executive briefing

aim RESEARCH
Advanced Institute of Management Research

Is discontinuous innovation on your corporate radar?

Twelve search strategies that could save your organisation

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Engineering and Physical Sciences Research Council

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AIM – the UK's research initiative on management

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.

This Executive Briefing reports on work going on within an international network of companies and researchers – details at www.innovation-lab.org – and we are particularly grateful to Professor Kathrin Möslein and Daniela Mueller for their help in preparing it. It draws on contributions from the organisations below. The authors wish to thank them for their participation and assistance.

about AIM

AIM consists of:

- Over 200 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 review

In a fast moving world, one of the biggest challenges facing organisations is dealing with discontinuous innovation (DI). Most organisations understand that innovation is an organisational imperative. They learn to listen to customers and constantly evolve their existing products and services, continuously improve their processes, so that they are not left behind by competitors.

Being ready for discontinuous innovation requires a specific set of organisational skills…

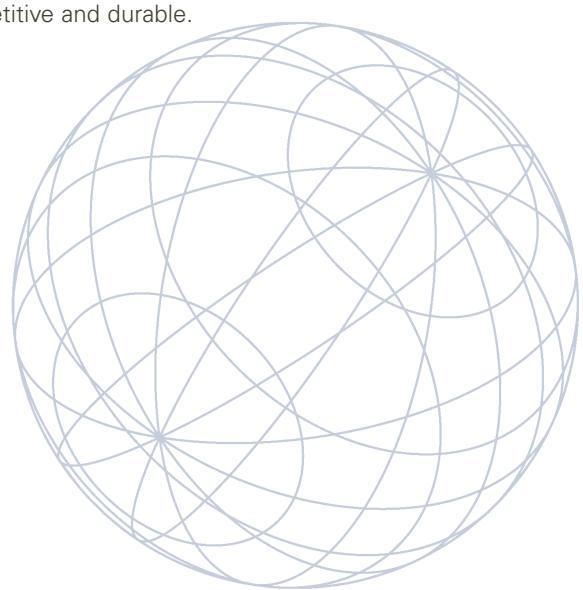
The ability to deal with this steady state type of innovation – the constant storms of change within an industry – is essential. Every so often, however, a whirlwind blows through an industry – whether caused by regulatory or political change, a technology, or a product, so radically different that it changes the shape of an industry completely and in doing so puts many existing, successful companies out of business.

In the early 1900s the buggy whip manufacturers in the US, an entire city dedicated to making a supposedly indispensable item, were put out of business almost over night by a new fangled machine called a quadracyle, built by a young inventor called Henry Ford. More recently Polaroid, one of America's great and longest standing companies, almost went the same way as the buggy whip manufacturers. The instant photography company was wrongfooted by the advent of digital photography, making a number of strategic mistakes in responding to this threat to its business.

For an organisation to be truly successful and sustain that success over many years it needs to be good at both steady state, conventional innovation, and to be able to sense a radical new discontinuous innovation on the horizon, and, preferably, come up with one itself.

Being ready for discontinuous innovation requires a specific set of organisational skills, not least the ability to search for signs of the potential whirlwind that may sweep through an industry, or, as with the internet, across entire business sectors right around the world.

This briefing document focuses on that search skill. By looking at what some leading organisations are doing in this area it suggests 12 different strategies for developing a search capability to detect triggers of discontinuous innovation. These strategies are also useful for more conventional innovation, and all organisations should employ some at least, if they aim to remain both competitive and durable.



The twelve search strategies are:

Sending out scouts: Dispatch idea hunters to track down new innovation triggers.

Exploring multiple futures: Use scenario planning techniques to envisage possible futures; then take action.

Using the web: Harness the power of the web, through online communities, and virtual worlds, for example, to detect new trends.

Working with active users: Team up with knowledgeable product and service users to see the ways in which they change and develop existing offerings.

Deep diving: In consumer research, study what people actually do, rather than what they say they do.

Probe and learn: Get the hands dirty early on, by prototyping quickly and often rather than spending ages planning.

Mobilise the mainstream: Activate users within the workforce – bring them into the product and service development process.

Corporate venturing: Create venture units and give them sufficient freedom and resources to do their job.

Being ready for discontinuous innovation requires a specific set of organisational skills…

Corporate entrepreneuring and intrapreneuring: Discover and nurture the entrepreneurial talent inside the organisation.

Use brokers and bridges: Cast the ideas net far and wide; plunder other industries.

Deliberate diversity: Create diverse teams and a diverse workforce to help challenge your assumptions.

Idea generators: Use creativity tools, and in a way that encourages, rather than squashes, creativity.

introduction: the discontinuous innovation challenge

Innovation matters. In today's turbulent and complex environment, smart firms know that if they fail to innovate both in terms of processes, and products and services, they will lose out to competitors. That's why they invest time and effort into creating systems, structures and processes to ensure a sustained flow of innovation.

One of the biggest innovation challenges is dealing with *discontinuous innovation*. When technologies shift, new markets emerge, the regulatory rules of the game move or someone introduces a new business model, many successful organisations suddenly become vulnerable.

A key part of the problem is that dealing with discontinuity requires a very different set of capabilities for organising and managing innovation: searching in unlikely places, building links to strange partners, allocating resources to high risk ventures, exploring new ways of looking at the business – all of these challenge the conventional approach to the innovation challenge. How does an organisation start building discontinuous innovation capability?

