

Search Strategies for Innovation

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A Needle in the Haystack

- With all of the sources for innovation that we have previously discussed, how can anyone make sense of it all.
- An entrepreneur simply does not have the bandwidth.
- Bessant and Tidd suggest a five question framework:
 - What? The different kinds of opportunity being sought in terms of incremental or radical innovation
 - When? –the different search needs at different stages of the enterprise
 - Where? –from local search aiming to exploit existing knowledge through to radical and beyond in new frames.
 - Who? -the different players involved in the search process, and in particular, the growing engagement of more people inside and outside the organization.
 - How? –What are the mechanisms for enabling this search.

What?

- We return to our previous discussion of push versus pull. Is some new idea or technology driving change or is the change responding to some market need?
- These are never fully independent.
- Many corporations practice “applied research” in order to direct research in area of particular need (or “pull.”)
- Our discussion of the various “push” forces included changes in regulatory policies. The changes in policies also generate new “pull” forces.
- Even a user led innovation, which is an example of “pull” often requires some kind of innovation from the sources of “push.”
- Henry Ford pointed out that “If I had asked the market they would have said they wanted faster horses,” instead he built the Model T.
- Market research is often useful for incremental innovation, but much less useful for radical innovation.

Steve Jobs

- ***“A lot of times, people don't know what they want until you show it to them.”***
- *Don't let the noise of other's opinions drown out your own inner voice. And most importantly, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.*
 - Steve Jobs
- Cofounder of Apple, NeXT, and Pixar
- Visionary of iPod, iPhone, iPad, iTunes, Macintosh, Apple II, etc.
- *"You've got to start with the customer experience and work back toward the technology - not the other way around."*

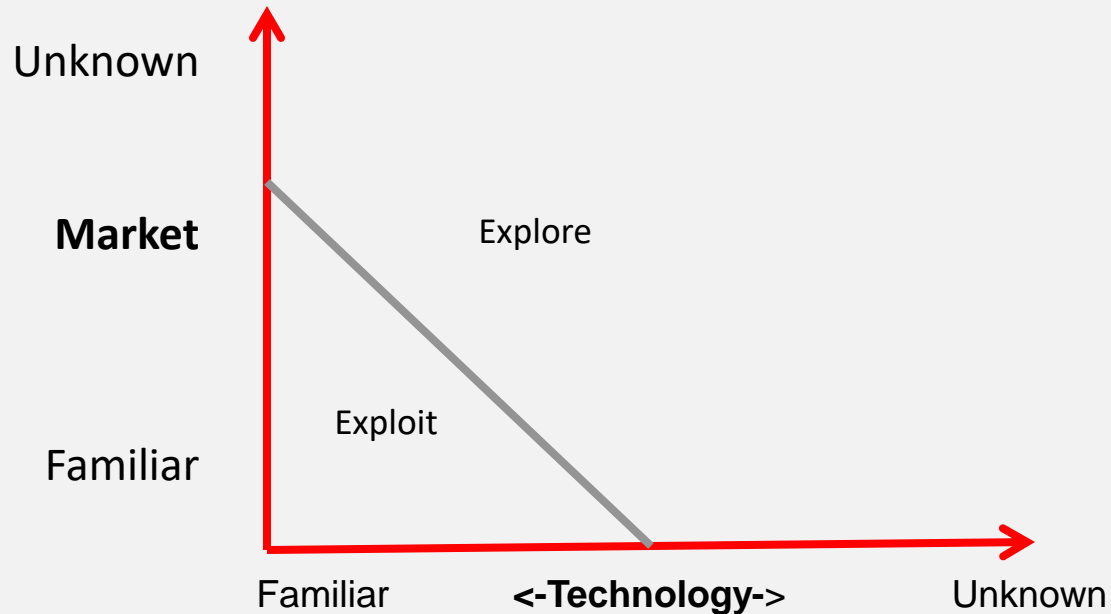


<http://www.jackmwilson.net/Cases/Case-Apple-Supplychain.pdf>

Incremental (do better) or Radical (do differently)

