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Radical Innovation: Making the Right Bets

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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 250 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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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.

Our research reveals that organisations, here in the UK and elsewhere, must face up to the complex challenges associated with exploring and developing radical ideas and innovations if they are to continue to be successful in the long term.

- Discontinuous innovation – 'doing something different' innovation – is often the driver of sustained competitive advantage and shareholder value creation. As such the ability to support radical innovation is an essential organisational competence.

- The decision-making process in which resources are allocated to innovation projects is extremely challenging, as the degree of uncertainty involved means that using conventional systems and processes often leads to radical ideas being rejected.

- The research identifies twelve excuses that organisations use to justify their decision not to pursue radical innovation. Organisations must learn to recognise when they are making these excuses and find other ways of evaluating how to behave when faced with radical innovation.

- The innovation selection environment that operates in organisations can be described in terms of four zones. In two of those zones, new strategies are required for innovation selection decision-making.

- There are a number of promising strategies that can help organisations to back an innovation winner. These include: building alternative visions; bridge-building to/from outside the box; probe and learn method; using alternative evaluation and measurement criteria; mobilising sponsorship and championship; using alternative decision-making pathways; deploying alternative funding structures; using alternative – dedicated/devolved/decentralised – implementation structures; mobilising entrepreneurship inside and outside the firm.

- Through a thorough understanding of the innovation selection process, organisations can avoid the pitfalls that lead to abandoning potentially market-winning radical ideas. At the same time they can learn how to implement strategies that nurture and develop that all-important discontinuous innovation.

introduction: the innovation decision-making challenge

Innovation is an organisational imperative. Despite the many interesting and challenging possibilities for change, however, the realities of resource commitment – where pursuing one avenue often closes another – mean that organisations cannot afford to innovate at random. Instead a framework is required allowing an organisation to map out the role it believes innovation can play in helping the organisation to survive and grow, and in doing so provide a means by which the allocation of scarce resources to a portfolio of innovation projects may be assessed.

In a complex and uncertain world, such a strategic framework for innovation should be flexible enough to help monitor and adapt projects over time as ideas move towards more concrete solutions, but rigid enough to justify continuation or termination of a project as uncertainties and risky guesswork become replaced by actual knowledge.

A further complication is that, by its very nature, innovation decision-making involves dealing with uncertain outcomes. No one knows if innovations will work. The only route to greater certainty is through starting a project and then monitoring outcomes, all the while making further resource allocation decisions based on calculating the risks associated with different options as best as possible.

Not all innovation decision-making is equal, either. With incremental innovation, where firms make small and gradual improvements, decision-making can be based on well-established existing experience. With more radical innovation, however, circumstances and risk are so far beyond a firm's normal parameters for innovation decision-making that the firm faces a significant challenge in allocating resources appropriately.

The Discontinuous Innovation Laboratory

The Discontinuous Innovation Laboratory (DILab) was originally established in the UK in 2005 as an experience-sharing forum for companies and academic researchers interested in exploring the new and revised management capabilities needed to deal with innovation 'beyond the steady state'. From the original network of 30 companies and five researchers, the network has grown to include 12 countries, around 150 companies and 35 academic institutions. (See www.innovation-lab.org for more information.)

In operation the underlying metaphor of a laboratory is important – the core format involves workshops at which experiences are shared and approaches explored and diffused. In between these meetings (which take place on a quarterly basis) there is extensive case study/interview based research using a common research framework. The purpose has been to identify not only core themes and practices but explore the variety in their application under a number of different sectoral and operating contingencies.

Discontinuous Innovation: A definition

Discontinuous innovation: involves a fundamental change in the approach or technology. Every now and then a disruptive event occurs that changes markets, industries, and even societies. A good example is the advent of the internet. Such world changing events give rise to a wave of discontinuous innovation across many industries. This has a destabilising – or disruptive – effect for established firms. (Together with management innovation, discontinuous innovation constitutes higher order innovation, which can be a source of lasting competitive advantage.)

(1) A different approach

Meeting the innovation decision-making challenge requires understanding and finding ways to view the world in new ways – reframing. Both individuals and organisations, through collections of individuals, are unable to process all the information available to them in order to understand the world they operate in. Instead they cope by constructing simplifying frameworks – mental models – with which to make sense of the world.

One problem dealing with discontinuous innovation is that we do not possess the mental models with which to deal with such radical innovation, and so we tend to try to force such innovation to fit existing models. This process is made easier as the early external signals of radical innovation are often very weak, allowing interpretation within established frameworks to persist for some time. By the time the implications of the radical innovation become very apparent it is often too late for the organisation.

Polaroid was once one of the world's most innovative businesses – a technologically successful company that created and led the market for instant photography. Yet almost overnight the shutters snapped shut on Polaroid for the last time as it dissolved into Chapter 11 bankruptcy at the turn of the 21st century. But it wasn't because the company failed to see digital imaging coming; the firm was aware of the technology and had a number of patents in the area. The problem with Polaroid was that its management was to reframe its business model to take advantage of the new conditions.

Organisations need to get to grips with the problem of reframing as it provides some useful clues on developing alternative routines to support decision-making relating to resource allocation selection for highly uncertain innovation projects.

Using the kind of rationale methods which work well for incremental innovation is likely to be ineffective because of the high uncertainty associated with radical innovation. The high degree of uncertainty makes it difficult to assemble facts to build a clear business case, whilst the inertia of the existing framework allows people to make justifiable rejection arguments of the kind highlighted in the twelve excuses table.

The problem is complicated by the potential for radical innovation options to conflict with mainstream projects, risking cannibalisation of existing and currently profitable markets, for example, and the need to acquire different resources to those normally available to the firm.

Instead, alternative approaches outside the normal decision-making channels, may be needed to handle early stage thinking and exploring of opportunities, bring the innovation back into the mainstream processes when the uncertainty level has been lowered. This may require the development of parallel structures within the organisation or even setting up satellite ventures and organisations outside the normal firm boundary.