The AIM Discontinuous Innovation Laboratory (DILab)

One way of getting to grips with this challenge is for firms to learn about managing discontinuous innovation together – sharing experiences, trying new things out, reflecting on what has and hasn't worked and looking at new ideas and models.

The AIM DILab, which started in spring 2006, allows networks of firms in the UK, Germany and Denmark, to link up with each other, and to work with academic researchers, drawing on experience in different sectors and countries, providing a chance to compare, contrast, share and develop understanding of this major challenge (www.innovation-lab.org).

This briefing captures the first results of a shared exploration of the search theme. Activities have involved a mixture of experience-sharing workshops (both in host countries and internationally) coupled with in-depth case research of DI experiences and experiments in each of the participating firms. In the future this will extend to explore other issues; in addition more countries including Australia, Finland, France, Norway, Spain, Sweden and The Netherlands will join the Lab and add their experiences and ideas to the pool.

the importance of early warning systems

1 The search problem

While there are many key questions in managing discontinuous innovation, this briefing looks at the results of the DI Lab's experience-sharing research into the first question – how to *search* for triggers for discontinuous innovation.

Firms need to indulge in search behaviour – seeking out new possibilities which combine their knowledge about markets and technologies in new ways.

Any organisation can get lucky once – stumbling across a new product or process, coming up with a new business model, opening up a hitherto untapped market. The real secret behind successful innovators is their ability to repeat the trick. Firms need to indulge in search behaviour – seeking out new possibilities which combine their knowledge about markets and technologies in new ways. There's plenty of space to cover – innovation can arise in new offerings (product or service or combinations), new processes, new positions (within marketplaces, geographical regions, supply and value chains) and even in reframing the underlying mental models about what the business is and how the firm might operate.

The challenge is a need to abandon search strategies based on systematic exploration of a known environment and instead start looking in strange places and odd directions. No organisation has enough resources to look everywhere, so instead they have to try and develop search strategies and mechanisms which help them extend their selection environment to new fields.

An added complication is that many of the discontinuous shifts in the environment don't appear as clear images on the radar screen. In innovation terms the new dominant design – a configuration of technology means and market needs – doesn't suddenly appear perfectly formed and clearly defined. Instead it emerges gradually as a result of trial and error, feedback and learning within a rich soup of players and possibilities.

Established players need the capacity to see the emerging patterns in new ways. For example, the rapidly growing field of VoIP (Voice over Internet Protocol) communications is not developing along clearly established trajectories towards a well-defined end-point. Instead it is a process of *emergence*. The broad parameters are visible – the rise of demand for global communication, the increasing availability of broadband internet, the potential of peer-to-peer networking models, growing technological literacy amongst users – and the stakes are high, both for established fixed-line players (who have much to lose) and new entrants (such as Skype, recently bought by eBay for $2.6bn). But the dominant design isn't visible yet – instead there is a rich fermenting soup of technological possibilities, business models and potential players from which it will gradually emerge. The process through which it will do so, will essentially involve experimentation, interaction, fast feedback and learning by doing (and often failing).

When increasing complexity and unpredictability – the sheer number of elements and the ways in which they can interact – combine, successful innovation requires the ability to reframe and unlearn old rules of the game.

It requires being able to search in unexpected places and pick up and learn about radically different and unimaginable possibilities.

2 Developing search capabilities

How do firms start to search in the fog of uncertainty which characterises a situation of increasing complexity and unpredictability? Organisations have to develop strategies for searching that deal with the problem of 'groping a way forward in the fog'. Using a mixture of judicious experimentation and a lot of fast adaptive feedback to emerging situations, firms can employ a 'probe and learn' approach.

Our experience with the DI Lab has identified 12 core approaches to the search problem (see Figure 1). This report describes the 12 search strategies including illustrative examples from the DI Lab member's experiences, and offers a framework for self-assessment around the development of such capabilities.

It is important to note that these strategies can be combined and are complementary – successful discontinuous innovators manage a portfolio of these search strategies, reacting to different contingencies.

It is worth highlighting that there is some overlap between some of the research strategies and they are often used in combination.

Figure 1: A framework model for DI search

Remember that these are additional approaches to help deal with the DI challenge, not a replacement for good practice search strategies around R&D or market research. Firms must explore and decide which are relevant and appropriate for a particular context. Which mix of strategies will offer the most extensive cover and insights?

In terms of reviewing capability for managing DI it is important to ask three key questions:

- Do you know about each of the strategies – or are there some you haven't tried or would like to learn more about?
- If you do know about all of them, do you use them all – or if not, do you have good reasons why you have chosen to concentrate on the ones you do use?
- If you do use some or all of the strategies, do you use them as well as you could – or are there further aspects which you could learn about and try?

key strategies for searching for discontinuous innovation

1 Sending out scouts

This involves sending out idea hunters (full or part-time) whose role is to search actively for new ideas to trigger the innovation process. They could be searching for technological triggers, emerging markets or trends, competitor behaviour, etc., but what they have in common is a remit to seek things out, often in unexpected places.

Search is not restricted to the organisation's particular industry; would banks and insurance companies have expected food stores to become their competitors? It is the task of these idea hunters to see and anticipate connections between currently unconnected fields. Idea hunters look at products and technologies also keeping an eye on changes in social trends, new business models, even in political situations. Scouts look ahead on behalf of the firm.

Idea hunters look at products and technologies also keeping an eye on changes in social trends, new business models, even in political situations.

