

Economics of Innovation

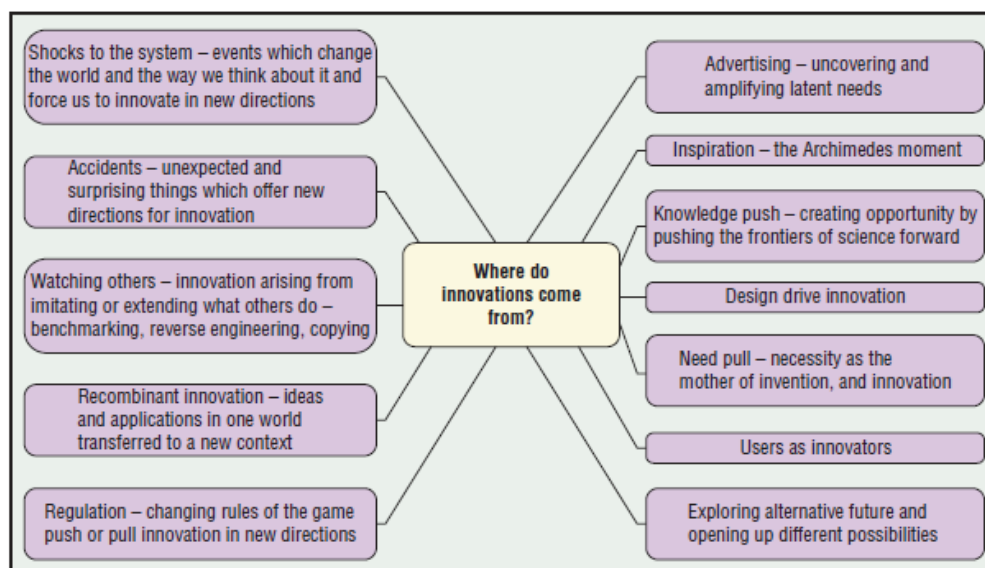
Topic 3 Search strategies for innovation

Prof. Corrado Cerruti

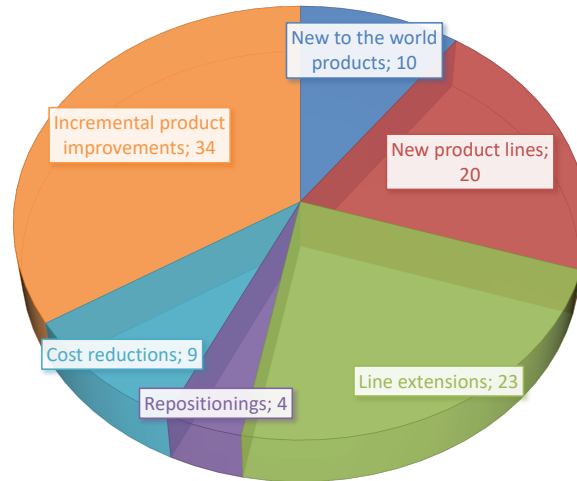
Slides are taken/adapted from:

J. Tidd, J. Bessant and K. Pavitt, *Managing Innovation. Integrating Technological, Market and Organizational Change*
John Wiley & Sons Ltd, 2018

Where do innovations come from?



Types of product innovation



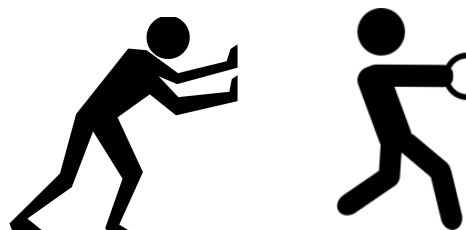
The figure indicates a typical breakdown
... but some companies like 3M do better!

<http://www.innovation-portal.info/wp-content/uploads/3M.pdf>

Push or Pull Innovation?

- The reality is that innovation is never a simple matter of push or pull but rather their *interaction*; as Chris Freeman, one of the pioneers of innovation research said, *'necessity may be the mother of invention but procreation needs a partner!'*.