Innovation	Incremental	Radical (higher risk but potentially higher reward.)
Product	<p>Windows 10 replaces (and fixes) Windows 8</p> <p>Chevrolet introduces V8 engine that shut down cylinders to save fuel.</p> <p>Higher efficiency incandescent lights</p>	<p>Linux is offered free as an alternative</p> <p>Tesla offers a fully electric vehicle</p> <p>First CFL bulbs use one eighth the energy and then LED bulbs use about one fourteenth the energy and last much longer.</p>
Process	<p>Better/lower cost fixed line phones</p> <p>Low cost brokerages</p> <p>More auctions</p>	<p>Skype and other VOIP</p> <p>Online low cost brokers.</p> <p>eBay</p>
Position	<p>Buick tries to sell to youth market</p> <p>Phoenix and others in online proprietary education</p> <p>Dell does mass customization direct to customer.</p> <p>Banks offer online services</p>	<p>Tata Nano designed for India market</p> <p>MIT, Harvard and others create EdX and offer MOOCs.</p> <p>Google Chromebook</p> <p>Muhammad Yunus and Grameen offer microcredit</p>
Paradigm or Business Model Innovation	<p>IBM one of the inventors of the PC sells the business to Lenovo and bets on computer services.</p> <p>Barnes and Nobel adds cafes to the bookstore experience.</p>	<p>Apple converts itself from a computer company to an entertainment company with iTunes and other products.</p> <p>Cirque du Soleil combines circus, dance, and music.</p> <p>Amazon sells books directly to the customer with no store.</p>

Innovation Space: Exploit or Explore?



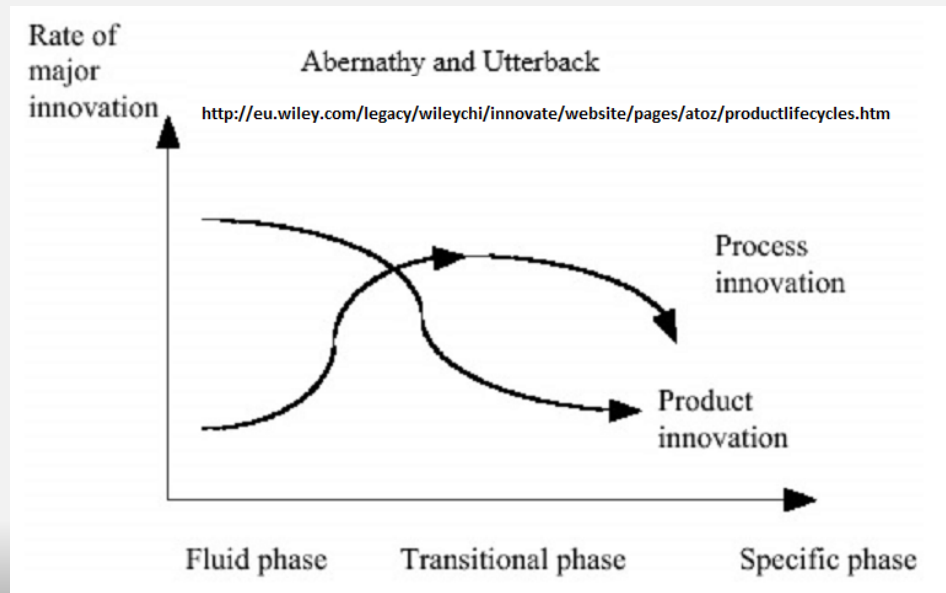
Exploit: When markets and technologies are reasonably well known, then we “**exploit**” the available innovations. This generally leads to incremental innovations and is “path dependent.” Where we end up depends upon where we have been.

Explore: Often, to maintain our competitive advantage, an enterprise needs to take more risk in unknown markets and technologies. We call this “exploration.”

Strategies are different for the two regions.

When?

- At different stages of the industry or product life cycle, the kinds of innovations may differ.
- More mature industries tend to focus on pull innovation and incremental innovation.
- Newer industries and products are generally exploring new markets and technologies and take more risks.
- This is called the Abernathy-Utterback model
 - <http://eu.wiley.com/legacy/wileychi/innovate/website/pages/atoz/productlifecycles.htm>



When? - The Innovation Life Cycle

- The Abernathy Utterback model.

