Mark Dames, David Robson, Madeline Smith and Tom Tumilty

Innovation 2.0: Redefining Boundaries Between Producers and Consumers

Innovation, the successful exploitation of new ideas, is increasingly a process of shared activity, often engaging the combined resources of individuals, business and government. Innovation 2.0 is the next generation of innovation that delivers new value to consumers and citizens by leveraging their desire and capacity to create value for themselves and their peers – generating social as well as economic gain.

Introduction

In a world where the most significant problems and opportunities are new, our ability to change as well as create is vital. Evolution is not the survival of the fittest, but of those best able to adapt. However, increasingly change is coming from the margins of society rather than the mainstream, such as in open-source software communities.[1] Across all sectors of the economy there is significant untapped potential in 'democratising' innovation, creating the development of new products, services and organisational structures that leverage emerging social and collective behaviours.[2] To release this un-tapped potential, new social, behavioural and technological trends must be understood and exploited.

New innovation communities have emerged that represent networks of users, experts, activists and individuals – inside and outside firms – collaborating to create new customer and citizen value. Innovation 2.0, the next generation of innovation, leverages these trends to access *all* sources of talent and *all* scales of enterprise – exploiting diversity of supply to address diversity of demand. For business this means re-defining the boundaries between customers and producers; for government it means re-framing the contract between citizen and state.

The Innovation 2.0 challenge

The question for business and government is how to effectively aggregate the value of peer-to-peer relationships formed under Innovation 2.0, and how to access and harvest the ideas and perspectives from those they do not control (see Figure 2). For most organisations, their focus on innovation largely ignores these issues with attention and resources directed almost exclusively to

The question for business and government is how to effectively aggregate the value of peer-to-peer relationships formed under Innovation 2.0, and how to access and harvest the long tail of ideas and perspectives from those they do not control.

Figure 1 Innovation 2.0

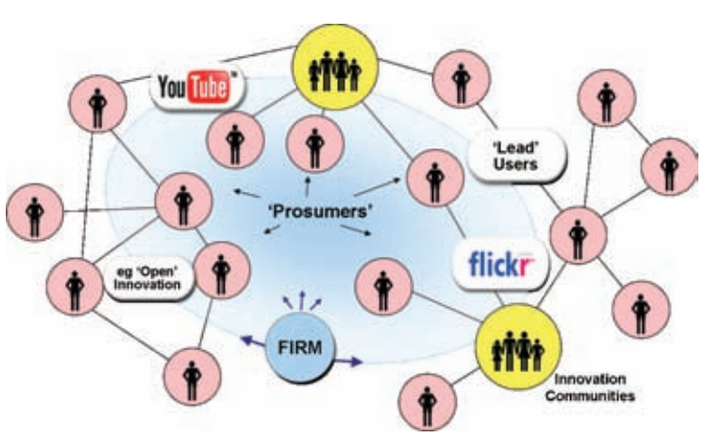
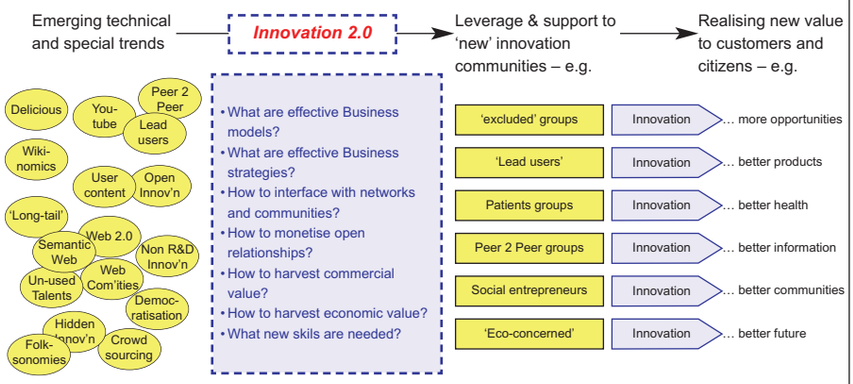


Figure 2 New and existing models of collective networking and social interaction



What new organisational relationships are necessary in order to harvest commercial and sustainable gain … what new skills are needed and how can companies exploit new technology, emerging business models and evolving social trends?

a linear 'science-to-commercialisation' paradigm. How can formal structures of firms and governments interface with informal networks and communities, and how can these relationships be harvested for economic and social gain?[3]