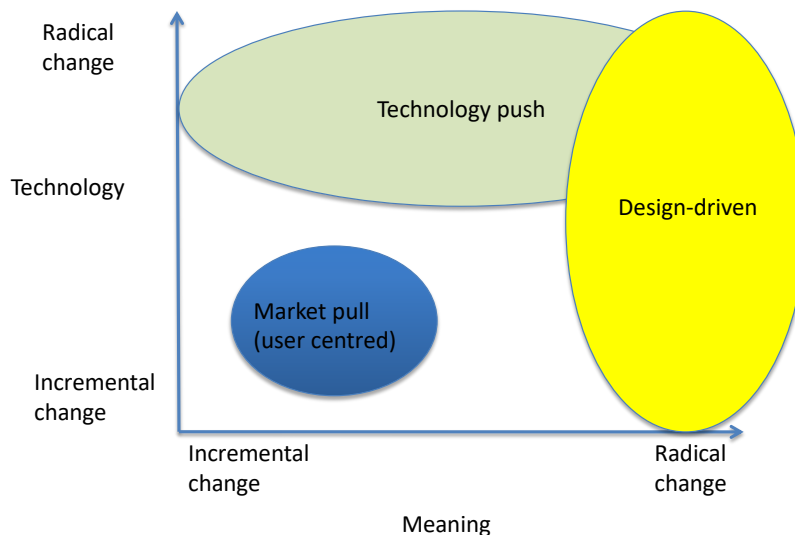
- There is a risk in focusing on either of the 'pure' forms of push or pull sources. If we put all our eggs in one basket we risk being excellent at invention but without turning our ideas into successful innovations –a fate shared by too many would-be entrepreneurs.



Incremental or Radical Innovation?

- Innovation can happen along a spectrum running from *incremental* ('do what we do, but better') through to *radical* ('do something completely different').
- We've also seen that there is a pattern of what could be termed '*punctuated equilibrium*' with innovation – most of the time innovation is about exploiting and elaborating, creating variations on a theme within an established technical, market or regulatory trajectory.
- Occasionally there is a breakthrough which creates a new trajectory –and the cycle repeats itself.
- This suggests that much of our attention in searching for innovation triggers will be around *incremental improvement innovation*.

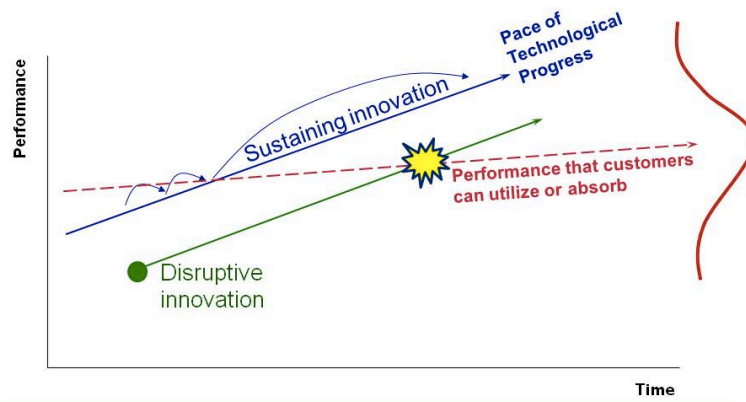
Design driven innovation



Source: Based on R. Verganti (2009) Design-Driven Innovation. Harvard Business School Press

Disruptive innovation

Disruptive Innovation - The Key Idea



<https://www.youtube.com/watch?v=mbPiAzzGap0>

Exploit or Explore?

- On the one hand firms need to deploy knowledge resources and other assets to secure returns and a 'safe' way of doing so is to harvest a steady flow of benefits derived from 'doing what we do better'. This has been termed '**exploitation**' by innovation researchers, and it essentially involves '*the use and development of things already known*'.

- The trouble is that in an uncertain environment the potential to secure and defend a competitive position depends on 'doing something different', i.e. radical product or process innovation rather than imitations and variants of what others are also offering. This kind of search had been term '**exploration**' and is the kind which involves '*long jumps or re-orientations that enable a firm to adopt new attributes and attain new knowledge outside its domain*'.