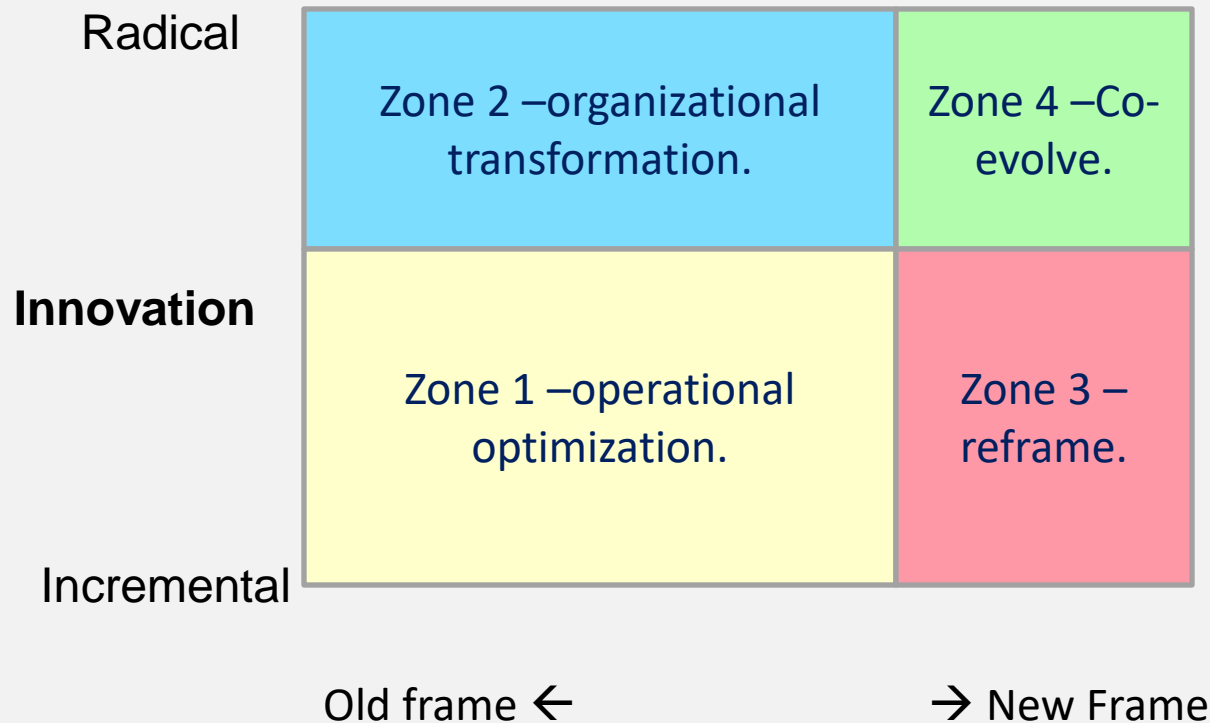
- <http://innovationzen.com/blog/2006/08/29/innovation-management-theory-part-6/>

Variable	Fluid Phase	Transitional Phase	Specific Phase
Innovation	Product changes/radical innovations	Major process changes, architectural innovations	Incremental innovations, improvements in quality
Product	Many different designs, customization	Less differentiation due to mass production	Heavy standardization in product designs
Competitors	Many small firms, no direct competition	Many, but declining after the emergence of a dominant design	Few, classic oligopoly
Organization	Entrepreneurial, organic structure	More formal structure with task groups	Traditional hierarchical organization
Threats	Old technology, new entrants	Imitators and successful product breakthroughs	New technologies and firms bringing disrupting innovations
Process	Flexible and inefficient	More rigid, changes occur in large steps	Efficient, capital intensive and rigid

Where?

- Incremental versus Radical innovation
- Established versus New Frame
 - Frame – the elements that the innovator thinks are relevant or “rules of the game.”
 - Threats, opportunities, competitors, collaborators, etc.
 - The frame, once established can become “the box” –as in “lets think out of the box”
- Frames can be incredibly powerful and limiting. Failure to recognize “the box” has doomed many enterprises.
 - Xerox failed to be able to compete with new low cost Japanese printers
 - RCA developed the transistor radio, but failed to recognize how important it would become.
 - Kodak developed digital cameras, but did not want to compete with their lucrative film business.
 - Wang, Data General, and Digital Equipment –all world leading computer makers all created personal computers, but never thought they would be important to industry. (All gone now!)

Where? Mapping Innovation Space



Where? Search Strategies for each Zone

- Zone 1- Exploit. Its about refinement in well known frames and doing incremental innovation. Optimize many existing things
- Zone 2 – Explore. Here you are working in a known frame but searching for radical innovations. These tend to be big project R&D.
 - Pharmaceutical companies are great examples when looking for new drugs.
 - Computer Companies took advantage of Moore’s Law to build innovative new hardware platforms.
Internet deployment created huge opportunities for Amazon, eBay, etc.
 - Social Media created new companies like Facebook, Tinder, Instagram, etc.
- Zone 3 –Reframing.
 - Fringe markets, bottom of the pyramid, disruptive innovation, etc.
- Zone 4 –Co-Evolution. This space is so complex that innovations generally emerge from multiple threads that somehow come together.
 - You have to be an early player to both observe and shape the emerging trends.
 - Failure is common and is seen as a learning experience. One must prepare to “pivot” quickly when the learning occurs.
 - Being an alert observer is imperative.

Who?