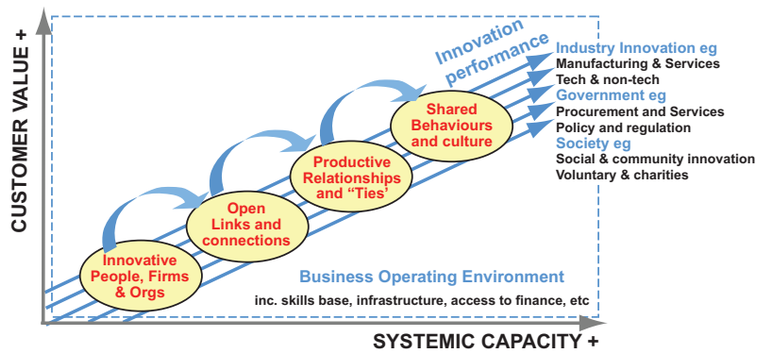
Companies have developed systematic processes for innovation, new product development, manufacturing, production and distribution. But in Innovation 2.0, these processes are becoming more and more democratised, to be controlled and resourced by communities and individuals. For business, what are relevant and effective business models? What new organisational relationships are necessary in order to harvest commercial and sustainable gain? In Innovation 2.0, what new skills are needed and how can companies exploit new technology, emerging business models and evolving social trends?

For government, often accused of lagging behind developments in innovation, what is their role in harnessing and adopting Innovation 2.0 and what are the implications on regulation and incentives? Users of products and services, equipped with the knowledge of how they really work in practice, are frequently more innovative than the original manufacturer or producer. Forward thinking governments recognise the role of such *user-led* innovation and its impacts on the economy and society at large. Citizens are increasingly changing from passive recipients of information provided by experts, to active producers of information themselves, and consumers of information made by other citizens.

In healthcare, the power of Innovation 2.0 is already changing the way in which patients interact with doctors and specialists. The internet is being used as a routine source of information by patients prior to visiting their doctor, by those in search of a second opinion and by friends and relatives eager to better understand the condition of someone they know. The widespread availability of online health information has profound implications for the relationship between patients and medical professionals by enabling users of services to provide information to one another about both their medical conditions, and their experiences of using health services. Studies have examined the patient benefits of participation in such user-generated online communities. Most that have reported measurable outcomes have detected positive effects of participation in user-generated websites. For example, one study found a positive correlation between the amount of participation on online communities of fellow patients and the psychosocial well-being of women with breast cancer.

Patient-led Innovation 2.0, in areas such as healthcare, can generate insights that help policy-makers and service providers better understand the information requirements and choices available for users and professionals at each stage. They are able to know what information each type of person needs, at what point in the decision-making process and through which channel it is best delivered. This kind of intelligence gleaned through Innovation 2.0 will help governments to know if, when and why information should be changed, optimising subsequent decisions and improving informed choice. Such creation and sharing of information across electronic networks is only now beginning to achieve a scale of consequence for policy-makers, equipment providers, users and professionals.

Figure 3 Key components of innovative capacity needed to generate customer value



A systemic approach to Innovation 2.0

For Innovation 2.0 to flourish it must operate across a wide diversity of actors that together respond as an adaptive system. This represents a complex and non-linear system of shared responsibilities, encompassing a dynamic choreography of interactions, relationships and behaviours. Therefore, a strategy for Innovation 2.0 must nurture an innovation ecology which emulates this systems-based approach – allowing resources to be directed to the points of maximum leverage, with government increasingly acting in the role of strategic enabler.

Successful innovation ecologies must encompass the following essential and self-reinforcing components (see Figure 3):

- **Innovative People, Firms, Organisations and Institutions** innovative people and companies; high-quality universities; responsive and imaginative public bodies; vibrant and committed voluntary and social agencies;
- **Open Links and Connections** innovative organisations leveraging links and connections with partners, customers and competitors; accessing skills, resources and ideas;
- **Productive Relationships and Ties** productive relationships benefiting the wider innovation system beyond the individual organisations concerned;
- **Shared Behaviours and Culture** collaborative relationships building trust and risk-sharing capabilities.

Underpinning a successful Innovation 2.0 ecosystem must sit a supportive operating environment where skills, funding, knowledge, access to markets, infrastructure and networks are all readily available.

Increased complexity makes it even more difficult to predict the outcomes of policy or strategy, especially in systems which do not behave in straightforward, linear ways.[4] A strategy for Innovation 2.0 must mirror this systemic complexity; be more holistic; recognise the connectedness of systems; anticipate unintended consequences and be able to cope with ambiguity.[5] Systematic understanding encourages business to develop innovative networks and relationships and directs government to focus on tackling structural or institutional weaknesses otherwise missed.

As a result, government and business find themselves needing to reach out beyond their usual organisational and entrenched stakeholders to find ways to connect with new groups – increasingly directly with citizens to effectively deliver and serve. The challenge for government, as with business, is how should they do this?

Variety demands diversity

We all want products, services, environments and communities that suit our individual preferences. Mass markets are fragmenting into niches, with increasing demand for options, specialisation, customisation and differentiation. For business and government, servicing future demand involves a never-ending quest to offer sufficient variety to satisfy increasing diversity. This relentless drive towards 'mass-customisation' is putting untold pressure on business models, public services, social infrastructures and the traditional processes of idea creation, development, production and distribution.

