

Entrepreneurship & Innovation 2012

Lecture 3 Innovation

Learning outcomes:

to identify what is innovation and what are the sources of innovation

Types of innovation - the **4Ps** of innovation

Product innovation:

changes in the things (products or services) which an organization offers

Process innovation:

changes in the ways in which they are created and delivered

Position innovation:

changes in the context in which the product or services are introduced

Paradigm innovation:

changes in the underlying mental modes which frame what an organization does

Tidd, J., Bessant, J. and Pavitt, K. (2005), *Managing Innovation – integrating technological, market and organizational change*, Wiley, 3rd edition

Question: Give examples for each of innovation types above.

Drucker's Purposeful Innovation

and the Seven Sources for Innovative Opportunity

Drucker, P (1994) *Innovation and Entrepreneurship*, Elsevier

Drucker, P (2002) *The Discipline of Innovation*, Harvard Business Review, Aug 2002, Vol 80, p95

“Systematic innovation consists in the purposeful and organised search for changes and in the systematic analysis of the opportunities such changes might offer for economic and social innovation”.

Source The unexpected

success, failure, outside event

Source Incongruities

between reality as it actually is and reality as it is assumed to be or as it ought to be

Source Process need

innovation based on process need

Source Industry and market structures

changes that catch everyone unawares

Source Demographics

changes in the population

Source Changes in perception

also changes in mood and meaning

Source New knowledge

both scientific and non-scientific

Question: Give examples for each of Drucker's seven sources above.

Drucker's principles of innovation

"Innovation is a systematic activity".

"The entrepreneur is well advised to forgo innovations based on bright ideas"

"Entrepreneurs are not risk takers. Successful innovators are conservative – they are not risk-focused, they are opportunity-focused".

Do's

- purposeful innovation begins with the analysis of opportunities
- innovation is both conceptual and perceptual
- an innovation has to be simple
- effective innovations start small
- successful innovation aims at leadership

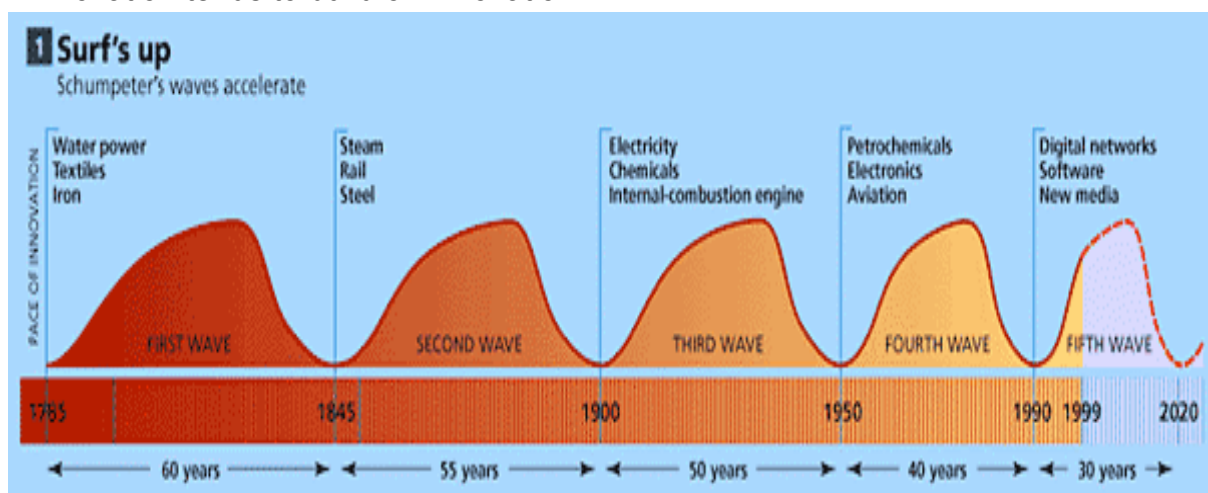
Don'ts

- do not try to be too clever
- do not try to diversify – stay focused
- do not innovate for the future, innovate for the present

Question: How far do you agree (or not) with Drucker's principles?

Kondratiev waves

Innovation tends to build on innovation.



Catch the wave

Feb 18th 1999 From The Economist print edition

The long cycles of industrial innovation are becoming shorter

In economics, **Kondratiev waves** - also called grand supercycles, surges, long waves, or K-waves - are regular S-shaped cycles in the modern (Capitalist) world economy. Fifty to sixty years in length, the cycles consist of alternating periods between high sectoral growth and periods of slower growth.