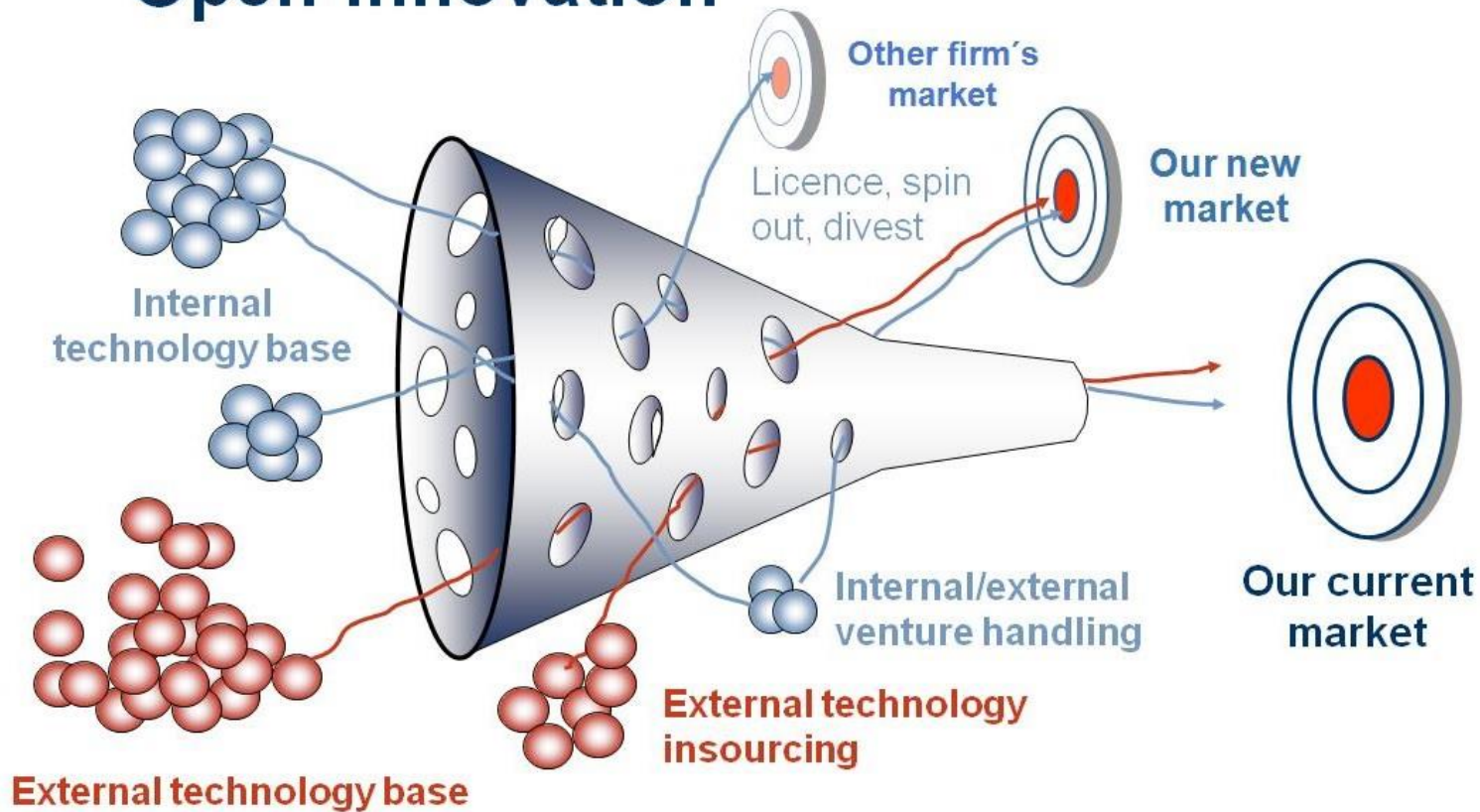
- Research and Development
 - Industrial Laboratories in the old days –Bell Labs, IBM Watson, GE Schenectady
 - Involvement with University Research
 - Companies are members of the UMass Lowell Mass Medical Device Development Center (M2D2) in order to get the first look at R&D coming out of the labs and start-up companies.
 - <https://www.uml.edu/Research/M2D2/Sponsors.aspx>
 - Partner or acquire new start-ups as they develop new products.
 - Cisco has made a huge success of this.
 - <http://www.cisco.com/c/en/us/about/corporate-strategy-office/acquisitions.html>
- Mobilize your own workforce.
 - <http://www.leanblog.org/2014/05/umass-memorial-aims-to-become-a-world-class-kaizen-organization/>
 - UMass Memorial Healthcare System -a \$3 billion network of hospitals and doctors asks every employee (11,400 frontline employees) to contribute one good idea each year.
- Involve the customer
- Use social networking
- Develop Communities of Practice.
- Foster Intrapreneurship