This is not a new phenomenon. Post-war industry has become more and more adept at capturing and exploiting transient trends and fashions, feeding and stimulating consumer demand for choice and variety. In recent decades, new methods of flexible production and supply-chain management have created an adaptable and responsive infrastructure of production and distribution. For many the 'Pareto' principle applies where 80% of sales result from 20% of business activity. However, currently most such companies still operate in imperfect markets where the links between supply and demand are limited by the imposition of practical logistics, economies of scale and limits on access to information. It is only relatively recently that these rules have been challenged. The phenomenon of 'long tail'[36] economics is connecting diversity of demand to diversity of supply. Companies such as *Amazon* and *eBay* have built business models that reach far down the long tail of both distribution and supply, enabling them to sell huge numbers of niche products in small volumes – *in addition to* huge numbers of popular products in large volumes. This trend is amplifying the consumer's and citizen's expectation for diversity and variety.

Leveraging diversity

The reality is that whether in business or in government, 'most of the smart people do not work for you'.[7] So, to compete in the future, organisations must develop ways to harvest innovation and insight from those they do not control. Just over 50 years ago[8] the English psychiatrist William Ross Ashby framed the *Law of Requisite Variety*, which describes the phenomenon that in all well-functioning mechanical and biological systems *'the regulator of any system must be a model of that system'*. In other words, only variety can master variety, and complexity deal with complexity. Consequently, in markets that are fragmenting and disaggregating, the challenge for companies is to engage as part of a 'system of innovation' that has itself the requisite variety, capacity and flexibility to respond. The challenge for government is similarly to develop policy that in terms of complexity mirrors the issues that are the intended target. However, too often in the face of complex challenges, strategies are developed that are complicated rather than complex. In systems, complexity is a measure of the subtlety, sensitivity and non-linear nature of causal relationships and systemic behavior. A complicated system, however, is merely intricate in scale and architecture but remains predictable in terms of inputs and outputs.

The implication here is that the strategic response of government and business to the reality of a non-linear challenge must be to nurture a non-linear capability and capacity – one which is also unpredictable and resistant to proscription. Such a system can only be cultivated, not managed. No single intent can control a complex system – its laws are a product of emergent systemic norms and values. This means that companies have to look beyond their own internal resources of innovation and production in order to get access to the

A strategy for Innovation 2.0 must nurture an innovation ecology which emulates this systems-based approach – allowing resources to be directed to the points of maximum leverage, with government increasingly acting in the role of strategic enabler.

necessary diversity and the best and most innovative ideas. Only this variety and diversity, engaged in emergent forms of collaboration, can begin to mirror the complexity of a globally connected and networked world.

In his seminal book *The Wisdom of Crowds*, James Surowiecki[9] explored the apparent wisdom demonstrated by crowds of independently thinking individuals – outperforming the judgment made by any single member of the group. This phenomenon leverages diversity, forms of decentralisation and Metcalf's law ($Vn \propto N^2$) which asserts that the power of a network is directly proportional to the square of the numbers of members. Consequently, organisations in the public and private sector may have to nurture collaborative networks of a larger scale than might seem necessary. This may challenge assumed and expected levels of failure or 'redundancy of effort'. Non-linear networks are neither efficient (at the micro scale) nor democratic. However, at the macro scale they have the resilience and adaptability that no hierarchical system can ever achieve in part because of their greater tolerance of redundancy. Not all organisations, or societies, will find this shift in culture and philosophical approach easy to make.

An essential aspect of the performance of networks and communities is that – counter to common expectations – the performance of diverse groups almost always exceeds that of expert groups. Work undertaken at the University of Michigan[10] compares the performance of a diverse set of problem solvers with a comparable group of experts. In this study, the authors demonstrate how diverse perspectives, heuristics, interpretations and mental models improve the collective ability to solve problems and make accurate predictions. So not only should networks be of sufficient scale and diversity, but organisations ought to also beware of the 'tyranny of expertise' and should not assume that the acknowledged expert will always provide the best answer. Expertise can sometimes seemingly provide the right solution – but as it turns out – to the wrong question.

Therefore, building an organisational capacity to leverage such diversity, especially that which exists in non-institutional settings, is for both government and business one of the key challenges in harnessing the potential of Innovation 2.0.

Leverage technological and social trends

New and emerging trends in technology and social interaction are shaping the way individuals, communities – and increasingly organisations – connect and share knowledge. New technologies – or often more accurately *new applications* of technology – such as web 2.0, wikis, virtual worlds and social software tools such as *Facebook* and *Bebo* – are enabling new forms of social and relational structures to evolve. These are typically non-hierarchical, networked, distributed, and with highly devolved forms of self-governance. As such, they are testing new forms of commercial and social 'business models' where the value to individual members is directly linked to value gained by the whole community. They are blurring accepted distinctions between the 'organised' structures of companies and the 'disorganised' structure of communities – introducing a powerful new 'meso' level of organising model, free of the limitations of proximity and top-down planning.

