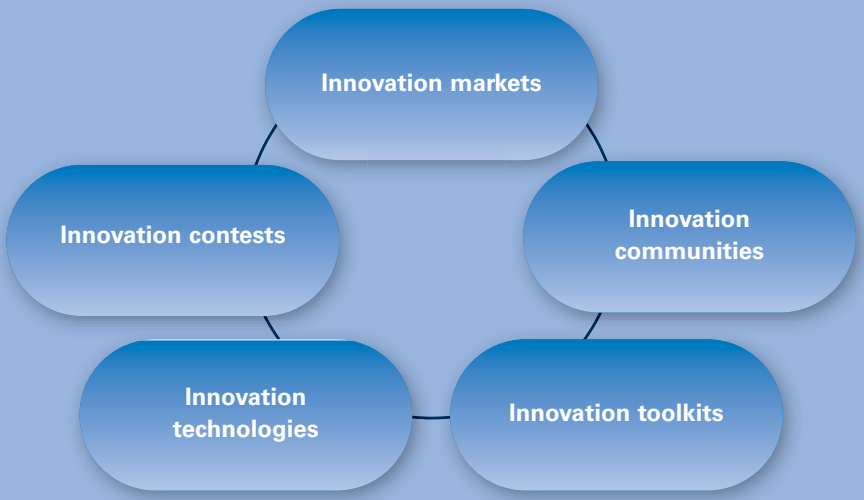
OCI – as the convergence of key streams in innovation management – clearly has considerable potential, the challenge is to realise that potential. The emphasis must be on *configuration* – finding new patterns within the rich set of OCI opportunities. What are the tasks we would like to achieve – and how can we best utilise OCI to help us get them done?

Powerful platforms for innovation

Internet technology, bringing together Web 2.0 and social software elements, has the potential to create powerful platforms for open collective innovation. We have identified five complementary approaches that organisations can engage in:

1 Innovation contests
2 Innovation markets
3 Innovation communities
4 Innovation toolkits
5 Innovation technologies

Figure 2: Five classes of tools for open innovation



1: Innovation Contests

Innovation contests call for solutions to clearly defined innovation challenges. They need to be widely publicised and garner significant recognition in order to motivate potential innovators. Social software features and web 2.0 allow the announcement of contests for innovation challenges, providing global reach at minimal cost, and promote their use as a platform for open collective innovation.

Innovation markets bring together supply and demand for innovation related activity in the virtual world.

Innovation contests come in many forms, from idea and design contests to contests targeted at marketable innovations (e.g. the Google Lunar XPrize). The contests cover product, process, organisational, marketing, and business model innovations.

It is important for organisations to structure innovation competition problems in a way that motivates competent innovators to enter, and that will produce innovative solutions that benefit the organisation, while at the same time not giving away strategic and commercially sensitive information.

Researchers at the University of Erlangen-Nuremberg and the Center for Leading Innovation and Cooperation (CLIC) identified and classified more than 400 innovation contests in an Innovation Contest Inventory (available online at www.innovation-contest.org). Their database shows how widely the approach is used and also the different forms that can be deployed. So, for example, contests that were focused on everyday life focused on: ideas that make life easier and more pleasant; sustainable innovation; a new generation of cars. Or information and communication technology contests focused on: the design of notebooks; a new generation of data centres; mobile services and applications; and animation.

2: Innovation Markets

Innovation markets bring together supply and demand for innovation related activity in the virtual world. Generally they take the form of Web 2.0 supported platforms, as intermediaries connecting innovation seekers (typically organisations) who announce innovation problems, and innovation providers who propose concrete solutions or concepts (typically single or team innovators). A growing number of innovation markets are available for organisations for announcing innovation challenges.

One renowned and well established innovation market, for example, is Innocentive, 'the world's first open innovation marketplace' (www.innocentive.com), founded in 2001 by Eli Lilly. Today, Innocentive serves organisations in more than 70 industries with more than 250,000 outside innovators from nearly 200 countries. Successful solution providers receive monetary rewards of anything from $5,000 to $1,000,000.