> One problem dealing with discontinuous innovation is that we do not possess the mental models with which to deal with such radical innovation...

Twelve excuses for rejecting radical innovation projects

Organisations have no shortage of justifications for persisting with the old ways of doing things. Our research has identified no less than twelve ways in which organisations attempt to rationalise the decision not to adopt a radical innovation.

| Argument	The established excuse	Examples
'It's not our business'	Recognition of interesting new business idea, but rejection as it lies too far from firm's core competence or current business areas.	Encyclopedia Britannica failed to exploit technologies of multimedia CDs and Internet, losing its position as leading information provider.
'It's not a business'	Evaluation suggests business plan is flawed along key dimension – often underestimating potential for market development and growth.	Fred Smith had the idea for an overnight delivery service while studying at Yale. His business professor, the United States Postal Service, UPS, experts, all said it would never work. Smith went on to found Federal Express**.**
'It's not big enough for us'	Emergent market size is too small to meet growth targets of large established firm.	Large and successful corporations need big ideas to grow. At one point Procter and Gamble needed to create a business the size of a Starbucks annually to meet growth targets. As a result, interesting new ideas are often dismissed as not big enough to help meet ambitious growth targets.
'Not invented here'	Recognition but ultimate rejection of interesting idea with potential – often by finding flaws or mismatch to current internal trajectories.	When Chester Carlson invented photocopying in 1937, the likes of General Electric, IBM, Kodak, and RCA, said the idea had no merit. Why buy an expensive copy machine when carbon paper was so cheap, plentiful, and convenient? Carlson set up his own company – Xerox – to exploit the idea.
'Invented here'	Recognition of interesting idea but rejection because internally generated version is perceived to be superior.	When electronics giant RCA developed a prototype portable transistor-based radio in the 1950s it saw little reason to promote apparently inferior technology continuing to develop and build its high range devices. Sony used the new technologies to gain access to the emerging consumer market and build a whole generation of portable consumer devices – reshaping the market.

Argument	The established excuse	Examples
'We're not cannibals'	Recognition of potential for impact on current markets but reluctance to adopt potentially competing idea.	The shift from cross-ply to radial tyres posed problems for existing players because it challenged them to cannibalise their existing markets.
'It ain't broke so why fix it'	No perceived relative advantage in adopting new idea.	Slow adoption of new techniques means newcomers are often able to seize advantage, as happened when solid state electronics innovators took on the established valve companies.
'Great minds think alike'	'Groupthink' at strategic decision-making level – new idea lies outside the collective frame of reference.	Despite extensive board-level discussion at Polaroid about how to react to digital imaging the response crystallised around the existing business model and groupthink helped rationalise that approach as the correct one.
'(existing) customers won't/don't want it'	New idea offers little to interest or attract current customers – essentially a different value proposition.	Disruptive innovation undoubtedly led to the shake-up in the airline industry with the shift towards low-cost, no frills travel.
'We've never done it before'	Perception that risks involved are too high along market and technical dimensions.	When fast followers are too slow they may end up so far behind the learning curve they cannot recover. Xerox was too slow reacting to the small copier revolution initiated by Japanese entrants to the market who brought new technologies to copying.
'We're doing OK as we are '	The success trap – insufficient motivation or organisational slack to allow exploration outside current lines.	It is difficult for incumbents to switch from approaches that have proved hugely successful up until that point.
'Let's set up a pilot'	Recognition of new idea's potential but limited, inadequate commitment to exploring and developing idea.	Senior management sets up a small team to develop ideas and plans for dealing with radical innovation, but backs off when faced with suggestions that have serious implications for the organisation, operationally as well as culturally.

Organisations try to balance the exploiting innovation activities – do what we do better – with more open-ended exploring innovation activities – doing something different. Most organisations also have innovation boundaries; comfort zones that define the limits to what is acceptable exploration, beyond which they are reluctant or unable to search.

Decision-making around radical options becomes constrained, giving rise to innovation anxiety and demands for thinking outside of the box. Higher levels of uncertainty put pressure on innovation resource allocation decision-making models. Ideas that do not fit neatly into the existing models are rejected, and over time a self-censoring element to the process arises.

Figure 1. The innovation selection space
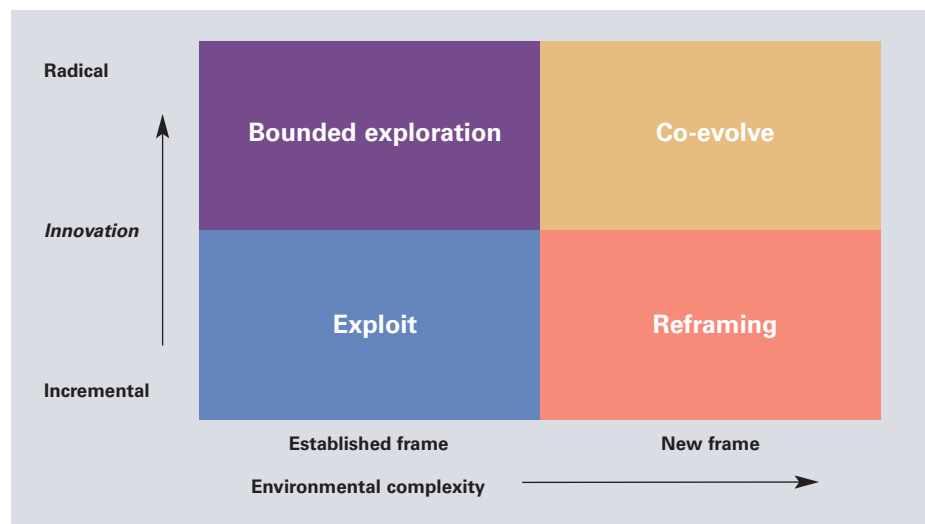
One way of looking at the innovation selection space is shown in figure 1. The vertical axis refers to the familiar 'incremental/radical' dimension in innovation, whilst the second relates to environmental complexity – the number of elements and their potential interactions.