Traditional roles are being re-defined in these new models. Examples such as *Wikipedia* and *YouTube* are democratising the tools of production and distribution making the customer and the producer one and the same. Peer-to-peer transactions are efficiently connecting consumers to suppliers, 'disintermediating' traditional business models which rely upon making such connections across otherwise imperfect markets. Users are also becoming the generators of knowledge and know-how. This knowledge had always existed but was not accessible; for example, the unique and individual know-how of 'lead' or 'expert' users was typically difficult to connect with. Such knowledge is now openly traded and exchanged in online forums and networks.

These new social networks and business models offer essential ways of harvesting *new* collective knowledge that can only emerge from these communities. Consequently, new forms of insight, knowledge, innovation and production are being generated by new communities.

These networked structures are introducing novel, more 'organic' mechanisms of growth and evolution. Communities and networks are not manufactured or built, but grown and nurtured. This growth does not follow accepted patterns and limits associated with the norms of organisational expansion. Similarly, their evolution cannot be managed but must be nurtured by supporting the context and the conditions – metaphorically the soil and the nutrients.

'Open' innovation and beyond open

To achieve the required diversity in order to be relevant to customer aspirations, leading companies are realising that internal innovation is not enough.[11] Organisations must develop and leverage open relationships with customers, competitors and suppliers to successfully compete in such markets. An open innovation[12] strategy deliberately brings in people from outside the organisation – and from the closed circle of specialists and experts – into the innovation process itself; drawing in ideas from users, from suppliers, even from competitors. Additionally, it exploits alternative 'outside' paths to implementation where the organisation cannot exploit and make use of all the good ideas that it has access to. Often this is done through venturing, licensing, or creating new business units to exploit new ideas.

But what happens when innovation occurs beyond organisational or institutional settings, in communities or across networks? How can organisations and societies harvest the innovation and insight of those they cannot control – or even easily connect with? This represents the long tail of ideas and innovation where some of the accepted rules of business and government break down. The reality is that the market has a greater appetite for innovation than traditional models can deliver.

Rise of the 'prosumer'

In parallel with increased diversity and variety is the blurring of the traditional boundaries between producer and consumer – the domain of the '*prosumer*'. Long-standing imperfections in markets are dissolving and companies like *Netflix* and *Flickr* have emerged to satisfy increasing

An essential aspect of the performance of networks and communities is that – counter to common expectations – the performance of diverse groups almost always exceeds that of expert group.

	Traditional Innovation	Innovation 2.0
Skills	Expertise triumphs	Diversity trumps expertise
Knowledge	*What* you know matters	*Who* you know matters
Intellectual Property	Take no risks - copyright, patent & protect	Judge the risk of releasing information against the return of gaining understanding
Tactics	The goal is to agree	The goal is to tap into those who disagree
R&D	Improve ideas by applying more resources	Improve ideas by sharing them
Assessment	Judge ideas by how they fit	Judge ideas by how they differ
Relationships	Relationship hierarchies	Relationship networks
Managing	Innovation management	Innovation cultivation

What does the breakdown of copyright mean for governments who have developed complex intellectual property laws to grant temporary monopoly to those who invest in new technology and creative ideas.

diversity with a supply of almost limitless variety generated by consumers and users. Businesses such as *OhmyNews* are exploiting and enabling an unprecedented increase in levels of user-generated production and user-controlled distribution. Control of idea generation, production and distribution are increasingly in the hands of such 'prosumers'.

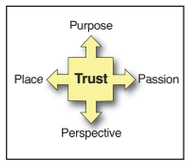
What does this trend mean for the business models of traditional media and broadcast corporations when news, entertainment and information is increasingly generated, produced and distributed by users? What does the breakdown of copyright mean for governments who have developed complex intellectual property laws to grant temporary monopoly to those who invest in new technology and creative ideas? What does it mean for consumers who now have access to vast amounts of un-filtered production with no guarantee of quality, decency, or accuracy or accepted norms of consumer protection?

In the UK, the *BBC* has realised that it needs to 'let go' if it is to remain relevant and tap into the creativity of their users. In 2005 the *BBC* launched a project called *BBC Backstage* to encourage non-commercial re-use of various types of information normally unavailable to outsiders. *Backstage* does with new media development what the open-source community has done with software development. Popular types of content provided by the BBC as part of Backstage include traffic reports, weather data and the TV programming guide. The site has a development community of around 1,300 users and has resulted in a number of innovative projects including *mtraffic* a mobile phone traffic news system covering the UK. The model is deceptively simple: developers are invited to make free use of various elements of the *BBC*'s site (such as live news fees, weather, TV listings) to integrate and shape innovative applications. The *BBC*'s aim is to promote innovation and creativity on the internet and – when someone is creating something really innovative – incorporate it into one of the Corporation's own core products. New business models such as these are emerging to aggregate and harvest innovation communities and leverage the talents of those you would not – or could not – employ.