Most cycle theorists agree, however, with the "Schumpeter-Freeman-Perez" paradigm of five waves so far since the industrial revolution, and the sixth one to come. These five cycles are

- The Industrial Revolution--1771
- The Age of Steam and Railways--1829
- The Age of Steel, Electricity and Heavy Engineering--1875
- The Age of Oil, the Automobile and Mass Production--1908
- The Age of Information and Telecommunications--1971

According to this theory, we are currently at the turning-point of the 5th Kondratiev.

Question: What will be the next wave?

Wickham's "Types of entrepreneurial innovation"

Potential impact In market	High	New insight Innovation	New world innovation
	Low	Incremental Innovation	Specialist innovation
		Low	High
		Technology	

Wickham, P (2001) Strategic Entrepreneurship, FT Prentice Hall, 2nd ed, see ch 14.

Flip this model, and which other very famous model does it closely resemble?
(Hint – look at Ansoff's matrix)

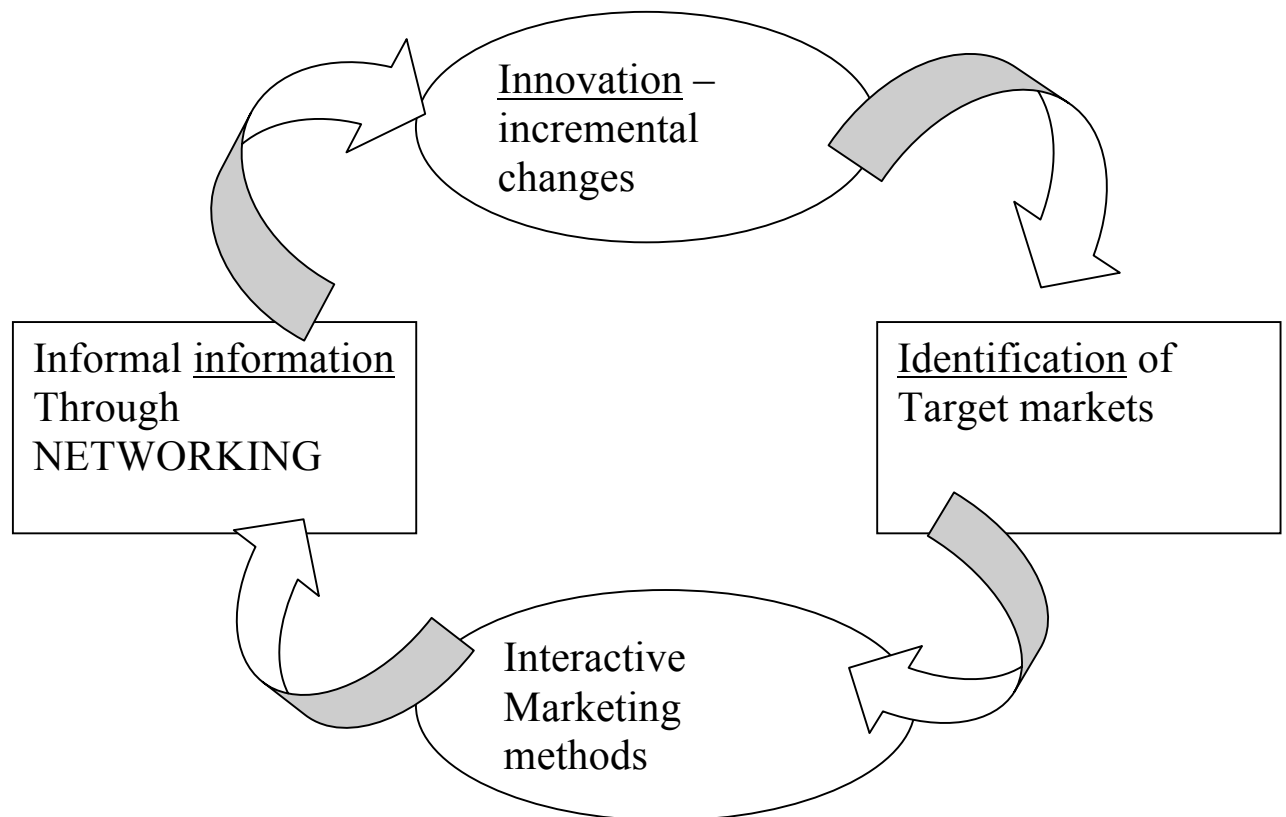
Potential impact In market	Low	Incremental innovation	Specialist innovation
	High	New insight innovation	New world innovation
		Low	High
		Technology	

Question: give examples for each box above

Innovation in marketing

Strategic Entrepreneurial Marketing - 4Is

Very relevant in hitech Cambridge



Innovation = *adjustments* to products / services
market approaches

Identification of markets = finding a *niche*

Interactive marketing methods = responsiveness
- internet !!
- social web

Informal information gathering = networking
= opportunities

Based on Stokes, D (1998) “Small Business Management”, Letts Educational

OECD Science, Technology and Industry Scoreboard 2011: Innovation and Growth in Knowledge Economies