Organisations may already employ potential idea hunters without being aware of their potential, for example, people from the R&D community who attend conferences and keep abreast of developments in their particular field of expertise.

Some examples:

- Brand giant, Procter & Gamble's Connect and Develop open innovation approach sets a target of sourcing 50 percent of innovation inspiration from outside the company. It employs around 80 'technology entrepreneurs', scouts, licensed to roam the world with a wide remit to find and bring back interesting new ideas.
- O2, the telecoms company, has a trend-scouting group of about ten people who interpret externally identified trends into O2's specific business context. Once a year the group meets with the board to discuss and select ideas.
- Another telecoms and tech company, BT has a scouting unit in Silicon Valley which assesses some 3000 technology opportunities a year in California. The four-man operation looks at more than 1000 companies per year and then targets the small number of cases where there is a direct match between BT's needs and the Silicon Valley company's technology.
- Webasto, an automotive supplier, has an in-official, 'idea hunter', an enthusiastic long-term employee who has created this job for himself. He provides varied input into the company's pre-development and product management. In addition they have trend scouts who go to trade fairs regularly and capture latest developments in the industry Webasto supplies and parts competitors produce.

It's not simple...

Key issues which may make or break this strategy:

- People in the organisation are not really listening.
- There are no mechanisms to feed the insights back to the right people.
- 'Latent' idea hunters are unaware of the valuable information they have.
- Scouts are often seen as a costly investment without a direct return.

2 Exploring multiple futures

One source of ideas about possible innovation triggers is to imagine alternative futures, especially those which do not necessarily follow the current trajectory. An effective way of creating and exploring such futures is through scenario-based approaches.

Shell pioneered scenario planning.[1] The company's Gamechanger programme makes extensive use of alternative futures to help identify issues that may impact on the business.

Companies have, however, come to realise that while predicting possible futures is useful, they must also take action to help shape and influence emergent alternatives. These activities may involve building links with different sets of stakeholders and being a part of a future which co-evolves out of those interactions.

Another related approach is to build concept models and prototypes to explore reactions and provide a focus for various different kinds of input which might shape and co-create future products and services.

More recently companies have started to develop these scenarios jointly with other organisations discovering exciting opportunities for cross-industry collaboration.

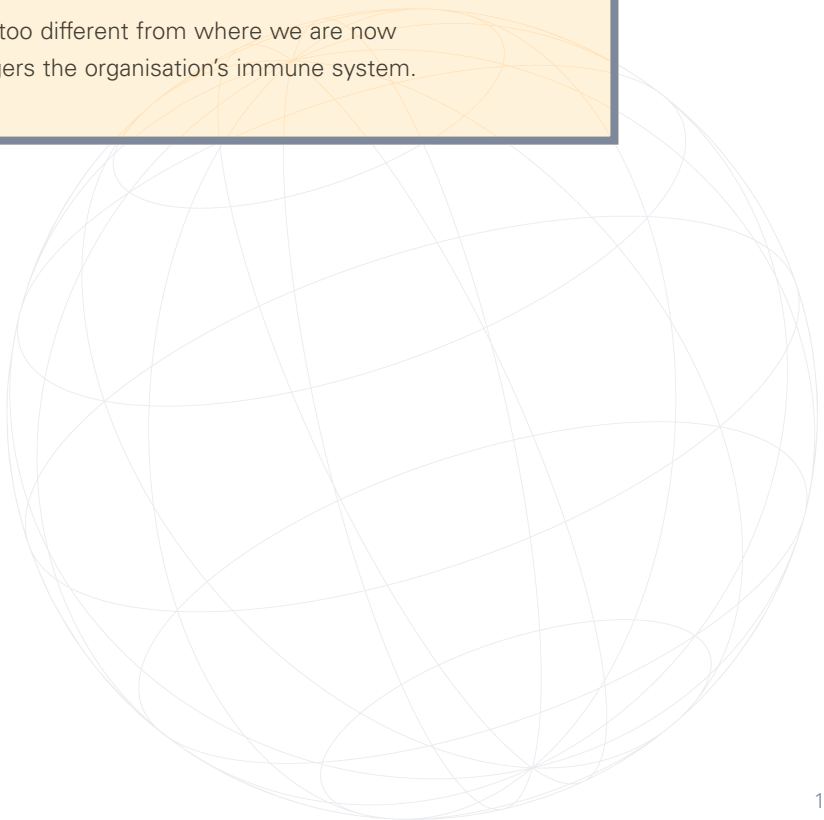
Some examples:

- BASF, the chemicals multinational, went through a multi-stage process, using the aging population mega-trend as a starting point. Starting with a discussion of experts from a variety of professions about what life for the aged would be and feel like in 2020, internal experts then related the results using an interactive process to BASF's industries.
- Concept vehicles and models allow exploration of different future possibilities and provide a focus for obtaining people's reactions to them – are used by many firms, for example, BMW and LTI (makers of the London black taxicab) in the automobile sector, or Airbus in the aerospace sector.
- Danish pharmaceuticals company, Novo Nordisk, uses a company-wide scenario-based programme to explore radical futures around its core business. In 2003 the company helped set up the Oxford Health Alliance, a non-profit collaborative entity bringing together key stakeholders – medical scientists, doctors, patients and government officials – with often very divergent views and perspectives. Surprisingly the stated goal was the prevention or cure of diabetes, which, if achieved, would potentially kill off Novo Nordisk's main line of business. But, as CEO Lars Rebien Sørensen noted it might also create new opportunities.