Innovation communities

In Innovation 2.0, organisations access skills and capacities far beyond their – or others' – organisational boundaries. The new and emerging models of social interaction and collective networking have seen the emergence of 'innovation communities' – representing informal networks of users, experts, activists and individuals inside and outside firms – who collaborate to create new customer and citizen value.[13] Whilst 'new world' examples such as *YouTube* and *Wikipedia* tend to catch the headlines, innovation communities have existed for as long as societies themselves, for example neighbourhoods, patient groups, fan-clubs and tenant associations.

There is untapped social and economic potential in such innovation communities that leverage peer-to-peer production and democratised innovation to harness the resources of competitors, suppliers, lead-users, customers and citizens. Innovation 2.0 means leveraging such diversity by reaching, connecting and aggregating value from Innovation Communities. This frequently necessitates a new set of skills, perspectives and metaphors that frame the challenge of nurturing communities as more akin to 'gardening' than 'manufacturing'. This involves heuristics seldom found in the 'Newtonian' world of hierarchical organisations more used to employing industrial metaphors of 'building' and 'constructing'. It demands an appreciation of how communities work, sensitivity to the drivers that define them, and an understanding of how innovative capacities emerge – in some more than in others.



Communities are defined and driven by a mixture of four essential aspects: *Purpose*, *Passion*, *Perspective* and *Place*. Most communities are defined by a mixture of drivers – albeit often dominated by one in particular. Communities such as neighbourhoods and cities find that *place* is the dominating factor, often with local campaign groups sharing *purpose* and *perspective*. All communities rely on trust as the common

Dominating driver	… demonstrated by	… examples
Passion	Visceral emotional and intellectual connection	Fan Clubs; user groups
Place	Physical proximity and geo-spatial connection (even from the past)	Neighbourhoods; towns; cities; regions; tenant associations; Alumni
Perspective	Common world-view 'lens' and point of view	Political groups
Purpose	Shared intention, objective or rationale	Pressure groups; activist groups; patient groups; professional associations

LEGO MINDSTORMS™ was officially launched in 1998. This advanced robotic kit incorporated a sophisticated microprocessor controller unit which – along with a selection of sensors such as sight, touch and hearing – equipped the device with a complex programmable range of movements and capabilities. However, within two weeks of product release hackers had deciphered the source code, posted it on the Internet and had started re-writing an advanced new operating system. This was a clear breach of IP rights and could have triggered conflict and litigation. However – balancing the risks of releasing information against the benefits of gaining understanding – LEGO realised that these hackers had become a free R&D resource. Lead users had extended and developed the capability of the product far beyond what Lego themselves imagined was possible. So when LEGO launched their next generation of MINDSTORMS in 2006 their press release read 'Hackers, get ready!' [16]

binding agent that connects these drivers together. Without trust, and the social capital that it represents, the community will fragment and dissolve.

Innovation communities are special in that whilst they exhibit *cohesion* in some drivers, this is contrasted by *diversity* in others. For example, user groups are primarily defined by a shared *passion*; however where this is contrasted by a diversity of *perspective* and *purpose*, innovation tends to flourish. Such diversity creates the essential tensions and dynamics for innovation to occur as competing views and agenda jostle for position and attention.

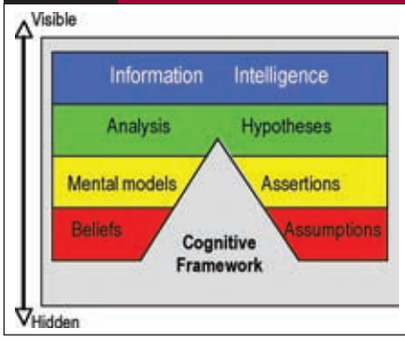
In contrast, where there is complete unanimity of *place*, *perspective*, *purpose* and *passion*, it is unlikely that significant innovation will occur. There may be significant commitment and the community may grow rapidly, but it will be characterised by a conservative and innovation-averse culture. Such communities can be found in some circles where resistance to 'heretical' views is shunned and isolated by means of effective intellectual immune systems. (Similar inertia can also be found in some organisations).

It is this tension – created by diversity – that provides the essential restlessness that inspires and stimulates innovation. Such innovation, therefore, tends to occur at the edges of these communities. Communities who have mastered the challenge of harnessing innovation are able to harvest the unique value from those members that challenge accepted norms, develop new forms of interaction, realise new forms of value and extend deeper levels of trust.

The evolution of innovation in communities is different from that operating in organisations where resources are controlled and where the hierarchy offers a structure and decision-making framework. In communities no one is in control – but neither are all members equal. Typically a relatively small number of individuals account for a disproportionately large share of community capacity and performance. Social network analysis can map the connections, relationships and structures of a community and vividly highlight where critical individuals act as key community animators or activists. In order to effectively engage with innovation communities it is essential to identify and connect with such individuals as they act as cultural carriers and conduits within networks – and also as a bridge to otherwise disconnected networks.