When?



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- Another influence on our choice of search approach is around **timing** – at different stages in the product or industry life cycle the emphasis may be more or less on push or pull.
 - **Mature industries** will require a very different approach to **new industries**.
 - Another important influence on the timing question is around **diffusion** – the adoption and elaboration of innovation over time.
 - Understanding diffusion processes and the influential factors (which we will explore in more detail in chapter 9) is important because it helps us understand where and when different kinds of triggers are picked up.
 - **Lead users** and **early adopters** are likely to be important sources of ideas and variations which can help shape an innovation in its early life, whereas **the early and late majority** will be more a source of incremental improvement ideas.

Who?

-
- **Knowledge networks**
 - **Knowledge connectors**
 - **Knowledge flow**
 - **Knowledge concentration**
 - **Knowledge architecture**
 - **Knowledge transformation, articulation and assimilation**

Where? The innovation treasure hunt

- A key problem in searching for innovation opportunities is not just that such firms fail to get the balance between exploit and explore right but also because there are choices to be made about the overall *direction* of search.



- Search space is not one-dimensional.

- Innovation rarely involves dealing with a single technology or market but rather a bundle of knowledge which is brought together into a configuration.

- Successful innovation management requires that we can get hold of and use knowledge about *components* but also about how those can be put together – what they termed the *architecture* of an innovation.

Where? The innovation treasure hunt

-Firms can be radical innovators but still be ‘upstaged’ by developments outside their search trajectory. The problem is that search behaviour is essentially *bounded* exploration and raises a number of challenges:

- When there is a shift to a new mind-set – *cognitive frame* - established players may have problems because of the reorganization of their thinking which is required.

-This is not simply a change of personal or even group mind-set –the consequence of following a particular mind-set is that *artefacts* and *routines* come into place which block further change and reinforce the status quo.

- Architectural - as opposed to component innovation – requires letting go of existing networks and building new ones.

- The new frame may not necessarily involve radical change in technology or markets but rather a rearrangement of the existing elements.

A map of innovation search space

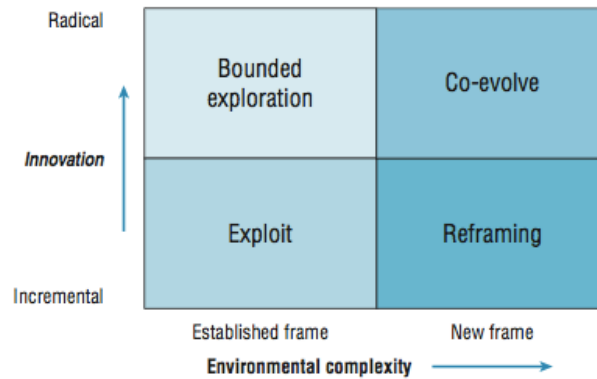


Figure 5.6 A map of innovation search space

How to search

Table 5.6 Extending search strategies for innovation

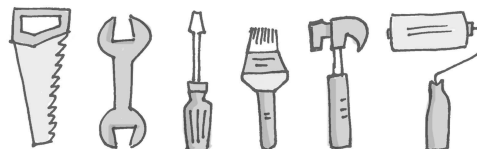
Search Strategy	Mode of operation
<i>Sending out scouts</i>	Dispatch idea hunters to track down new innovation triggers.
<i>Exploring multiple futures</i>	Use futures techniques to explore alternative possible futures; and develop innovation options from that.
<i>Using the Web</i>	Harness the power of the Web, through online communities, and virtual worlds, for example, to detect new trends.
<i>Working with active users</i>	Team up with product and service users to see the ways in which they change and develop existing offerings.
<i>Deep diving</i>	Study what people actually do, rather than what they say they do.
<i>Probe and learn</i>	Use prototyping as mechanism to explore emergent phenomena and act as boundary object to bring key stakeholders into the innovation process.
<i>Mobilise the mainstream</i>	Bring mainstream actors into the product and service development process.
<i>Corporate venturing</i>	Create and deploy venture units.
<i>Corporate entrepreneurship and intrapreneuring</i>	Stimulate and nurture the entrepreneurial talent inside the organization.
<i>Use brokers and bridges</i>	Cast the ideas net far and wide and connect with other industries.
<i>Deliberate diversity</i>	Create diverse teams and a diverse workforce.
<i>Idea generators</i>	Use creativity tools.