It's not simple...

Key issues which may make or break this strategy:

- Expecting clear cut answers.
- Working forwards from the present rather than backwards from the future.
- People who are too firmly grounded in what is possible today.
- Lack of sufficient diversity – people not escaping the company mindset.
- Reactions to futures which are too different from where we are now – the fear of the unfamiliar triggers the organisation's immune system.



3 Using the web

In its simplest form the web is a passive information resource to be searched – an additional space into which the firm sends its scouts. Increasingly there are professional organisations who offer focused search capabilities to help with this hunting – for example, in trying to pick up on emerging cool trends among particular market segments.

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Developments in communications technology also make it possible to provide links across extranets and intranets to speed up the process of bringing signals into where they are needed. Some firms have sophisticated IT systems giving them early warning of emergent fashion trends which can be used to drive a high speed flexible response on a global basis.

The web can also be used as a multi-directional information marketplace. For example, pharma company Eli Lilly's www.innocentive.com used as a match making tool, connecting those with scientific problems with those being able to offer solutions. There are now many websites acting as a brokering service, linking needs and resources, creating a global market-place for ideas – and providing a rich source of early warning signals.

Websites can also be employed as online laboratories for conducting experiments or prototype testing. Second Life (www.secondlife.com) is an online role playing game with over five million users. People assume alternate identities represented by avatars and interact in an alternative online world – in the process creating a powerful laboratory for testing out ideas. Since by definition Second Life is the result of people projecting their aspirations and interests in a different space it offers significant scope for early warning about or even creating new trends. The potential of advergaming is being explored, for example, by US clothing retailer American Apparel which opened a virtual store whilst IBM has set up offices at several locations.

The largest network of web-based communities for innovation is organised by CommuniSpace, a Boston based company that organises and hosts communities around products and brands for major manufacturers around the world. At the beginning of 2007, CommuniSpace operated more than 300 parallel communities. In each of these communities, members discuss either concrete product concepts posted by companies, or develop in a more open discussion new ideas and trends.

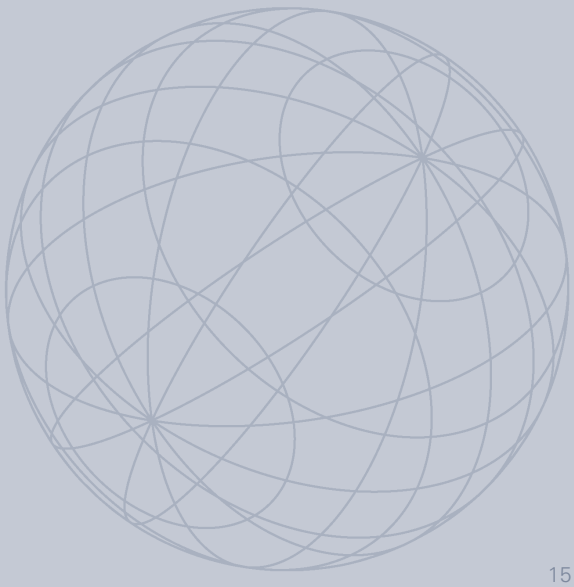
Some examples:

- In June 2001 Eli Lilly launched the internet site www.innocentive.com as a space through which it and other companies could access a large pool of scientists.
- LEGO, the Danish toy company, has set up the LEGO Factory website – you can build your own model online and then have the 'ready to assemble set' sent out to you (http://factory.lego.com). This supports direct communication with users that can be difficult to identify otherwise, such as train enthusiasts. In this way LEGO gets feedback from its most advanced users and uses this information to enhance mainstream products.
- Under development at Webasto, the automotive and transport solutions company, is a 'department store for ideas' where company employees can list their ideas and in a future step, external solvers can contribute in finding technical solutions to the posted ideas.
- BMW makes use of the Web to enable a Virtual Innovation Agency – a forum where suppliers from outside the normal range of BMW players can offer ideas. These can be both product related and also process-related – for example a recent suggestion was for carbon recycling out of factory waste.

It's not simple…

Key issues which may make or break this strategy:

- Insufficient understanding of company vision; it's all very well to pick up stuff from the web but the problem is knowing what is relevant.
- Using the web tends to work best when you know what the problem is.
- How do you deal with misinformation, and how to filter out information that is relevant; one approach is to use fuzzy logic to discern pattern.
- Lack of ability to make lateral connections.
- Taking insights gained from the internet at face value (without further verification or cross-checking).



4 Working with active users

Users should be viewed as active players in the innovation process, not passive consumers of innovations created elsewhere. Their ideas and insights can provide the starting point for new directions and help create new markets, products and services.

A typical example is that of the enthusiastic long-distance racing cyclist who designed a rucksack that could be filled with water and had a pipe leading to his mouth so he could cycle for hours without having to stop for a drink. This user-developed prototype has now become an important new product category across the leisure industry.

With the advent of powerful new tools there is huge scope for engaging users in active co-creation of products and services. For example, the Internet has enabled the open source movement to develop high quality software as a co-operative process, whilst tools like rapid prototyping, simulation and computer-aided design help create the spaces where active users can interact with professional designers.

Active users become particularly important in the DI context because very often the challenge is to find the things which no-one has yet noticed, or the markets which don't yet exist.

Find active users in these communities and companies can co-create significant innovation with them.

Often at the fringes of the mainstream, active users are tolerant of failure, prepared to accept that through mistakes they can get to something better – hence the growing interest in participating in perpetual beta testing and development of software and other on-line products.