Rising complexity means that it becomes increasingly difficult to predict a particular state because of the increasing number of potential configurations of these elements. It is here that problems of decision-making become significant because of very high levels of uncertainty.

The first two zones represent familiar territory in the innovation selection space.

■   **Zone 1**

This is the exploit domain in innovation. It presumes a stable and shared frame, a business model architecture, within which adaptive and incremental development takes place. Selection is associated with the steady state, and includes portfolio methods, stage gate reviews, clear resource allocation criteria, project management structures, and so on. The structures involved in this selection activity are clearly defined with relevant actors, clear decision points, decision rules and criteria.

■ Zone 2

Zone 2 involves selection which is a bit more adventurous but still takes place within the same basic mental frame – business model as usual.

The bets may have longer odds but the decision-making is still carried out against an underlying strategic model and sense of core competences. Debate and politicking may take place about which choices to make, but there is an underlying framework to define the arena in which this takes place.

The structures involved in such selection activity are, of necessity, focused at high level key strategic commitments rather than tactical investments. These are big bets. There are often tensions between the exploit and exploring views, and boardroom battles between these two camps for resources are often tense.

Since exploratory concepts carry high uncertainty the decision to proceed becomes more of an act of faith than one matched by a clear, fact-based business case. Consequently, emotional characteristics, such as passion and enthusiasm on the part of the proposer – champion behaviour – or personal endorsement by a senior player – sponsorship behaviour – play a more significant role in persuading decision-makers.

■ Zone 3

This zone is associated with reframing. It involves searching and selecting from a space where alternative architectures are generated, exploring different permutations and combinations of elements in the environment.

This process, essentially entrepreneurial, is risky and often results in failure but can also lead to the emergence of new and powerful alternative business models. This often happens by working with elements in the environment not embraced by established business models, and consequently poses problems for existing players.

There is a strong reinforcing inertia about systems for search and selection. The value networks take on the character of closed systems which operate as virtuous circles and, for as long as they are perceived to create value through innovation, act as inhibitors to reframing. After all, why change an apparently successful formula with relatively clear information about innovation options and well-established routines for managing the process?

The innovation in this space does not necessarily involve pushing technological frontiers, but rather about working with new architectures – new ways for framing what is already there.

The low cost airlines industry, for example, developed a new way of framing the transportation business based on rethinking many of the elements – turnaround times at airports, different plane designs, different internet based booking and pricing models, etc. – and also working with different new elements – essentially addressing markets like students and pensioners which had not been major elements in the traditional business model.

Innovation resource allocation approaches which work well for zones 1 and 2, do not necessarily work well here. The innovations themselves may not be radical, but they require consideration through a different lens and the kinds of information which are involved, and the perceived significance of that information may be unfamiliar or hard to obtain.

Zone 2 involves selection which is a bit more adventurous but still takes place within the same basic mental frame...

For example, in moving into new under-served markets the challenge is that traditional market research and analysis techniques may be inappropriate for markets which effectively do not yet exist.

Many of the twelve justifications can be mapped on to difficulties in managing selection in zone 3. For example, *'it's not our business'* relates to the lack of perceived competence in analysis of new and unfamiliar variables. '*Not invented here'* relates to similar lack of perceived experience, competence or involvement in a technological field and the inability to analyse and take rational decisions about it. *'It's not a business'* – relates to apparent market size which in initial stages may appear small and unlikely to serve the growth needs of established incumbents. But such markets could grow – the challenge is seeing an alternative trajectory to the current dominant logic of the established business model.

The challenge is detecting a possible new pattern and absorbing and integrating new elements into it. This is hard to do because it requires reframing, and challenges the existing system. Powerful social forces that militate towards conforming come into play. Significantly, where there are examples of radical changes in mindset and subsequent strategic direction, these often come about as a result of crisis, which shatters the prevailing mindset, or with the arrival from outside of a new CEO with a different world view.

The challenge is detecting a possible new pattern and absorbing and integrating new elements into it.

- **Zone 4**

Zone 4 is where new-to-the-world innovation takes place; it is the edge of chaos, a complex environment where innovation emerges as a product of a process of co-evolution, and complex interactions between independent elements.

Processes of amplification and feedback reinforce what begin as small shifts in direction and gradually define a trajectory. All bets are potentially options – and high variety experimentation takes place. Selection is a real problem since it is, by definition, impossible to predict what is going to be important or where the initial emergence will start and around which feedback and amplification will happen.

This zone poses major challenges to established sets of selection routines, even if capable of dealing with known unknowns. Zone 4 is unknown unknowns territory. Analytical tools and evidence-based decision-making, reviewing business cases, for example, are inappropriate for deciding on what moves to make in an innovation game where the rules are unclear and the board on which it is played has yet to be designed.

> Zone 4 is where new-to-the-world innovation takes place; it is the edge of chaos, a complex environment...

A good example is the management of chronic diseases like diabetes in a future where the incidence is likely to rise, the costs of treatment will rise faster than health budgets can cope, and where many different stakeholders are involved – clinicians, drug companies, insurance companies, carers and patients.

Table 1 below summarises the challenges posed across our selection space and highlights the need to experiment with new approaches for selection in zones 3 and 4.