Absorptive capacity

- One more broad strategic point concerns the question of where, when and how organizations make use of external knowledge to grow.
- The reality is, of course, that they differ widely in their ability to make use of such trigger signals – and the measure of this ability to find and use new knowledge has been termed ‘absorptive capacity’(AC).
- It is an important construct because it shifts our attention to how well firms are equipped to search out, select and implement knowledge.
- AC is essentially about accumulated learning and embedding of capabilities –search, acquire, assimilate, etc. –in the form of routines (structures, processes, policies and procedures) which allow organizations to repeat the trick.
- Firms differ in their levels of AC and this places emphasis on how they develop and establish and reinforce these routines.

Tools and mechanisms to enable search

- Within this broad framework firms deploy a range of approaches to organizing and managing the search process.
- R&D units can be structured to enable a balance between applied research (supporting the ‘exploit’ type of search) and more wide-ranging, ‘blue sky’ activities (which facilitate the ‘explore’ side of the equation).
- Choice of techniques and structures depends on a variety of strategic factors like those explored above – balancing their costs and risks against the quality and quantity of knowledge they bring in.



Managing internal knowledge connections

- One area which has seen growing activity addresses a fundamental knowledge management issue which is well expressed in the statement – *if only xxx (insert the name of any large organization) knew what it knows!* In other words how can organizations tap into the rich knowledge (and potential innovation triggers) within its existing structures and amongst its workforce?
- Much of the knowledge lies in the experience and ideas of ‘ordinary’ employees. Increasingly organizations are trying to tap into such knowledge as a source of innovation via various forms of what can be termed ‘high involvement innovation’ systems such as suggestion schemes, problem solving groups and innovation ‘jams’.
- There has also been an explosion in the use of internal online platforms to encourage and enable idea submission, development and acceleration.



Extending external connections

- Search strategies include:
 - Sending out scouts
 - Exploring multiple futures
 - Innovation markets
 - Working with active users
 - ‘Deep diving’
 - Probe and learn
 - Corporate venturing
 - Use brokers and bridges



Challenges in innovation search

TABLE 5.7 Key challenges and solutions in innovation search

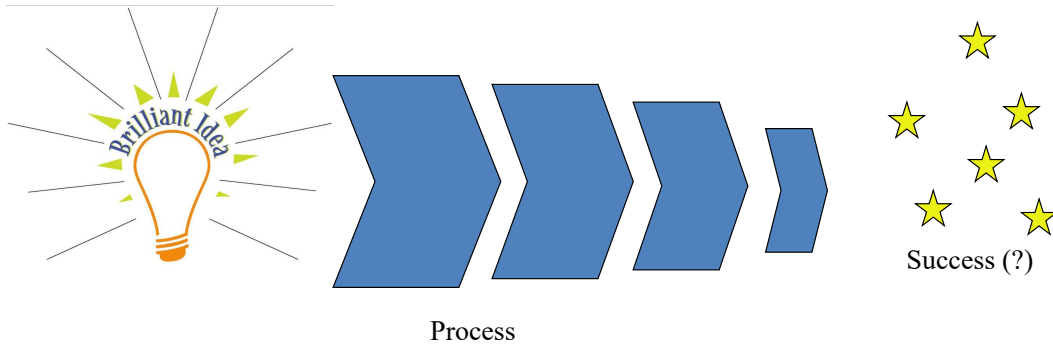
Zone	Search challenges	Tools and methods	Enabling structures
1 'Business as usual' – innovation but under 'steady state conditions', little disturbance around core business model	Exploit – extend in incremental fashion boundaries of technology and market. Refine and improve. Close links/ strong ties with key players	'Good practice' new product/service development Close to customer Technology platforms and systematic exploitation tools	Formal and mainstream structures High involvement across organization Established roles and functions (including production, purchasing, etc.)
2 'Business model as usual' – bounded exploration within this frame	Exploration – pushing frontiers of technology and market via advanced techniques. Close links with key strategic knowledge sources	Advanced tools in R&D, market research. Increasing 'open innovation' approaches to amplify strategic knowledge search resources	Formal investment in specialised search functions – R&D, Market Research, etc.