Other examples of innovation markets include NineSigma (www.ninesigma.com), Innovation Exchange (www.innovationexchange.com), Atizo (www.atizo.com) and Battle of Concepts (www.battleofconcepts.nl).

Innovation communities enable innovators to share and develop ideas, discuss concepts and promote innovations.

Most of these markets focus on organisations publishing innovation problems. Some markets, however, such as Planet Eureka (www.planeteureka.com) offer a provider-driven innovation market. Solution providers can look for both suitable problems, and purchasers for their innovative solutions, while on the other side organisations search for promising innovative concepts. It is an approach that is especially attractive to small and medium-sized organisations.

Other forms of innovation markets have emerged which are led by community principles FellowForce (www.fellowforce.com) or Brainfloor (www.brainfloor.com), for example. (The Market for Open Innovation by Kathleen Diener and Frank Piller, is a comprehensive guide to many of these innovation markets.)

3: Innovation Communities

Innovation communities enable innovators to share and develop ideas, discuss concepts and promote innovations. Web 2.0 and social software-based innovation communities normally link interested and specialised innovators for particular issues and thus support collective development and enhancement of innovation concepts. They emerge from groups that come together voluntarily and independently to create innovative solutions in a joint effort, embracing a family-like spirit. Open source software communities such as Mozilla, Linux and Propellerhead are typical examples; the success of these communities has led to the formation of a growing number of issue-related communities in various industry sectors.

Today, many organisations have discovered that innovation communities can be a useful tool for creating innovations. Increasingly, firm-sponsored innovation communities are replacing originally emergent and self-organised innovation communities. One example of such a company-led innovation community is the Apple Developer Connection (developer.apple.com). It invites innovators to develop applications, offers, and solutions around Apple products.

What makes this community special is that external enthusiasts do not contribute free of cost. In fact, there are different levels of community memberships, which imply different subscription fees – the premium membership reaches an annual subscription of $3.500! Apple's innovation community is not only a tool for creating innovations, but a business model for profiting from open collective innovation.

4: Innovation Toolkits

Innovation toolkits provide an environment in which users develop solutions step-by-step. Internet-based innovation toolkits provide various people, even those without specific qualifications, the opportunity to participate in structured innovation activities.

Overall, we can distinguish three types of toolkits, each aimed at distinct strategic targets, design principles and user groups:

Toolkits have been divided into:

- *Toolkits for user innovation* support the generation of innovation ideas, using a 'chemistry set' to enable complete trial-and-error cycles, featuring great solution space with high costs of usage;
- *Toolkits for idea transfer* foster application of existing ideas in a new context, applying 'black boards' with unlimited solution space and low costs of usage;
- *Toolkits for user co-design* perform product configurations, using a restricted solution space by technical restrictions and standardised modules and are mostly used as a selling tool to attract customers of all kinds.

Regardless of the specific configurations, toolkit-based innovation essentially needs feedback (either by the system or by users), simulates possible solutions (regarding design, performance and costs) and fosters the quest for solutions.

5: Innovation Technologies

Innovation technologies enable progress from the concept level of open innovation of products to open fabrication and manufacturing. Examples include 3D-scanners, 3D-printers or laser cutters.

These technologies are associated with the prospect of making innovation activities available to everyone as well as the trend towards 'personal fabrication'. All innovation technologies that support the steps of prototyping and implementation are comprised in this tool class. No specific qualifications are needed to profit from these technologies.

Innovation technologies enable participants to collectively and globally develop intangible specifications for real products, services, and solutions. Two-dimensional software controlled cutting with CNC-cutters allows fascinating designs for furniture, fitments and accessories to be created (cf. www.ronen-kadushin.com or www.movisi.com).

3D-printers (i.e. printers that create three-dimensional objects out of different materials, e.g. plastic powder) allow a fast and immediate construction of prototypes during development and thus enable rapid prototyping. They also enable individuals or organisations to design and produce customised products instantly. First innovators design and specify three-dimensional models of innovations and then order these directly from their household computers.