Table 1: Selection challenges, tools and enabling structures

Zone	Selection challenges	Tools and methods	Enabling structures
1 **'Business as usual'** – innovation under steady state conditions, little disturbance around core business model.	Decisions taken on the basis of exploiting existing and understood knowledge and deploying in known fields. Incremental innovation aimed at refining and improving. Build strong ties and work with key players in existing value network.	'Good practice' new product/service development. Portfolio methods and clear decision criteria, stage gate reviews along clear and established pathways.	Formal and mainstream structures – established stage-gate process with defined review meetings. High involvement across organisation roles and functions in the decision-making.
2 **'Business model as usual'** – bounded exploration within this frame.	Exploration – pushing frontiers of technology and market via calculated risks – buying a look at new options through strategic investments in further research. Involves risk-taking and high uncertainty.	Advanced risk assessment tools – e.g. R&D options and futures. Multiple portfolio methods and 'fuzzy front end' toolkit – bubble charts, etc. Criteria used are a mix of financial and non-financial. Judgmental methods allow for some influence of passion and enthusiasm.	May form part of existing stage gate and review system with extra attention devoted to higher risk projects at early stages. May also involve special meetings outside that frame – decision-making at strategic (board) level rather than operational.
3 **Alternative frame** – taking in new/different elements in environment.	Reframe – explore alternative options, introduce new elements. Challenge involves decision-making under uncertainty, but not simply a problem of lack of information and the need to take risky bets to learn more. There is also the issue of unfamiliar frames of reference and the difficulty of letting go of a dominant logic. Cognitive dissonance means that incumbents have trouble forgetting enough to see the environment through new eyes.	May use variations of existing toolkit – e.g. portfolio methods, but extend parameters: fuzzy front end, bubble charts, etc; alternative futures and visioning tools; constructed crisis; prototyping – probe and learn; creativity techniques; use of internal and external entrepreneurs decentralising development of early business case; alternative funding models and decentralised authority for early stage exploration.	Unlikely to fit with established decision structures – stage gate and portfolio – since these are designed around established business model frame. Needs parallel or alternative evaluation structures – at least for early stage.
4 Radical – new to the world – possibilities. New architecture around as yet unknown and established elements.	Emergence – need to co-evolve with stakeholders ▪ Be in there ▪ Be in there early ▪ Be in there actively.	Complexity theory – feedback and amplification, probe and learn, prototyping and use of boundary objects.	Far from mainstream: satellite structures – skunk works or even outside the firm; licensed dreamers; outside agents and facilitators.

managing the innovation selection process

(1) Tools to help

Faced with the reframing and high uncertainty challenges of zones 3 and 4, how can organisations manage the selection process? We've seen that established methods like stage gates, business cases, portfolio tools etc, start to break down under these conditions – so what else can they use? Research and experience-sharing within the AIM Discontinuous Innovation Laboratory suggests a number of promising lines for development, including:

- Building alternative visions;
- Bridge-building to/from outside the box;
- Probe and learn methods;
- Using alternative evaluation and measurement criteria;
- Mobilising sponsorship and championship;
- Using alternative decision-making pathways;
- Deploying alternative funding structures;
- Using alternative – dedicated/devolved/decentralised – implementation structures;
- Mobilising entrepreneurship inside and outside the firm.

a) Building alternative futures

Firms should look at alternative mental models, consider different approaches and attempt to assess their relevance and salience for their business strategies – as an insurance policy if nothing else.

Here the area of futures studies is useful, using tools such as forecasting, trend extrapolation and scenario building to create and explore alternative models of the future and the potential threats and opportunities which they contain. This develops flexibility in framing, helping build a tolerance for ambiguity within the decision-making structures of the organisation.

Increasingly futures tools are being deployed in frameworks designed to open up new innovation space. The Gamechanger programme, for example, has been used in organisations such as Shell and Whirlpool. Many other companies, including BMW, Novozymes and Nokia, use similar approaches, deploying a range of techniques including metaphors, storytelling and vision-building, increasingly in a cross-sectoral fashion, recognising that the future may involve blurring of traditional market or demographic boundaries.

The electrical engineering and electronics firm Siemens uses storytelling, identifying trends of the future (like mega cities) and using these as the basis for storytelling about the importance of selecting discontinuous ideas to deal with the future challenges that go hand in hand with these trends.

> **Increasingly futures tools are being deployed in frameworks designed to open up new innovation space.**

Organisations can use a 'constructed crisis' technique, where the firm deliberately explores radical and challenging futures to create a sense of unease, a platform from which to develop new directions forward. Or another strategy is to use outsiders, such as consultants, to provoke and challenge the status quo by questioning existing assumptions and presenting radically different views to the collective wisdom of those in charge. The challenging can also come from inside the organisation. Intel, for example, which by fostering a process called 'constructive confrontation' encourages a degree of dissent.

Strong leadership can be critical to carrying the company forward into new territory, especially when the orthodoxy is being challenged.

b) Prototyping as a way of building bridges in the selection process

Radical innovation is essentially a leap into the unknown and part of the problem is that we don't have anything against which to compare it. Short on facts and relying on imagination and guesswork it should be no surprise that there is often a tendency to play safe – especially if the imagined picture of the innovation looks like nothing ever seen before.

When entrepreneurs see something new, in order to take that forward and make the idea a reality, they face the challenge of mobilising resources and convincing people of an innovation's potential without any supporting evidence.

In these cases a useful strategy is to attempt to build bridges in the minds of potential supporters between the current state of affairs and what might be. Building bridges involves finding stepping stones between the two situations, and one way of achieving this is to use prototyping, creating stepping stones that allow people to better understand and shape the idea when it is still in its formative stages.

Matthias Gold, Senior Manager of Egozentrik – a German start-up company that designs hybrid bikes – reports that they developed around 40 prototypes over a five years period to collect information about the unknown territory of hybrid bikes and to learn from the feedback gained.

Prototyping includes physical models, simulation, and many other forms, spanning both manufactured products and service concepts. The process can also involve outsourcing the exploration to consultants that act in a bridging fashion, reducing the risk to the organisation. By employing consultants like IDEO or ?What if! organisations can conduct safe experiments and then develop and work with the emerging prototype.