Challenges in innovation search

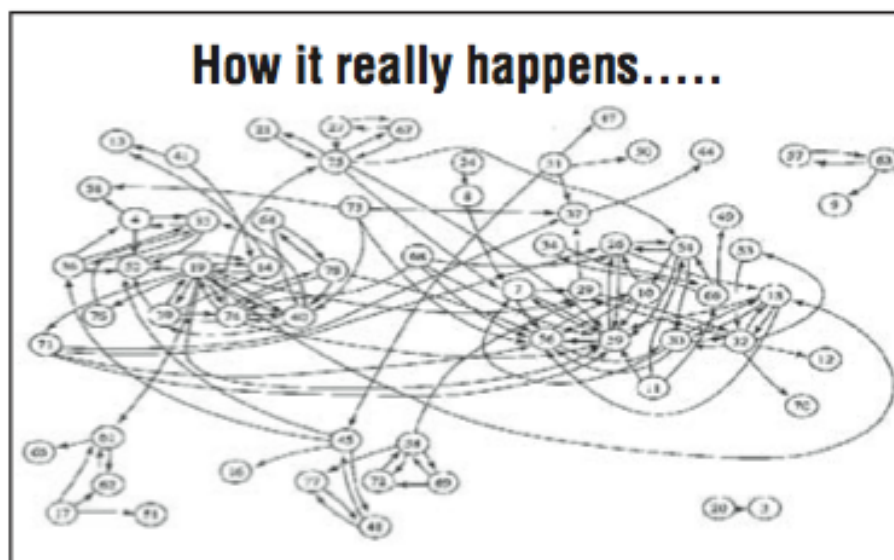
TABLE 5.7 Key challenges and solutions in innovation search

Zone	Search challenges	Tools and methods	Enabling structures
3 Alternative frame – taking in new/different elements in environment. Variety matching, alternative architectures	Reframe – explore alternative options, introduce new elements. Experimentation and open-ended search. Breadth and periphery important	Alternative futures Weak signal detection User-led innovation Extreme and fringe users Prototyping – probe and learn Creativity techniques Bootlegging, etc.	Peripheral/ad hoc Challenging - 'licensed fools' CV units Internal entrepreneurs, Scouts Futures groups Brokers, boundary spanning and consulting agencies
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 'Licensed dreamers' Outside agents and facilitators

How innovation happens in practice?