Some examples:

- When LEGO originally launched the Mindstorms RCX – the programmable LEGO toys – within a few days the most advanced users had cracked the code and developed their own updated versions. These advanced users produced variants of the product that were superior to the original. In 2006 LEGO was launching a radical new Mindstorms product – the NXT. This time it invited some leading users to participate directly in the development. In recognition of the success of this program, LEGO stated in January 2006 that it was looking for 100 more citizen developers (http://mindstorms.lego.com).
- This kind of approach is being explored by the British Broadcasting Corporation (BBC) – a major producer of broadcast media now trying to deal with the discontinuous challenges of the new digital media environment. One experiment, *BBC Backstage*, is trying to do with new media development what the open source community did with software development. The model is deceptively simple – developers are invited to make free use of various elements of the BBC's site, such as live news feeds, weather, and TV listings, to integrate and shape innovative applications. The strap line is *'use our stuff to build your stuff'*. Since the site launched in May 2005 it has already attracted the interest of hundreds of software developers (www.bbcbackstage.com).
- Webasto went through a systematic approach to understand what lead users are and how to identify them. Building on existing literature they identified 4 aspects that really drive people's propensity to innovate (cognitive complexity, team expertise, general knowledge, willingness to help). Based on those aspects they developed a questionnaire that they sent out, depending on the project in question, to up to 5,000 people from their database. About 20% returned the questionnaires. There were several selection steps (e.g. age bracket, innovation potential) before they arrived at a lead user group of between 10 and 30. The lead users committed to come for an entire weekend, and without pay.
- Airport Munich (Flughafen München) is very keen on involving their key customers in product and process innovation. The different kind of customers (airlines, passengers, suppliers) trigger various activities, e.g.: regular meetings with airlines and suppliers to review quality requirements, common projects concerning the development of new products and processes with the lead users or active involvement of customers (passengers, meeters and greeters, users of retail facilities, employees) who have repeatedly contacted the airport with suggestions or complaints in the past.

It's not simple…

Key issues which may make or break this strategy:

- An attitude of NIH (not invented here) inside the organisation.
- Might our volunteers be more enthusiastic than competent?
- How do we manage the intellectual property (IP)?
- Finding ways to reward active users. (Recognition tends to be more effective than purely financial rewards – LEGO names the inventors on the product packaging).
- Lacking a clear strategy for dealing with intellectual property rights.
- Users are feeling exploited rather than appreciated.

5 Deep diving

One powerful source of demand-side innovation triggers comes from taking a much deeper look at how people actually behave – as opposed to how they say they behave. Sometimes what people say and what they actually do is different. In recent years there has been an upsurge in the use of techniques to get closer to what people need and want in the context within which they operate. 'Deep dive' is just one of the terms used to describe the approach.[2]

Rather than asking consumers and customers what they might like, researchers observe the everyday life of real people, capturing the experiences of people as and when they occur. This leads to the creation of new insights a deeper understanding of how existing products and services are actually used, and also insights of new needs or wants that a company might be able to address. Often customers and consumers are not even aware of these latent consumer needs.

Some examples:

- To ensure its new terminal at Heathrow would address user needs well into the future, airports business BAA commissioned some research into what users in 2020 might look like, and what their needs might be. The ageing population came up as an issue; focusing on the behaviour of old people at the airport it noticed old people tend to go to the toilet rather frequently. So, the conclusion was to plan for more toilets at Terminal 5. However, when someone followed people around they noted that many people going to the restrooms did not actually use the toilet – they went there because it was quiet, and they could actually hear the announcements.
- Towards the end of the last century, brands multinational Unilever, felt that it had become too far removed from their consumers, particularly in less developed countries, so it decided to send people out to spend some time where the customers were, even to live in their homes. Such community based observations led, for example, to the development of a reduced foam detergent for the Indian market where washing is mainly done by hand. This meant that less water was required to rinse clothes, saving up to two buckets of water per wash.

It's not simple...

Key issues which may make or break this strategy:

- Confusing ethnographic market research approaches with more traditional techniques such as focus groups or direct questioning (which lend themselves more to incremental innovation).
- Researchers looking for confirmation of what they believe (seeing what you want to see).
- Researchers are untrained in the techniques of ethnographic research.

6 Probe and learn

It is difficult to imagine a radically different future, and hard to predict how things will play out. A powerful approach is to try something out – probe – and learn from the results, even if they represent a failure. This way, emergent trends, potential designs, etc. can be explored and refined in a continuing learning process.

There are two complementary dimensions here – the concept of prototyping as a means of learning and refining an idea, and the concept of pilot-scale testing before moving across to a mainstream market. In both cases the underlying theme is essentially one of learning as you go, trying things out, making mistakes but using the experience to get closer to what is needed and will work.

One aspect of this strategy is to get physical as early and quickly as possible. When you are trying to do something radically new, people may have problems getting their head around it. Having something to show them – be it a picture or even a rough model – can help. Empirical observations of organisations with effective innovation cultures show that working with prototypes and simulations drive the innovation process. Prototyping is about improvising with the unanticipated, in ways that create new value.

It is difficult to imagine a radically different future, and hard to predict how things will play out.

Piloting, selecting a small but relevant testing ground, offers a deliberate learning strategy, and experiments may be designed with the prime intention of getting more information about what and what not to do.