Prototyping plays an important role in highly complex environments (zone 4) where there is no clear direction and where processes of co-evolution are involved. Under these conditions tools like feedback and amplification around key points are important. Arguably prototypes provide the boundary objects to enable this to happen. For example, in the UK the NHS have been working with a team from the Design Council on prototypes for radical new approaches to diabetes care – recognising that this is huge and growing problem that will require very different approaches to its management in the future. (see www.designcouncil.info/RED/health for more).

c) Probe and learn

A big part of the problem when making selection decisions about radical innovation ideas is the scale of uncertainty. Given the choice, organisations opt for more certain over less certain, a tendency that militates against more radical innovation.

One way of dealing with the uncertainty problem is to use 'probe and learn' approaches, taking small steps into the unknown. The idea is to facilitate a move to a new place outside the comfort zone through a series of planned experiments. These serve two functions – they provide new information about what does and doesn't work and so help build the case for selection. But they also represent ways of mapping unsafe territory and reducing the emotional anxiety. In this sense they are investments in what has been called 'buying a look' – and they help assemble the beginnings of a case for further support and exploration.

Probe and learn stages the risk attached to selection decision-making into smaller steps, rather than forcing a once and for all commitment. Investments in buying a look may help point in new and exciting directions justifying the investment – or they may fail, revealing that it is the wrong direction to head in.

Increasingly, smart organisations are using probe and learn approaches as a deliberate strategy to explore and take options on uncertain but interesting future directions. So, rather than confirming and shaping existing ideas, prototyping becomes a planned experiment to test a hypothesis, where failure of the experiment is worth as much as success in terms of learning about the directions not to travel in.

Collecting data from extreme environments and fringe users becomes useful for getting early warning about possible weak signals for change, and learning how to work under these very different conditions. There are plenty of methods to choose from but they all share the characteristic of being deliberate experiments in the unknown.

BBC Backstage tries 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, TV listings and so on, to integrate and shape innovative applications. The strap line is *'use our stuff to build your stuff.'*

Ben Metcalf, one of the programme's founders, summed up the approach.
"*Top line, we are looking to be seen promoting innovation and creativity on the Internet ... if someone is doing something really innovative, we would like to ... see if some of that value can be incorporated into the BBC's core propositions.*" The process is linked to Innovation Labs – essentially a short-term incubator run at various regional locations where promising ideas can be worked up jointly by BBC staff and developer before being pitched to senior managers for possible adoption.

d) Using alternative measurement and evaluation criteria

Selection systems require decision-making criteria, and a general acceptance of these criteria as a good basis on which to take decisions. The high uncertainty associated with radical innovation makes this problematic. As a result, a compromise is often reached whereby existing systems are adapted; a solution that may be only partially effective.

For example, Reckitt Benckiser employs conventional criteria but increases the hurdle rate in order to mitigate the risk associated with uncertainty. Kodak relaxes conventional criteria recognising that discontinuous innovation needs room for moulding and maturing. Unilever applies broad boundaries – maximum permissible losses – within which discontinuous innovation can be nurtured.

Elsewhere, organisations are experimenting with deploying alternative criteria within their decision systems, using approaches like discovery-driven planning where higher uncertainty is involved along technical, market or other dimensions. The idea here is that, instead of using stage gates when a simple 'pass/fail' decision is made, learning loops are used where at each loop there is a discussion about what is known and what needs to be explored further – where to target the next stage of learning. These models link to resource allocation in the same way as stage gates but have the advantage of allowing further exploration to proceed.

e) Mobilising networks of support

People with radical ideas need a great deal of personal energy, enthusiasm and passion to move their ideas forward, and get them beyond the organisation's comfort zone. Help from other people can also be very useful; especially if those people happen to be powerful sponsors at high levels who can help promote their cause or ease some of the tensions it sets up.

Champions of radical innovation fulfil a number of different roles, including: technical champions, project champions, senior management champions and business unit champions. These roles may be combined in a single individual, such as James Dyson of Dyson vacuum cleaner fame, or be divided among several people in a team or tandem arrangement, as with Art Fry and Spence Silver at the multinational conglomerate 3M.

In their work on radical innovation in the USA, academics Gina Colarelli O'Connor and Robert Veryzer observed three distinct roles of individuals that help formulate, articulate, sustain and implement DI opportunities:

- Ruminators – are contemplative, experienced and progressive people, with the ability to bring together disparate information by looking far beyond their own business boundaries. This role is key to the search phase.

- Champions – promote the opportunity identified by the ruminator. They are entrepreneurial in obtaining the necessary resources and effective at selling or justifying the vision. This role is key to idea selection.

- Implementers – are often volunteers who enjoy working on more risky projects, particularly if they feel they have an opportunity of working on technology that may change the world. These people are key to implementation.

The challenge lies in building champions into the decision-making process, rather than hoping that they will emerge. One approach is to make formal links with senior managers who are then tasked with becoming a sponsor for discontinuous innovation projects. Another approach is to identify and use highly technically adept individuals with a high profile reputation.

For example, one basic element of British Telecoms' Wakaba programme (Japanese for 'green shoots'), designed to support innovative ideas within the company, is the creation of partnerships. Each project has a senior management mentor associated with it. Every eight weeks on-going innovation projects are reviewed by a jury of top executives. The mentors represented at these sessions provide advice and guidance to help shape and take ideas forward. This process ensures that top management is both aware and involved in the innovation activities.

Some organisations, such as Cancer Research for example, may co-opt outsiders to help with the innovation process, to bring in different perspectives and provide support and championship for interesting ideas.

f) Using alternative decision-making pathways

Smart organisations have systems in place to review the progress of innovation projects from idea to implementation. These systems often take the form of an innovation funnel: a sieve at the front to select and build a balanced portfolio of projects which match business needs and then a series of stage gates to review progress against increasingly tight criteria and objectives.