Managing Knowledge Spaghetti



<https://www.youtube.com/watch?v=-Njo1dQglfU>

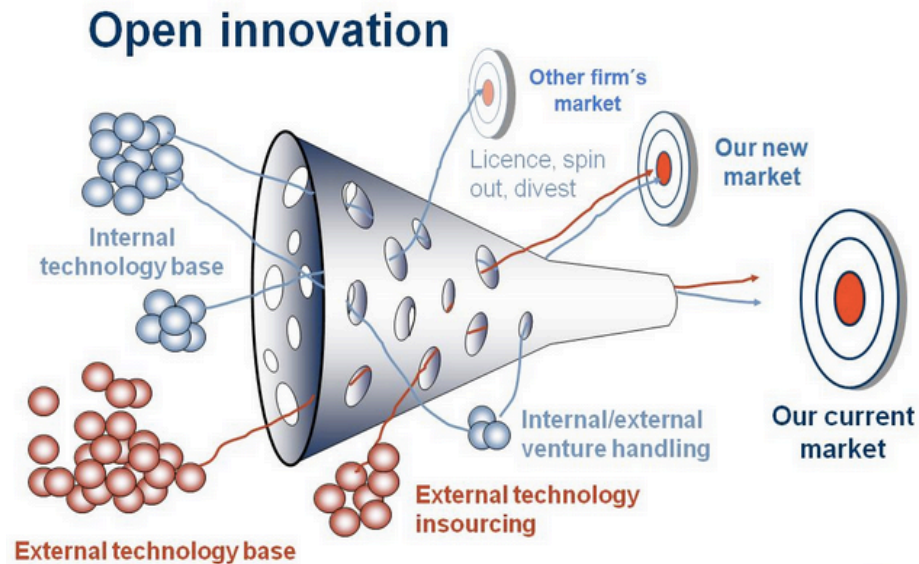
Types of innovation network

- Entrepreneur-based
- Internal project teams
- Communities of practice
- Spatial clusters
- Development consortia
- Supply chain learning
- Learning networks
- Recombinant innovation networks
- Managed open innovation networks
- User networks
- Innovation markets
- Crowdsourcing and funding networks

Benefits of learning networks

- In shared learning there is the potential for challenge and structured critical reflection from different perspectives .
- Different perspectives can bring in new concepts (or old concepts which are new to the learner).
- Shared experimentation can reduce perceived and actual costs or risks in trying new things.
- Shared experiences can provide support and open new lines of inquiry or exploration.
- Shared learning helps explicate the systems principles, seeing the patterns (separating the wood from the trees).
- Shared learning provides an environment for surfacing assumptions and exploring mental models outside of the normal experience of individual organizations (helps prevent 'not invented here' and other effects).
- Shared learning can reduce costs (e.g. in drawing on consultancy services and learning about external markets) which can be particularly useful for small/medium-sized enterprises (SMEs) and for developing country firms.

Open innovation



Open innovation principles

BOX 6.3 Chesbrough's Principles of Open Innovation can be Summarized as:

- Not all the smart people work for you
- External ideas can help create value, but it takes internal R&D to claim a portion of that value for you
- It is better to build a better business model than to get to market first
- If you make the best use of internal and external ideas, you will win
- Not only should you profit from others' use of your intellectual property, you should also buy others' IP whenever it advances your own business model
- You should expand R&D's role to include not only knowledge generation, but knowledge brokering as well

Source: Based on H. Chesbrough, 'Open innovation', Harvard Business School Press, Boston, Mass. 2003

Challenges in open innovation

- conditions and context, e.g. environmental uncertainty and project complexity
- control and ownership of resources
- coordination of knowledge flows
- creation and capture of value.

Challenges in open innovation

TABLE 10.3 Potential benefits and challenges of applying open innovation

Six principles of open innovation	Potential benefits	Challenges to apply
Tap into external knowledge	Increase the pool of knowledge Reduce reliance on limited internal knowledge	How to search for and identify relevant knowledge sources How to share or transfer such knowledge, especially tacit and systemic
External R&D has significant value	Can reduce the cost and uncertainty associated with internal R&D, and increase depth and breadth of R&D	Less likely to lead to distinctive capabilities and more difficult to differentiate External R&D also available to competitors
Do not have to originate research in order to profit from it	Reduce costs of internal R&D, more resources on external search strategies and relationships	Need sufficient R&D capability in order to identify, evaluate and adapt external R&D

Challenges in open innovation

Six principles of open innovation	Potential benefits	Challenges to apply
Building a better business model is superior to being first to market	Greater emphasis on capturing rather than creating value	First-mover advantages depend on technology and market context Developing a business model demands time-consuming negotiation with other actors
Best <i>use</i> of internal and external ideas, not <i>generation</i> of ideas	Better balance of resources to search and identify ideas, rather than generate	Generating ideas is only a small part of the innovation process Most ideas unproven or no value, so cost of evaluation and development high
Profit from others intellectual property (inbound OI) and others' use of our intellectual property (outbound IP)	Value of IP very sensitive to complementary capabilities such as brand, sales network, production, logistics, and complementary products and services	Conflicts of commercial interest or strategic direction Negotiation of acceptable forms and terms of IP licences