Probe and learn strategies allow firms to devise experiments to explore alternative hypotheses – for example, looking for opportunities in the segments of the market they are not active or strong in. If an incumbent wishes to anticipate disruptive threats, it should test out some alternative radical hypotheses and carry out such experiments at the fringes of its existing business.

There are many challenging probe and learn experiments going on, at what leading management thinker C. K. Prahalad calls 'the bottom of the pyramid'.[3] His work looks at how radically different products and services emerge when firms try to create them for the vast market of poor people earning below the $2/day poverty line. Cases include new communication systems, low cost sustainable energy systems, low cost high quality health care and micro-finance models for purchasing of consumer goods and services.

Some examples:

- Novo Nordisk is making extensive use of probe and learn approaches in trying to understand the possible evolution of new diabetes-related services and care pathways which may represent an important new direction for this traditional pharmaceutical firm with its emphasis on drugs and delivery systems. Much of this work is going on in laboratories where very different conditions apply – for example, in Africa where the need is for holistic solutions involving education, clinics and treatment centres, and prevention methods – all delivered from a very low cost base.
- After disappointing results applying electronics in toys LEGO changed its development approach towards more intensive use of prototypes. Prototypes were created within days – often within hours – after the ideas matured. The result was a much more precise dialogue, both within the organisation and with the main customers. Eventually, this led to more simple technology and more successful sales.
- Webasto uses, as do many companies in the automotive industry, concept cars on trade shows to show its newest product developments and investigate its new innovations, primarily in discussion with the automotive industry. (Note that Webasto is no OEM, so they normally do not build cars) Concept cars, as prototypes in general, also have an important communication function by promoting discussion of the innovations externally in a larger context. Thus, Webasto's management demands that prototypes should not just be rush models, but realistic and functional representations of the latter products.

It's not simple…

Key issues which may make or break this strategy:

- Insufficient mechanisms / willingness to act upon insights.
- Issues about withdrawing the offering, e.g. if it is a time-bound service.
- Success / evaluation criteria for the trial are unclear.
- If the prototypes are 'too neat' there is a risk that those who come face to face with it regard them as final products.
- If it is too easy to make prototypes they become devalued as happened with nice-looking budgets when spreadsheet programmes became widespread.

7 Mobilise the mainstream

One problem searching for DI clues is that the organisation is often already stretched, and lacks resources for new and different search activities. A helpful way to amplify search capacity is to make better or different use of existing resources – to mobilise the mainstream players in new or additional roles. For example, it could refocus the core tasks of groups like procurement, sales or finance staff to pick up peripheral information about trends in the wider world.

The scope within the mainstream is considerable – not only all a company's own staff but the network of other organisations with which it works. In a recent IBM survey of 750 CEOs around the world 76 percent ranked business partner and customer collaboration as top sources of new ideas, whilst internal R&D ranked only eighth.

Outperformers, in terms of revenue growth, used external sources 30 percent more than underperformers. Benefits from collaboration with partners included reduced costs, higher quality and customer satisfaction, access to skills and products, increased revenue, and access to new markets and customers.

One other important element in mobilising the mainstream is the use of multiple stakeholders – people who are players in the game but who may not always share the same values or indeed who may be opposed to the core business model. Use their objections and concerns as a stimulus for new innovation direction.

Some examples:

- At Bang & Olufsen, the audio and video company, a number of 'inspiration clubs' have been formed, each with a chair who has the role of facilitator and driver. The setup ensures that ideas from the whole organisation are identified and elaborated.
- Reckitt Benckiser, the household cleaning, health and personal care solutions company, has a network of internal correspondents who feed what is happening in their market into a central team. It also taps into the knowledge of PAs who process a lot of the information anyway. A central team takes the information from the field, combines it with information gathered from other sources, and produces a bulletin that is published every six to eight weeks. Unused material is stored and remains available for future reference. The bulletin is sent to select senior management.

It's not simple…

Key issues which may make or break this strategy:

- You need the right people to do the job. If they are not curious, if they cannot make connections that others might not be able to make, if they cannot communicate and sell their insights this strategy will fail at the first hurdle.
- The next stage where things can go wrong is if there are no structures to feed-back and disseminate the insights.
- The strategy will not be effective if insights are not taken seriously and there is no consequence or people do not like or believe in what they are told.
- Finally, companies that use this strategy successfully have mechanisms in place to enrich the raw data coming back from the field and structures to ensure that the distilled information reaches the most appropriate people in the organisation.

8 Corporate venturing

Corporate venturing is the setting up of special units with the remit and budget to explore new diversification options. Loosely termed 'corporate venture' (CV) units they range from simple venture capital funds, for internal and externally generated ideas, through to active search and implementation teams, acquisition and spin-out specialists, etc.

The purpose of corporate venturing is to provide some ring-fenced funds to invest in new directions for the business. Such models vary from being tightly controlled by the parent organisation to being fully autonomous. CVs are not always successful; many fail.

Research on what drives success of corporate venturing units, measured in terms of their strategic and financial contribution, found that:

- Those corporate venturing units that engage actively with the wider venture capital community are more successful than those that do not.
- Venture capital-like equity-based systems were not found to influence corporate venturing unit performance.

The purpose of corporate venturing is to provide some ring-fenced funds to invest in new directions for the business.

Much seems to depend on the clarity of purpose. If the VC is set up simply as a pot of money to throw at any interesting new venture it will probably fail. But if it has a clear strategic focus and operates with criteria for assessing options, then it may have a chance of succeeding.