Radical innovation is less amenable to the mainstream funnel approach. That is because the mainstream systems are designed to manage risk and enable decision based on market and technological facts that are marshalled into a clear business case. Ideas which are vague, hazy, speculative and lacking a clear business case – radical innovation – are thrown out.

The inability of conventional funnel systems to cope with more risky innovation has led some organisations to create alternative pathways for developing radical ideas, at least to the stage where they can stand up for themselves in the mainstream innovation funnel process.

These parallel or alternative structures for radical innovation vary in shape and form but essentially have a 'fuzzy' front end which allows for building a potential portfolio of higher risk ideas and options, plus some additional mechanisms for gradually building a business case which can be subjected to increasingly critical criteria for resource allocation.

These systems may well rejoin the mainstream funnel at a later stage, or they may continue to operate in parallel – see figure 2. And they may lead to a range of options other than progression as a mainstream project – spin off, license out, buy in, for example.

Smart organisations have systems in place to review the progress of innovation projects from idea to implementation.

The Ordnance Survey mapping organisation in the UK uses a model based on the popular BBC TV series, *Dragon's Den*:

- A panel of senior executives periodically get together to assess competitive funding bids for both conventional and discontinuous projects.

- Ideas generated by employees are initially assessed against predefined criteria by 'innovation angels' who then select and refine projects for presentation.

- The idea is then pitched to the members of the Dragons Den which decide on whether to support it with ring fenced funds.

- Not only are the projects selected using a forum that bypasses the corporate immune system but they also gather considerable executive support from the outset.

The communications company O2 adopts a more informal approach, using Presentation Rounds. These are early stage forums in which both conventional and discontinuous ideas can be pitched to senior staff. No formal screening criteria are applied and the competition is not to win funding. Successful projects gain the interest and support of the senior staff and are allocated a champion, who acts as a sponsor and advocate, to help take the idea further and assist in securing resources.

Both methods require either discretionary or dedicated developmental resources, which are separate from the traditional R&D or Innovation budgets.

Another interesting development is the use of internal markets to assess ideas. The key is to open the evaluation to a broader set of people, and get an aggregation of opinions. Some companies, for example, are experimenting with virtual stock market models. A group of people are able to trade virtual shares of new product ideas on a virtual stock market. Virtual shares can represent multiple future events – the specific sales of a new product at a determined timeslot, for example. The value of the shares depends on the realisation of the market situation.

This tool falls somewhere between evaluation by experts and consumer research. Not only can an organisation gain market insights, it can also track down people with a specific talent in forecasting future sales, identifying them by the value of their virtual portfolio.

Another approach is to use open evaluation platforms which enable all or some individuals within the business to evaluate a product quantitatively or qualitatively and to make suggestions about how to take the idea further.

Swedish paper products company SCA has developed a system that not only aims to manage normal and radical innovation via different routes, but attempts to capture and retain ideas which, while not finding immediate application, might prove useful in the future.

Central to the system is distinguishing between 'inside the box' and 'outside the box' innovation ideas.

- 'Inside the box' ideas are defined as incremental technological innovations with little market novelty and initiatives which are within the current competence area of the firm.

- Those ideas which are completely new for the firm, in either the technological or business dimension, are defined as 'outside the box' initiatives.
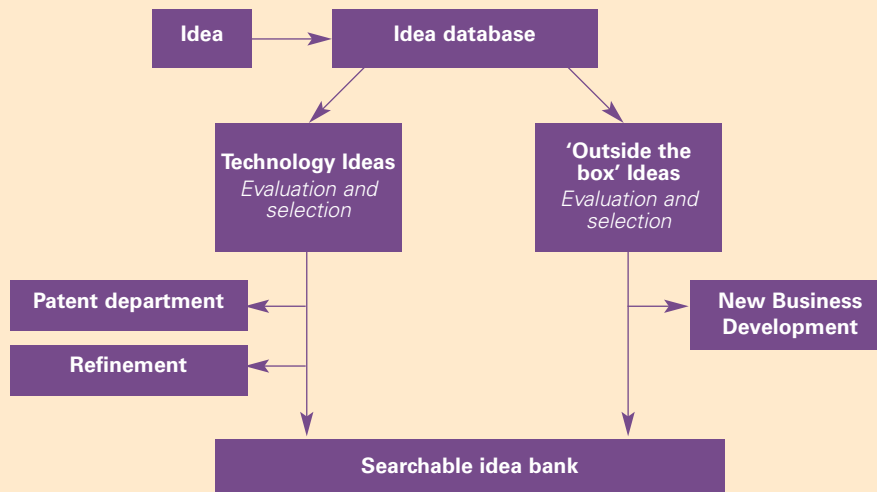
When an idea is submitted it is classified as either 'inside the box' or 'outside the box' and then takes a different path depending on its nature.

'Inside the box' ideas go either to the patent department for further investigation, or to the market organisation. Those ideas are treated like other project initiatives within the firm.

'Outside the box' ideas go to a recently started unit called New Business Development (NBD) which lies outside the rest of the organisation and aims to evaluate, incubate and develop those ideas. Here, the evaluation process differs from the assessment of incremental innovations. The criteria are less rigid; rather than evaluating an idea according to the current capabilities of the firm, the initial screening attempts to define gaps in capabilities, and find ways to solve the potential problems associated with those gaps.

Moreover, instead of evaluating ideas according to their risks, an iterative approach is employed aiming to identify and reduce risks. When these ideas have been developed further they are either handed over to the main organisation of the firm or launched as independent ventures.

g) Deploying alternative funding structures

Resources are essential to allow further exploration of technical or market options, to develop and test ideas, to commit to full-scale preparation and launch, and to support innovations in the long term as they mature and continuously improve. But how should you allocate resources?

Not surprisingly, smart organisations have developed sophisticated alternative and parallel funding arrangements which provide access to funding on a range of different terms.