For business and government, tapping into such innovation communities represents an important opportunity to leverage the capacity and desire of customers and citizens to create value for themselves and for their peers.[14] Understanding the dynamics of how

Figure 5 Cognitive Framework



innovation communities evolve helps to indicate how, in what way and at what stage organisations should harvest the insights of these groups.[15]

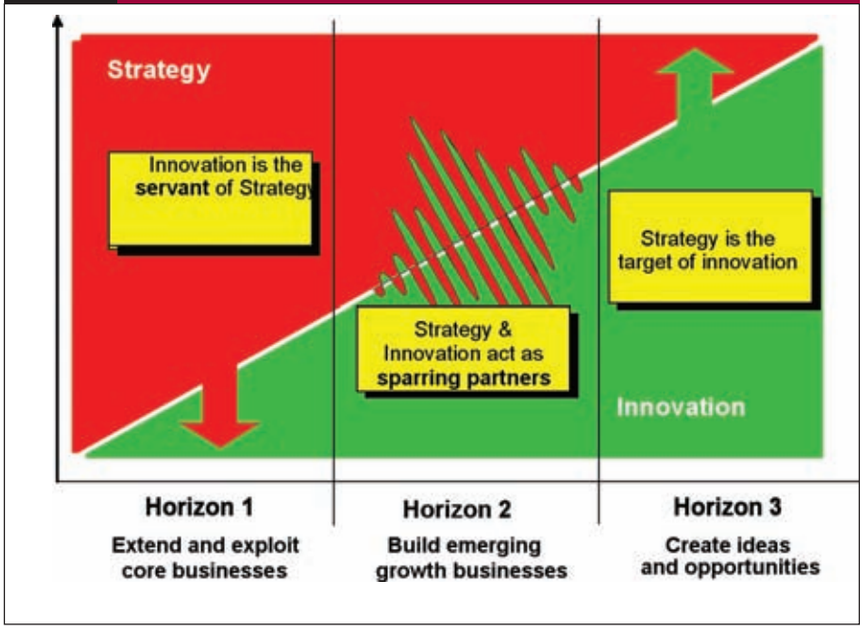
Organisational barriers

Leveraging diversity is not all about looking outwards. Success will require strategies that proactively address internal barriers to Innovation 2.0. These barriers are typically cognitive rather than intellectual. Technical skills and knowledge are a given; the challenge is to adopt behaviours and business models that support collective innovation.

Cognitive behaviour within an organisation can lead to a mind-set where the organisation becomes a prisoner of deeply-held assumptions or beliefs. There are different levels of awareness and thinking in an organisation: at the surface level lies information, data or raw intelligence (see Figure 5: Cognitive Framework). This is sorted and 'made sense of' by means of analysis and synthesis. In practice, organisations tend to develop and adopt agreed mental models to act as proxies for reality. They serve to explain and illustrate complex interdependencies and dynamics, for example regarding markets or competitive relationships. These models can also help to fill – sometimes unwittingly – 'uncertainty gaps' where lack of information or lack of under-

Communities who have mastered the challenge of harnessing innovation are able to harvest the unique value from those members that challenge accepted norms, develop new forms of interaction, realise new forms of value and extend deeper levels of trust.

Figure 6 Three horizons perspective



standing is resolved by assertions contained in the model. In as much as these assertions are explicit, the model can be manipulated and changed. Where ideas are visible, they are subject to challenge and change.

Such mental models are based on a series of assumptions and beliefs about how things are. Many of these assertions are expressed as components or variables within the model, and can therefore be modified, excluded or amended. However, deeper levels of thinking and belief within an organisation are more hidden, remaining unchallenged and more rigid. Over time these deep-seated beliefs impinge upon the way in which more visible information is treated. Information that does not fit organisational beliefs is 'filtered-out'.

This cognitive framework[17] operates like an 'intellectual economy' in an organisation, attaching value to new ideas and received information, offering a framework for comparison and value judgement. In this sense it *can* be helpful. Yet, in the face of disruptive change, this mindset can trigger the corporate immune system to suppress ideas that don't fit accepted wisdom, preventing the right questions being asked and critical innovations being made. Innovation 2.0, however, equips organisations with perspectives far beyond the constraints of their cognitive framework, allowing them to harvest the unique vae from those they cannot control *because* they cannot control them.

Three horizons of perspective

A key step in overcoming cognitive rigidity is the concept of differing horizons of perspective. Most organisations recognise that they operate in an environment that changes over time. Many organisations deal with this by compartmentalising their thinking into near term, medium term and long term. However, far fewer organisations understand the fundamental differences in perspective that need to be adopted to make effective use of near, medium and long term views. For many organisations, the view of the medium and long term consists of an extrapolation of the present, leaving mental models and assumptions (guided by the prevailing cognitive framework) largely unchallenged. Not surprisingly, disruptions and discontinuities often find such organisations ill-prepared. The concept of 3 Horizons has been popularised by McKinsey & Company for application in business growth strategy.[18] Some basic principles can be developed and applied to a broader description of organisational perspective.