Some examples:

- Unilever has not one but three vehicles to draw the benefits from corporate venturing:
  a) A fund 40 percent owned by Unilever with the rest owned by banks and 'fund the funds'. The purpose of the fund is to buy companies from entrepreneurs and see whether they can be scaled up and turned into a larger success.
  b) Unilever Technical Venture (UTV), based in San Francisco, which is wholly owned by Unilever. However, investment decisions do not involve the parent organisation. The fund's purpose is to invest in early stage technology start ups and take a minority stake.
  c) Unilever Venture which has a twofold purpose: invest in technical spin-outs, and invest in businesses that are close to the core.
- SAP, the business software solutions outfit, has set up a venture unit called SAP Inspire to fund start ups with interesting technologies. The mission of the group is to "be a world-class corporate venturing group that will contribute, through business and technical innovation, to SAP's long-term growth and leadership."

It does so by: seeking entrepreneurial talent within SAP and providing an environment where ideas are evaluated on an open and objective basis; actively soliciting and cultivating ideas from the SAP community as well as effectively managing the innovation process from idea generation to commercialisation; looking for growth opportunities that are beyond the existing portfolio but within SAP's overall vision and strategy.

In trying to open up new market and technology space to move beyond its current product range, Coloplast, the Danish medical devices firm, established a small group, Nebula – New Business Lab, with the remit to explore and bring back new options. These could be acquisitions, licences for new technologies, new alliances and partnerships or established product ideas. The group also had the mandate to explore licensing and spinning out.

It's not simple…

Key issues which may make or break this strategy:

- Sign-off procedure unclear.
- Selection criteria not clearly defined – the more discontinuous an idea, the more difficult it will be for the CV department to evaluate the idea.
- No exit strategy.
- Need for clear definition of the corporate venturing unit's targets and ambitions.
- Need for clear mechanisms for resolving conflict between CV unit and the parent organisation.
- Strong limitation with regard to the number of projects than can be sponsored (at SAP, only 1/100 of all projects make it into this process).

9 Corporate entrepreneuring / intrapreneuring

The other side of the CV coin, corporate entrepreneuring, includes various ways of mobilising high involvement innovation across the organisation. Sometimes called 'intrapreneurship', it attempts to build on ideas generated within and across the organisation to move it into new areas.

Creating the culture to enable this is not simple, it requires a commitment of resources but also a set of mechanisms to take bright ideas forward, including various internal development grants and an increasingly difficult venture funding process. At its heart is a strong incentive scheme for those willing to put their drive and ideas into innovation projects – if these succeed the originators get to run the businesses they create.

Classically entrepreneurs are those individuals who seize opportunities – often created by emerging discontinuities in technology or markets. Intrapreneuring simply tries to bring this energy and drive inside the organisation – but in doing so it raises some fundamental questions about the tension between creativity and control and between playing by the rules and making new rules up.

Intrapreneurs offer a powerful route to new ideas but they also provide an implementation pathway to make sure those ideas get taken forward. Many intrapreneurship programmes stress the importance of informal networking, bootlegging and other mechanisms to take ideas forward below the radar screen of formal corporate systems.

Some examples:

- Biotech business Novozymes is building an internal network of entrepreneurs. Besides identifying internal people it also recruits people with entrepreneurial spirit from the outside – often people who had built up their own businesses. While aware that these people may be very different from existing employees and want to leave after a short period of time, it decided that even a couple of years would be enough time to provide inspiration and learning.

Much innovation happens at the boundary between one knowledge set and another; not at the frontier of knowledge.

- 3M, the diversified tech company, is well known for its 15 percent rule which says that every scientist can spend 15 percent of his or her time on a project of their choosing. That allows them to explore and develop their own ideas; they are also allowed to engage and persuade their colleagues to spend their 15 percent time on the project.Some people build up their own 'undercover R&D organisation' within 3M.
- BMW has a strong commitment to 'bootlegging' – encouraging people to try things out without necessarily asking for permission or establishing a formal project. In BMW these are called U-boot projects. This approach means that people deploy their natural entrepreneurial abilities and often come up with creative solutions.

  Importantly, they also learn ways of getting the attention of the mainstream and managing changes in attitudes. A good example was the Series 3 Estate version. The mainstream company thought the model conflicted with the image of BMW as a high quality, high performance and sporty car. However, a small group of staff worked on a U-Boot project to make a prototype, even using parts cannibalised from other cars. The model is a great success and has opened up new market space for BMW.

It's not simple...

Key issues which may make or break this strategy:

- Inertia and narrow-mindedness.
- Weak or ineffective incentive schemes.
- Lack of time / space to enable intrapreneurship.
- Expecting the same success rate as for mainstream developments.
- Punishing entrepreneurs for failure.

10 Use brokers and bridges

Much innovation happens at the boundary between one knowledge set and another; not at the frontier of knowledge. The scope for transferring ideas from one sector to another is huge, and a powerful source of discontinuous innovation. Innovation happens when you connect different bodies of knowledge. For example, bringing Philips together with coffee maker Darboven led to the Senseo, a radical departure in kitchen equipment.

People who can see these connections are invaluable. Based on assumption that 'the future is already here, it's just unevenly distributed' much recent research work on networks and broking suggests that a powerful search strategy involves making or facilitating connections – 'bridging small worlds'.

This isn't a new idea – but it has always been associated with helping discontinuous innovation. For example, Henry Ford's 'revolutionary' ideas which formed the basis for mass production and the modern assembly line, saw connections between different industries and set up his business in a way that built on the insights gained from diverse settings to create a new approach.