Figure 2: Funding alternatives
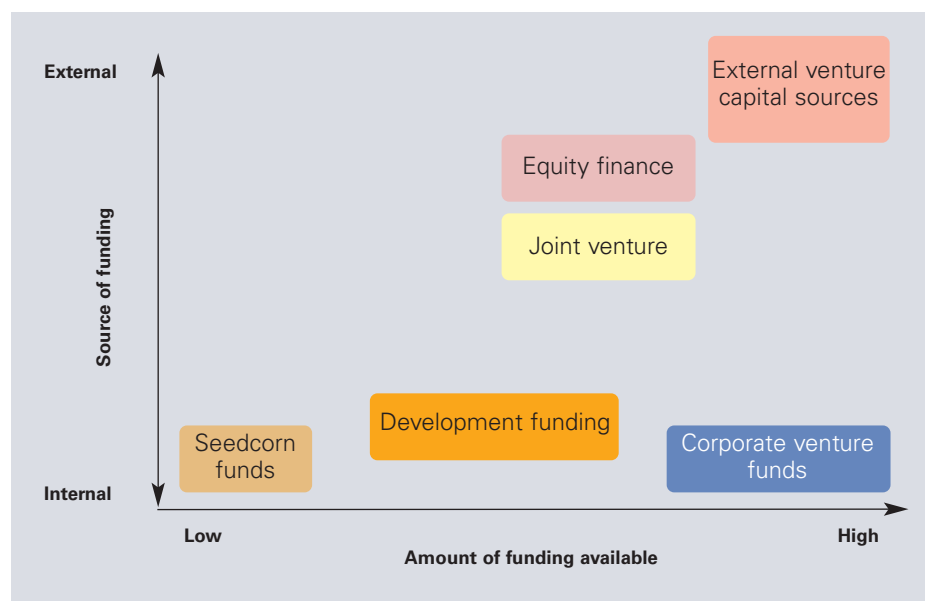
Figure 2 shows a range of funding alternatives. One axis details the amount of funding, from small development increments to full scale big bets. The other axis is the extent to which this is internal funding as opposed to external.

A significant number of organisations tap special dedicated or discretionary budgets to finance radical innovation projects. Using a special funding approach provides access to a more reliable funding stream for those people working on the project. In many cases such projects also have a top level champion who can sometimes provide additional access to resources.

Partnering also brings in resources, but with a different perspective – that of an external organisation. It enables financial risk to be shared and ensures that an incubating discontinuous innovation is given appropriate focus, not left on the back-burner.

Many organisations develop a parallel structure or track for ideas which lie outside the mainstream by setting up some kind of dual structure, whether it is called a special project team, incubator, new venture division, corporate venture unit or skunk works. Some have a more formal status than others; some have more direct power or resources; others are dependent on internal sponsors or patrons.

The purpose of the dual structure is to protect new and often high-risk ideas from the mainstream organisation until they have achieved some measure of commercial viability. Such units, though, are hard to manage effectively. Research suggests that they work best when they have CEO-level support, clear objectives, and their own separate sources of finance. They work least well when parent company managers meddle in the evaluation and selection of ventures, and when they are expected to support multiple, changing objectives.

Another issue with dual structures is the need to bring the idea back into the mainstream at some point. Dual structures are useful vehicles for growing ideas to the point where they can be more fairly evaluated against mainstream criteria and portfolio selection systems, but they need to be seen as temporary rather than permanent mechanisms. Otherwise there is a risk of separation and, at the limit, a loss of leverage against the knowledge and other assets of the mainstream organisation.
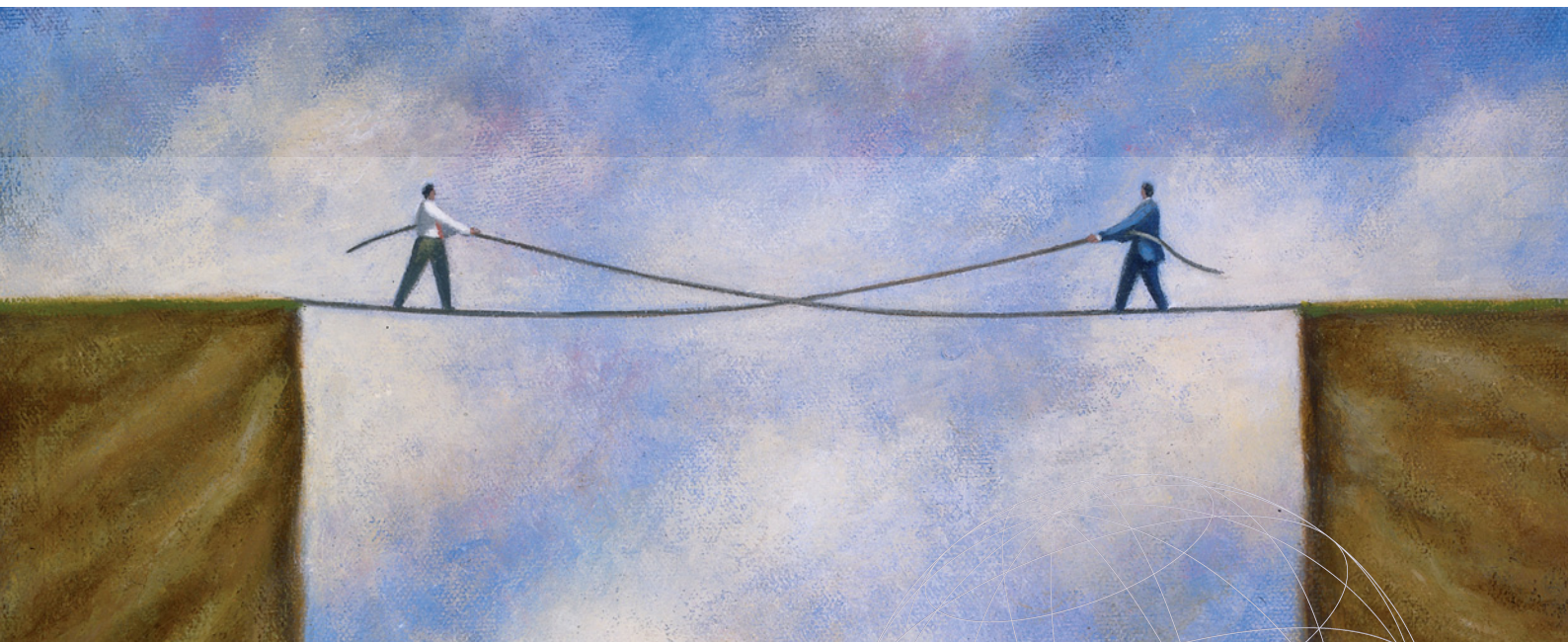
h) Using alternative, dedicated implementation structures