The internet company Ponoko (www.ponoko.com) offers the possibility to create, manufacture, and finally distribute many different design concepts. Companies like Ponoko threaten to turn the retailing world upside down.

conclusion: the OCI challenge – learning new tricks

Finally, it is worth emphasising that embracing trends in openness, and engaging in open networks of innovation, is not enough on its own to maximise the chances of effective and successful innovation. Organisations must also be in the right frame of mind to innovate.

In most cases innovation is not like in cartoons – a brilliant flash of inspiration, a light bulb goes on above someone's head and the world changes. Instead it is a journey, with the idea passing through a series of stages, being shaped and refined as it goes along, before it reaches the destination of successful adoption and widespread use.

In most cases innovation is not like in cartoons – a brilliant flash of inspiration, a light bulb goes on above someone's head and the world changes.

However, while the cartoon model is a massive oversimplification, it is worth individuals reflecting on how they do think about innovation. Our mental models of innovation shape what we pay attention to, what we prioritise, what we organise and manage. If these models are flawed then our approach to managing innovation also risks being flawed.

Whether it is an individual entrepreneur or an organisation that holds on to a simplified concept of innovation, the risk is the same, that we operate with models which are poor templates for designing an effective approach to managing innovation.

Innovation today is highly networked, globally distributed, enabled by powerful information and communication technologies and engaging a rich variety of internal and external stakeholders. In such a richly networked world, for example, there are many new features – emergent properties – which arise as the "whole becomes greater than the sum of its parts." This opens up rich new opportunities – and massively increases the potential fluency and flexibility available to us as innovators. But it also requires that we learn some new tricks in terms of skills, tools and mechanisms to organise and manage at this level.

Building dynamic capability

Innovation management is essentially about *dynamic capability*, requiring organisations to review their approaches and revise their routines and patterns of behaviour in the face of a constantly shifting environment. Organisations and individuals must ask three core questions:

- Of our routines, which do we need to do more of and strengthen?
- Which should we do less of, or even stop?
- Which new and different routines do we need to add?

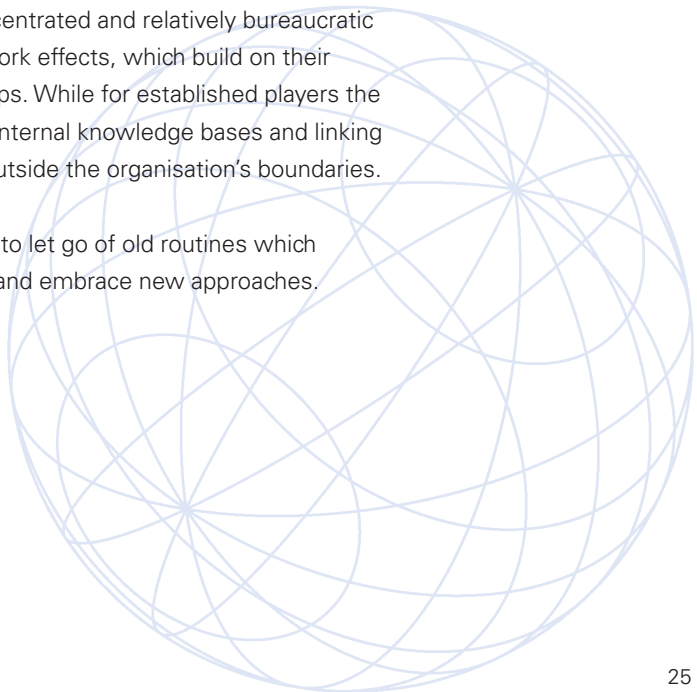
The process of generating new routines is one of trial and error, involving considerable experimentation and learning. The current shift towards OCI represents a significant step-change in environmental conditions which will require a new version of the underlying model for innovation management – a fifth generation, network based and technology-enabled approach.

Networks will play a central role in 21st century innovation in many ways. Creating a communications network in the 21st century will require invisible wireless networks covering a wide area. Wireless communications cater for mobility – information can flow across cellular networks in any direction and connect actors in reconfigurable ways. Since mobile communications networks have become established, there has been an explosion of new possibilities which we are still learning to exploit.