Strategies to support open innovation

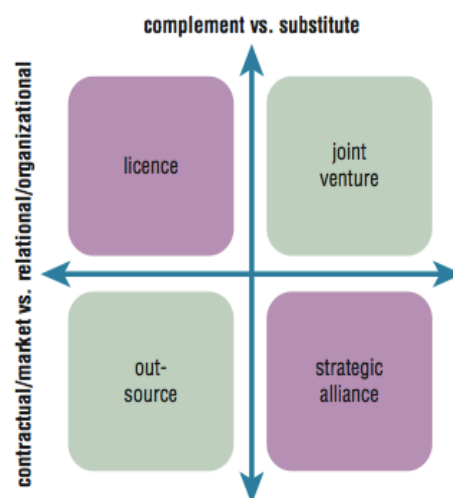
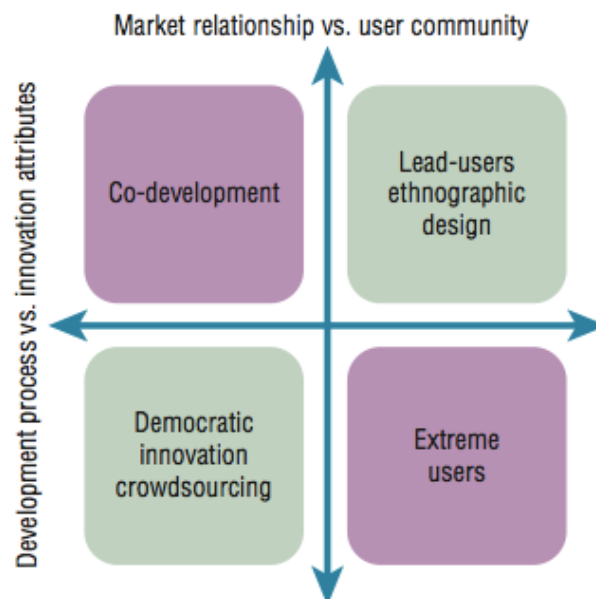


FIGURE 17.1 Strategies to support open innovation

Characteristics of partnership models

- Fewer suppliers, longer-term relations
- Greater equity – real ‘cost transparency’
- Focus on value flows – the relationship, not the contract
- Vendor assessment, plus development
- Two-way or third-party assessment
- Mutual learning – share experience, expertise, knowledge and investment

Options in engaging users



Tools for working with open connected innovation

- Innovation markets – e.g. [innocentive.com](http://www.innocentive.com/)
- Innovation contests
- Innovation communities
- Innovation toolkits
- Innovation technologies



Innocentive case

InnoCentive's Open Innovation Marketplace connects organizations seeking solutions to important challenges they face with an unrivaled network of expert problem solvers – both experts from within your industry, but more importantly experts from outside of your industry that can offer diverse perspectives and fresh insight. Our proven Challenge Driven Innovation™ (CDI) model delivers real innovative solutions to complex problems and empowers Seeker organizations to uncover and harness new business opportunities.