One problem with making decisions about resource allocation for discontinuous innovation projects is that the ideas are not well developed when they first come up for consideration.

A strategy for dealing with this is to make use of different mechanisms for incubation and early stage development elsewhere – off-line or at least away from the harsh environment of the normal resource allocation system.

Coloplast, the Danish medical devices firm, established a small group, Nebula – New Business Lab, with the remit to explore and bring back new options in an attempt to open up new market and technology space and move beyond its existing product range. Those options could include acquisitions, licences for new technologies, new alliances and partnerships or established product ideas. The group also looked at licensing and spinning out.

Some organisations set up external ventures where such incubation can take place. Siemens makes use of satellite SMEs in which it has a share to act as incubator environments to take forward some of its more radical ideas. Others take stakes in start-ups to explore and develop ideas to the point where they might represent formal options for full acquisition – or spin out.

Another approach is to use third party consultants as a short-term environment in which more radical ideas can be developed and explored. IDEO and others have been playing this role on behalf of several firms; the consultancy firm ?What if! now has its own venture arm in which it takes stakes in radical ideas which emerge from its consulting activity.

In many cases the venturing and the dedicated funding themes are linked in some form of new venture fund. At Unilever Ventures, for example, the firm's quasi-autonomous division is responsible for assessing, selecting, and investing in discontinuous innovation opportunities originating from within and outside Unilever.

With a budget of $250m it is essentially a corporate venture fund that co-invests in businesses outside the usual scope of Unilever operations. It has an exit horizon of five years and, beyond not losing more than $50m a year, is relatively unconstrained.

Unilever's approach is also ideally suited to engaging in partnerships. These confer a host of benefits including risk sharing, a higher probability of project success through shared skills and experience, and a greater level of commitment than found in solo ventures.

Furthermore the reduction in risk and uncertainty associated with effective partnerships may lead to a broader range of discontinuous innovation being considered and selected. At the end of the five-year investment cycle the mature businesses will either need to be sold off or bought out entirely and incorporated into Unilever's corporate structure.

It must be noted, however, that although they are effective vehicles for identifying and exploring radical innovation, the operational, organisational and strategic disconnect between such venture works and their projects and the corporation raises some serious issues, not least being the feasibility of assimilating a mature but discontinuous business into the parent company.

SAP, the business software solutions firm, set up a venture unit called SAP Inspire to fund startups 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 this in several ways including:

- 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.

i) Mobilising entrepreneurship

Entrepreneurship is at the heart of the discontinuous innovation challenge – seeing opportunities and making them happen in the form of radical innovation. It makes sense, therefore, to explore options that help the process forward, and build on the core principles of entrepreneurship – like being able to pitch an idea with passion and enthusiasm, as well as a good story.

One strategy is to try to identify and work with entrepreneurs inside and outside the organisation and allow their natural capabilities to help select and implement discontinuous innovation ideas. This freedom is at the heart of many famous programmes such as 3M's intrapreneuring, or more recently, the 'free' time allocated to Google's engineers to explore new ideas of their own.

Procter and Gamble takes its open innovation model forward partly through the use of technology entrepreneurs who identify new ideas and help to promote and sell them internally, for example.

Biotech firm 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.

A number of organisations are trying to make explicit use of the entrepreneurial approach to help with the other stages of the discontinuous innovation challenge – search, select and implement. Creating the culture to enable this is not easy, it requires a commitment of resources, and also a set of mechanisms to take bright ideas forward, including various internal development grants and often complicated and fickle internal funding processes.

Many such schemes include a strong incentive scheme for those willing to take a lead in taking ideas into marketable products at their core. An additional incentive is often the opportunity to not only lead the development of the new idea, but also get involved in the running of the new business.

Fostering a bootlegging culture – encouraging people to try things out without necessarily asking for permission or establishing a formal project – can also be a productive way of nurturing more radical ideas. It allows strong ideas to surface through the energy of entrepreneurs, in spite of apparent rules and constraints.

conclusion

Innovation strategy is far from being an exact science. The process of choosing where to place scarce resources when the outcomes of the projects to be backed are unknown has a lot in common with betting at the racetrack – but without the benefit of the initial betting odds to provide a guide to prospective success.

Over time, however, smart organisations develop systems to help them with the uncertainty attached to discontinuous innovation – using frameworks and techniques which help them convert raw uncertainty into a degree of calculated risk, and then to spread this risk across a portfolio of projects. To return to the betting metaphor, they find ways of arriving at some betting odds for their radical innovation projects, and then continue to adjust those odds over time as the projects progress.

Increasingly, radical innovation – do something very different – rather than incremental, steady state innovation – doing what we do but better – is what provides competitive advantage and industry beating performance. To do radical innovation well means that organisations have to develop parallel and workable systems to provide an effective approach to managing highly uncertain innovation outcomes.

While the perfect system for detecting, nurturing, developing and exploiting radical innovation has yet to be created, our research shows that there is lot firms can do to increase their prospects of success – it is no longer a question of a sticking a few pins on a list of projects and hoping for the best.

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