In neuroscience, recent developments show the significant interconnectedness of the neural systems in the brain, working together as networks sharing and co-processing information. At the same time there is a growing understanding of plasticity – the ability to remake those connections and find new pathways to meet new challenges – whether in the early experiences of an infant learning about the world for the first time, or in the case of stroke victims and others where damage in one part of the brain is compensated for by re-establishing alternative connections.

For the wave of new organisations riding the waves of open connected innovation, the opportunities are significant – instead of concentrated and relatively bureaucratic structures there is an opportunity to exploit network effects, which build on their agility and ability, to form and manage relationships. While for established players the challenge is one of reconnecting their extensive internal knowledge bases and linking up to the rich potential set of additional players outside the organisation's boundaries.

To do so, however, organisations must be willing to let go of old routines which have served well but may no longer be relevant, and embrace new approaches.



action points

Open collective innovation

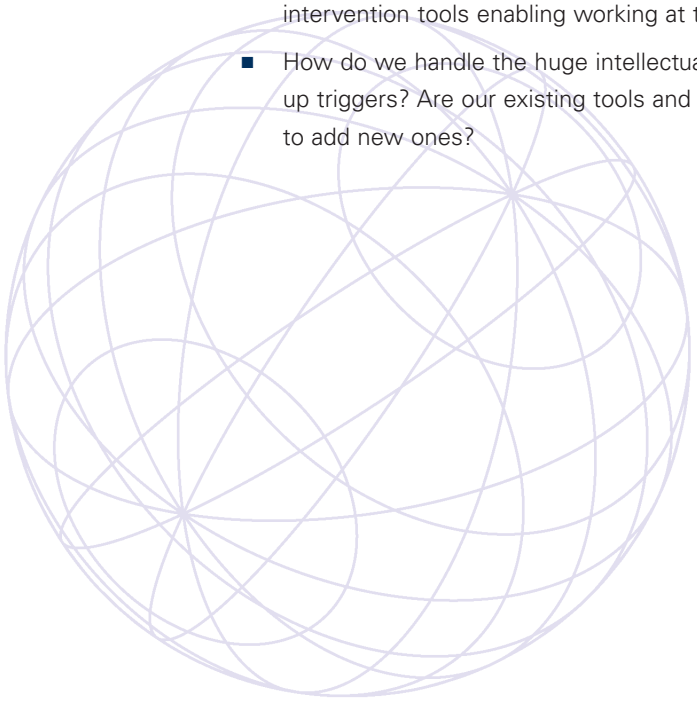
OCI isn't new – innovation has always been a multi-player game. But recent developments in technology and social networking have dramatically changed the landscape in which it takes place and opened up significant new opportunities. Internet applications plus social networking creates platforms for powerful new innovation approaches.

The technology is just the tip of the iceberg – although we are seeing much more happening on-line, the real power of OCI lies in bringing people together as active innovation communities.

The technology is just the tip of the iceberg – although we are seeing much more happening on-line…

Taking advantage of this requires new approaches. Ask yourself:

- Do we know about and make use of OCI – can we give examples of what we do to exploit this new innovation opportunity?
- Do we know about and use OCI platforms? Which ones? Why?
- Are we using OCI to search in new directions for innovation triggers?
- Who is responsible for exploring OCI as a specific new innovation space?
- How do our HR plans take account of OCI in recruitment, etc? What are the relevant skills for OCI – for example in brokering and managing connections, network facilitation, etc? How will these skills be articulated and developed?
- How do we find, form and work with communities of innovators inside – and outside – the organisation?
- How do we integrate OCI into our mainstream innovation activities? For example, how will we manage the sheer volume of ideas we receive once we open up our innovation process?
- How will we sort and judge the ideas – filter out the crazy ones, find the good ones and build on them?
- What tools do we need to enable OCI – and do we have them or do we need to develop them? Is there a need for a new toolkit of systems design and intervention tools enabling working at this network level?
- How do we handle the huge intellectual property (IP) issues which this opening up triggers? Are our existing tools and frameworks sufficient or do we need to add new ones?



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