Horizon 1 contains the current priorities (and perspective) reflecting today's views and issues, exploiting what is known and understood – here innovation serves existing strategy. This is where most of the organisational focus is rightly directed. In H1, mental models are well expressed and innovation tends to respect these assertions, seeking to build on 'known' knowledge.

Horizon 3 contains the familiar 'futures' type focus, environment scanning and research into new opportunities or trends that may impact Horizon 1 at some time in the future. In H3, it is legitimate and necessary to question assumptions and current views. However, cognitive rigidity often means that in reality H3 output is valued only if it reflects the H1 perspective – i.e. 'If I can see how it fits my mental model then it is of value'. In this instance, the cognitive framework remains largely unchallenged and only 'acceptable' H3 content migrates across into H1 (see Figure 6).

However, in between lies Horizon 2. Here organisations must innovate ideas that are 'uncomfortable'. These ideas represent real emerging opportunities that are no longer in the 'pipe dreams' of H3; however, neither are they ready to be adopted as replacements in H1, often because they challenge the current strategy and organisational structures.

Not surprisingly, most organisations find the sparring between conflicting mindsets in H2 the most difficult and challenging to manage. This is because assumptions and orthodoxies are challenged to such a degree that it triggers the attention of corporate anti-bodies who consequently wrestle to neutralise the threat to the dominant H1 logic.

It is in Horizon 2 – where innovation and strategy tussle as sparring partners – that Innovation 2.0 can free organisations from the straight jacket of their cognitive framework. Here 'lead' or 'extreme users' and 'Innovation Communities' can conceive, prototype and test new innovations that would not be possible in the corporate con-

In the face of disruptive change, this mindset can trigger the corporate immune system to suppress ideas that don't fit accepted wisdom, preventing the right questions being asked and critical innovations being made.

straints of H1 or in the rarefied conceptual world of H3. This is not necessarily an easy process for organisations in the private or public sector to adopt. 'Acceptable' behaviours exhibited and observed help reinforce cognitive rigidity. If 'challenge' – however uncomfortable – is seen as welcomed, the strength of Innovation Communities can be harnessed. If not, the barriers to adoption will be too high, and the organisations will fail to evolve.

Conclusions

Accelerated by globalisation and supported by enabling technologies, innovation is increasingly becoming an open, collaborative process, involving users, suppliers and companies of all sizes. New and emerging models of collective networking and social interaction are increasingly transforming the way in which users interact and the way in which ideas are developed, shared and exploited. New innovation communities have emerged that represent networks of users, experts, activists and individuals inside and outside firms; which collaborate to create new customer and citizen value.

Innovation 2.0 requires both government and private organisations to access skills and capacities far beyond their organisational boundaries. A new set of technologies is emerging that enables firms to collaborate and therefore innovate more effectively and efficiently than ever before. Innovation technology provides new opportunities for communities of innovators to evolve, creating flatter structures, subverting the role of experts through discussions in online communities using wikis, blogs and other collaborative spaces. The mainstreaming of these technologies is likely to create an entirely new environment for innovation.

For business and government, innovation communities represent an important opportunity to leverage the capacity and desire of citizens to create value for themselves and for their peers.

Innovation 2.0 will be collaborative, interactive and widely connected. The new and undeniable logic of Innovation 2.0 must be accepted, grasped and acted upon:

- Technology-based innovation and R&D is necessary but not sufficient. New collaborative forms of innovation are occurring across all sectors of the economy, including the development of new services and organisational structures that leverage emerging social and collective behaviours;
- Technical skills and knowledge are a given. Today the management and policy challenge is to adopt the behaviours and business models that enable collective innovation. Here, the barriers are cognitive rather than intellectual;
- Collaborative behaviour and attitudes are essential for individuals and organisations to realise innovation and to deliver value to customers. An effective innovation strategy must be, first and foremost, a skills and human resources strategy;
- There is untapped potential in new innovation communities. Often non-R&D focussed but market-based, they leverage emerging social and technological trends such as peer-to-peer production and open innovation models where innovation is democratised to harness the resources of competitors, suppliers, lead users, customers and citizens.

Finally it is clear that we are all in this together. For ever-more diverse social and commercial innovation challenges – diversity trumps expertise. Increasingly business strategies and public policies must use diversity of talent to address diversity of challenge, utilising all talents, customers, citizens and experts to seize opportunities and to address needs. Successfully forging such an enlightened public and commercial partnership may be what truly unlocks the potential of Innovation 2.0.

Accelerated by globalisation and supported by enabling technologies, innovation is increasingly becoming an open, collaborative process, involving users, suppliers and companies of all sizes.