Open Innovation

- “Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology”. Alternatively, it is "innovating with partners by sharing risk and sharing reward." The boundaries between a firm and its environment have become more permeable; innovations can easily transfer inward and outward.
- The central idea behind open innovation is that, in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (i.e. patents) from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-offs).
- The open innovation paradigm can be interpreted to go beyond just using external sources of innovation such as customers, rival companies, and academic institutions, and can be as much a change in the use, management, and employment of intellectual property as it is in the technical and research driven generation of intellectual property. In this sense, it is understood as the systematic encouragement and exploration of a wide range of internal and external sources for innovative opportunities, the integration of this exploration with firm capabilities and resources, and the exploitation of these opportunities through multiple channels.
 - https://en.wikipedia.org/wiki/Open_innovation
 - Henry Chesbrough used the term for his book.

Open Innovation – A Graphical Representation.

Open innovation



Stolen with pride from Prof Henry Chesbrough UC Berkeley, Open Innovation: Renewing Growth from Industrial R&D, 10th Annual Innovation Convergence, Minneapolis Sept 27, 2004

9 C 2002 Henry Chesbrough EIRMA SIG III, 2005-10-20

<https://glennas.wordpress.com/tag/open-innovation/>

Lastly

- All of this searching for innovations is no good at all if you cannot actually implement the innovations due to a lack of “absorptive capacity.”
 - Absorptive Capacity –the ability to learn and recognize the value new ideas and assimilate and implement them.
- Xerox is a sad case in point. Xerox created a Palo Alto Research Center (PARC) to bring together some of the finest researchers in technology.
 - Some of the technologies they invented or developed include: laser printing, Ethernet, the modern personal computer, graphical user interface (GUI) and desktop paradigm, object-oriented programming, ubiquitous computing, amorphous silicon (a-Si) applications, and advancing very-large-scale integration (VLSI) for semiconductors.
 - [https://en.wikipedia.org/wiki/PARC_\(company\)](https://en.wikipedia.org/wiki/PARC_(company))
 - They failed to commercialize most of these. In fact Steve Jobs visited PARC and saw the GUI, the mouse, and other technologies and decided to go build his own version. His first effort was called Lisa, but never went anywhere. Then he created the Macintosh. The rest is history. This is the legend, but the truth is only a little different:
 - <http://web.stanford.edu/dept/SUL/sites/mac/parc.html>

General Electric and the Search for a Future

- We have given several examples of companies that have successfully transformed themselves several times in order to continue to survive and thrive.
 - GE and IBM are two of the best examples.
- We have also discussed companies that failed to transform themselves in the face of technological and business model changes. Many have disappeared or become much smaller.
 - Examples include Wang Computer, Digital Equipment, Polaroid, Motorola, Blockbuster, Borders Bookstore, Kodak, Xerox, and others.
- GE and IBM are two very good examples of companies that are in the midst of transforming themselves once again. Will it work?
- As part of their **search strategy**, GE is moving its headquarters to Boston.
 - Why

GE Moving to Boston

- Yes, GE has been offered terrific tax benefits by both the city and state.
 - But many cities and states would offer them equal benefits.
- Why Boston?
- To be close to the source of innovations around the Internet of Things (**IOT**) (and Biotech to a lesser extent).
 - <http://fortune.com/2016/01/13/ge-hq-to-move-to-boston/>
 - <https://www.bostonglobe.com/business/2016/01/13/general-electric-will-announce-tomorrow-that-has-selected-boston-for-global-headquarters-according-official-familiar-with-process/ZYZSu7GorfVTRXM2ZlaabJ/story.html>
 - <http://www.forbes.com/sites/petesaunders1/2016/04/19/business-goes-where-talent-flows/#e0a986b5d63c>

Bill Gates gives his view of the key innovation challenges in our future.

- Accelerating Innovation with Leadership

- https://www.gatesnotes.com/About-Bill-Gates/Accelerating-Innovation?WT.mc_id=10_06_2016_06_AcceleratingInnovation_BG-LI_&WT.tsrc=BGLI

- “Because we are at a pivotal moment when the conditions are ripe for transformative innovations, there are many important things this new group of national leaders—including whoever is elected in the U.S. in November—can accomplish over the next decade. There are four objectives I think we should prioritize:”

1. Provide everyone on earth with affordable energy without contributing to climate change.
2. Develop a vaccine for HIV and a cure for neurodegenerative diseases.
3. Protect the world from future health epidemics, which might be more infectious than Ebola and more deadly than Zika.
4. Give every student and teacher new tools so all students get a world-class education.