Launch a Challenge

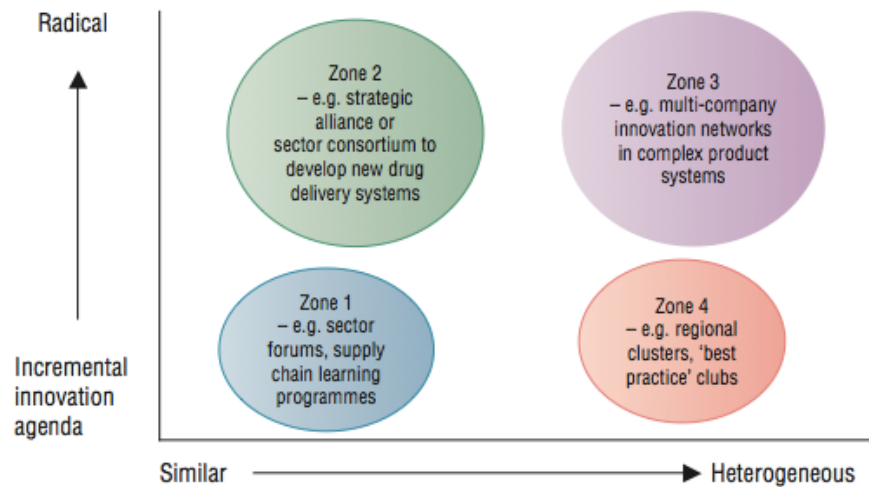


Solve a Challenge

https://www.youtube.com/watch?time_continue=67&v=csMUGmZ0KqI&feature=emb_logo

<https://www.wazoku.com/>

Types of innovation networks



Barriers to new network formation

TABLE 6.3 Barriers to new network formation (based on²³)

Primary objective	Type of barrier	Description
Finding prospective partners	Geographical	Discontinuities often emerge in unexpected corners of the world. Geographical and cultural distance makes complex opportunities more difficult to assess, and as a result they typically get discounted.
	Technological	Discontinuous opportunities often emerge at the intersection of two technological domains.
	Institutional	Institutional barriers often arise because of the different objectives or origins of two groups, such as those dividing public sector from private sector.
Forming relationships with prospective partners	Ideological	Many potential partners do not share the values and norms of the focal firm, which can blind it from seeing the threats or opportunities which might arise at the interfaces between the two world views.
	Demographic	Barriers to building effective networks can arise from the different values and needs of different demographic groups.
	Ethnic	Ethnic barriers arise from deep-rooted cultural differences between countries or regions of the world.

Source: Based on Birkinshaw, J., J. Bessant, and R. Delbridge. Finding, Forming, and Performing: Creating Networks for Discontinuous Innovation. *California Management Review*, 2007. 49 (3): 67–83

Generic approaches to new network formation

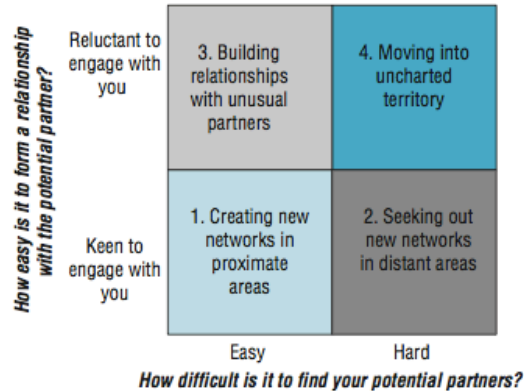


FIGURE 6.2 Four generic approaches to network building

Source: Based on Birkinshaw, J., J. Bessant, and R. Delbridge. Finding, Forming, and Performing: Creating Networks for Discontinuous Innovation. *California Management Review*, 2007. 49 (3): 67–83

Challenges in building innovation networks

- how to manage something we don't own or control
- how to see system-level effects not narrow self-interests
- how to build trust and shared risk taking without tying the process up in contractual red tape
- how to avoid 'free riders' and information 'spillovers'

Managing innovation networks

- *Network boundary management.* How the membership of the network is defined and maintained.
- *Decision making.* How (where, when, who) decisions get taken at the network level.
- *Conflict resolution.* How conflicts are resolved effectively.
- *Information processing.* How information flows among members and is managed.
- *Knowledge management.* How knowledge is created, captured, shared and used across the network.
- *Motivation.* How members are motivated to join/remain within the network.
- *Risk/benefit sharing.* How the risks and rewards are allocated across members of the network.
- *Coordination.* How the operations of the network are integrated and coordinated.

Summary

- The ways knowledge actually flows around an innovation project are complex and interactive, woven together in a kind of social spaghetti where different people talk to each other in different ways, more or less frequently, and about different things.
- Increasingly, the networks we have to learn to deal with are becoming more virtual, a rich and global set of human resources distributed and connected by the enabling technologies of the Internet, broadband and mobile communications and shared computer networks.
- Open innovation is a very broad and therefore popular concept, but needs to be applied with care as its relevance is sensitive to the context. The appropriate choice of partner and specific mechanisms will depend on the type of innovation project and environmental uncertainty.