References

1 'The Success of Open Source', Steve Weber, Harvard University Press, 2004
2 'Democratising Innovation', Eric Von Hippel, MIT Press, 2005
3 'Democratising the Future' Josephine Green, Philips Electronics NV, 2007
4 'System Failure – why governments must think differently', J. Chapman, Demos, 2004
5 'Systems Thinking and the practice of Government', G. Mulgan, Systemist, 2001
6 'The Long Tail', Chris Anderson, Wired, Oct. 2004
7 Credited to Bill Joy, Sun Microsystems Inc.
8 'An Introduction to Cybernetics', W. Ross Ashby, Chapman & Hall, 1956
9 'The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations Little', by James Surowiecki, Brown (2004).
10 'Groups of diverse problem solvers can outperform groups of high-ability problem solvers', Lu Hong / Scott E. Page, 2004
11 'Embracing Open Innovation', BT, http://www.btnewsonline.com/BTNewsOnline/Downloads/InnovationWP_Final_V2.pdf
12 'Open innovation', Henry Chesbrough, Harvard Business School Press, 2003.
13 See also 'Creation Nets', April 2006; 'The Only Sustainable Edge: Why Business Strategy Depends on Productive Friction and Dynamic Specialisation', John Hagel and John Seely Brown, Harvard Business School Press, 2005
14 See 'Scottish Centre for Innovation' as a proposed and emerging example of leveraging distributed innovation and design methodology, Jonathan Clark, Scottish Enterprise. 2007
15 For a model of the evolution of communities see Dynamic Clusters, Madeline Smith, Scottish Enterprise, (forthcoming publication).
16 LEGO press release ENFIELD, Conn. (May 1, 2006)
17 'Cognitive Rigidity', David Robson, International Conference in Intelligence Analysis, 2005.
18 The Alchemy of Growth', Mehrdad Baghai, Stephen Coley, David White. Orion Business, 1999.
19 'Innovation Technology – How technologies are changing the way we innovate', NESTA, 2007

The authors

Mark P Dames, BT

Mark Dames is responsible for ICT strategy and implementation within advanced engineering and evolutions, BT Design. He graduated in 1988 with a BSc(Hons) in electronics and physics from Edinburgh University. He joined BT's research laboratories in the same year. Working in the optical physics division, he was part of a team carrying out research into novel optical switching technologies for application in future-generation telecommunications networks. In 1997 he was awarded a PhD by Cambridge University for his doctoral thesis on the development of a high-capacity, high-performance optical ATM switching architecture.

After a two-year period as a management consultant with Accenture, specialising in communications technology, in 1999 he rejoined BT as a senior consultant specialising in the design of operational support systems.

He is currently an adviser to the Scottish Government Innovation Policy Unit and sits on the Advisory Board of Technology Ventures Scotland, Scotland's leading technology and research commercialisation forum.

David Robson, Scottish Enterprise

David Robson trained as a product designer at the Glasgow School of Art.

He joined Town Art and Design as a staff designer of street furniture. David moved to Westclox UK as head of design, and later marketing and product management.

Subsequently, David joined the Design Council working with industry on multi-disciplinary design projects. He was appointed CEO of Scottish Design Ltd, consulting with companies on design and product development; and was appointed a Fellow of the RSA.

David then joined the international division of Scottish Enterprise to manage secondary foreign direct investment. In 2000 he was appointed Director of Innovation Development leading a 'do-tank', researching and developing innovation policy and programmes.

Latterly he was appointed director of policy and practice developing new policy and strategy for industries division in Scottish Enterprise, Scotland's main economic development agency.

David is a board member of ITI Scotland Ltd and has written on innovation and cognitive bias. He is an innovation advisor to the National Security and Intelligence Community in the UK and the USA.

Tom Tumilty, Scottish Government

Tom Tumilty is head of the innovation policy unit within the Enterprise, Energy and Tourism Directorate of the Scottish Government. Since 1995, he has led the unit in providing briefing and policy advice for Ministers on all aspects of innovation, the knowledge-based economy and the industrial/commercial aspects of science and technology, including research and development and knowledge transfer.

He is the lead policy contact on internationally-recognised projects such as the Proof of Concept Fund and the Intermediary Technology Institutes (ITIs).

Before joining the Civil Service, Tom spent 15 years in the travel industry, latterly as managing director of a medium-sized travel company.

Madeline Smith, Scottish Enterprise

Madeline Smith is manager of industries intelligence for Scottish Enterprise. Working as part of the priority industries division, her role focuses on policy, strategy and evaluation, including sharing best practice across the clusters.

Madeline joined Scottish Enterprise six years ago, initially to manage one of the regional 'Business Gateway' services.

A chartered engineer, her previous experience was in manufacturing, strategy, new product development and logistics in the drinks industry, having originally trained as a master brewer.