Increasingly organisations are looking outside their normal knowledge zones, as they begin to pursue open innovation strategies. There is a clear message that networking, whether internally across different knowledge groups, or externally, is one of the big management challenges of the 21st Century. Organisations are starting to use social networking analysis and other tools to map their networks and spot bridges – this is a source of a growing professional service sector activity. Firms like design experts IDEO, specialise in the innovation process itself; their key skill lies in making and facilitating connections.

Some examples:

- P&G Connect and Develop mechanisms including internal websites, gatekeepers, and communities of practice, through which people can meet and find out about projects and expertise (www.scienceinthebox.com/en_UK/pdf/C_DbrochureFINAL.pdf)
- The UK engineering services company Arup has done extensive work on mapping its social networks inside and outside the business to better exploit the connectivity. They have a map of the Arup 'brain' which indicates where connections are made and could be made and who could engineer such links.

It's not simple…

Key issues which may make or break this strategy:

- The belief that knowledge has to be tightly controlled.
- A belief that 'we must stick to our guns'.
- The inability to communicate and understand unrelated industries / professional mindsets.
- Lack of skills or mechanisms to enable the right connections to be made.
- Too much information, not enough connection.

11 Deliberate diversity

One search strategy, in trying to deal with the problem in discontinuous innovation, is to create diversity of vision by hiring different skills and experience sets, or by creating heterogeneous groups and teams within the firm.

A variation on this theme is to collaborate with strange partners to learn new perspectives. One of the interesting observations about close working relationships between firms is that, in terms of innovation, sometimes 'the ties that bind become the ties that blind'.

At the limit there is considerable scope for learning across sectors and out of industry. For example, some of the apparently radical innovation in health care began life in automobile factories.

Some examples:

- Danish medical company Coloplast hired an astrophysics PhD to help think about products of the future. He asked 'stupid' questions, as he did not know – nor was he expected – to understand specifics about the industry.
- Webasto had an extensive discussion on the topic 'querdenker' (people who think against the grain). It realised that they had stopped recruiting such people, one reason being that such people can be quite demanding on resources. The company sometimes uses consultants or other external people to take on the role of a querdenke.
- Design and innovation consultancy IDEO hire people from backgrounds as diverse as medicine, engineering, anthropology and physics, to create a team with a strong track record in coming up with groundbreaking new ideas.

It's not simple…

Key issues which may make or break this strategy:

- An attitude of 'don't rock the boat'.
- Not allowing time for networking to take place; viewing it as a waste of time.
- The view that the way we have always done it is best.
- Believing that there is one right way.
- The 'not invented here' problem – firms see the world in the ways they want to see it, and reject ideas – and people – who challenge that.
- People who don't fit in don't stay very long.
- Difficult and different people are a pain in the neck – we don't want them (but we might need them?).

12 Idea generators

Last – but by no means least – is the strategy of using creativity tools and techniques to increase the flow of radical ideas.

Organisations have long since recognised the potential of using their workforce not simply as pairs of hands but as idea sources. There is plenty of scope for mobilising this resource towards more radical options and helping with discontinuous search.

Rather than using internal resources to do the searching and scanning for potential discontinuities, an increasing number of firms use an external agency. Such external agents are not necessarily required to produce detailed concepts or ideas but rather act as early warning systems for weak signals about changing trends.

For example, trend agencies provide companies with more general insights on socio-demographic development etc. But the interpretation for the company-specific context still needs to be undertaken by someone more familiar with the organisational context. An increasing number of design and innovation consultancies offer exploration of future scenarios and the investigation of company-specific implications.

Some examples:

- IDEO and other design houses deploy sophisticated creativity tools and a deliberately diverse set of perspectives to come up with radically different solutions.
- P&G Encore uses retirees to help act as gatekeepers and spotters.
- IBM hires school kids as trend spotters and an information feed to its pattern recognition toolkit.

It's not simple…

Key issues which may make or break this strategy:

- A mentality of 'not invented here'.
- A lack of structure and or resources to act on the insights.
- Not wanting to believe what you are hearing.
- Little connection between the workshops at which creative idea generation takes place and the mainstream organisation and its activities.

conclusion

Discontinuous innovation isn't about the everyday, but about the occasional, and because it doesn't happen all the time it poses a particular challenge, see it coming too late, or not at all, and a firm may end up out of business. History is clear on the matter; established firms prosper under steady state conditions but suffer when the rules of the game change.

Yet established firms can use the experience and resources of past projects to help spot the discontinuities coming. The ideal is to match the accumulated resources and wisdom which an established player possesses, with the entrepreneurial flair of the newcomer with fresh ideas and perspectives.

History is clear on the matter; established firms prosper under steady state conditions but suffer when the rules of the game change.

This briefing shows how smart firms are developing their innovation capabilities, so that they can pick up on discontinuous shifts early enough to do something about them. Just as human beings evolved an elaborate capacity for peripheral vision to help them get out of trouble quickly by spotting it early, so these firms are developing their version of such a capability in the innovation processes.

Of course, developing effective search approaches is only part of the solution to the discontinuous innovation challenge.

Firms must still deal with the problem of how to react to incoming signals which may point them in radically different directions, and require very different strategies. How to develop capabilities around strategic selection and decision-making is another key question, and one which the DI Laboratory is exploring in its next phase of work.

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