Investing in R&D and talent is critical for sustained research effort that can lead to breakthrough technologies. **Follow the R&D levels of investment of OECD and non-OECD countries over the last 30 years in this animation.**

http://www.oecd.org/document/10/0,3746,en_2649_33703_39493962_1_1_1_1,00.html



September 2011

This tenth edition of the OECD Science, Technology and Industry (STI) Scoreboard builds on the OECD's 50 years of indicator development to present major world trends in knowledge and innovation. It analyses a wide set of indicators of science, technology, globalisation and industrial performance in OECD and major non-OECD countries (notably Brazil, the Russian Federation, India, Indonesia, China and South Africa) and includes some experimental indicators that provide insight into new areas of policy interest.

Reading

A dark art no more

Oct 11th 2007 From The Economist print edition

Like management methods before it, innovation is turning from an art into a science

"WHAT matters gets measured." That is one of the basic tenets of corporate strategy taught at business schools. As driving growth through innovation is today at the top of corporate agendas you would expect to find managers treating it like a science. After all, manufacturing philosophies such as "total-quality management" (a process of continuous improvement) and "Six Sigma" (which uses statistical methods to eliminate variations and defects) were quantified and widely deployed a long time ago, often with good results.

Yet innovation remains a frustratingly fuzzy notion. Many bosses think it is essentially a creative process. Some anoint "chief innovation officers", bring in consultancies or set up secret "skunk works" to tease out the ideas they fear their own bureaucracy might squash. One senior executive maintains that innovation simply cannot be defined exactly, but that "like pornography I know it when I see it."

The wrong measure

Jorma Ollila, non-executive chairman of both Nokia and Royal Dutch/Shell, argues that it is a mistake to measure innovation by the number of patents issued by a company or the extent to which new technologies are introduced. He suggests that the most fertile area of innovation today can be found in management.

One reason why bosses might not want to be too obsessive about creativity is that generating ideas is the easy part. Exploiting them has always be harder. As Thomas Edison, one of America's greatest inventors, put it, genius is 1% inspiration and 99% perspiration. But many managers are reluctant to take the same hard-nosed approach they use in other parts of their business and apply it to fragile creative types.

If any firm has an analytical approach to innovation it should be Google. After all, the firm's superstars are its software engineers. It is so obsessed with data that it posts nerdy tip sheets on statistical-quality measurement above the urinals at the Googleplex. And yet managers sound like mumbling teenagers when they are asked how they approach innovation.

Marissa Mayer, the company's flamboyant head of "user experience", declares that Google is not merely a search engine but "an innovation engine" that needs constantly to reinvent itself—"just like Macs and Madonna". As 3M and some other firms do, Google grants its engineers permission to spend 20% of their paid time on pet projects unrelated to their daily job. She points to a few examples of new products that have emerged this way, such as Gmail, but cannot provide any real evidence that allowing staff to take time off from their normal jobs contributes more to the firm than it costs.

It is a question that even Eric Schmidt, Google's chief executive, cannot answer. Surprisingly, he declares that trying to measure his firm's innovation process would choke it off altogether. Tim Brown, head of Ideo, a design consultancy, concurs: "A lot of innovation is anti-Six Sigma. You want a lot of variance."

Fuzzy logic

Not surprisingly, Jeffrey Immelt, chairman of GE, strongly disagrees. His firm has long been a champion of Six Sigma. Mr Immelt reckons that "operational excellence" is the crucial part of innovation, not the fuzzy ideas-generation bit. He suggests that "passion and vision" might make up just 20% of the process.

Larry Keeley of Doblin, an innovation consultancy, has followed this debate closely for decades and insists the answer is clear: "Creativity is maybe 2% of the innovation process. It's a vanishingly small component, and it's the part you can acquire from outside the firm."

Despite difficulties trying to define it, the innovation process is steadily becoming a practical science to be measured, taught and managed. Clayton Christensen, a professor at Harvard Business School and an expert on the subject, insists that "innovation simply isn't as unpredictable as many people think. There isn't a cookbook yet, but we're getting there."

The Haas business school at the University of California at Berkeley has already gone so far as to revamp its entire curriculum to concentrate on innovation management. Berkeley is home to some of the leading experts on the subject, including Henry Chesbrough (who popularised the notion of "open innovation") and AnnaLee Saxenian (whose recent book "The New Argonauts" analyses Silicon Valley and related innovation clusters). Richard Lyons, now of Goldman Sachs, led the revamp at Haas in his previous job. He is convinced that all managers can be taught how to nurture innovation.

The rough outline of how this might be done is emerging. But there is no one-size-fits-all strategy. Bosses have to appraise the strengths and weaknesses of their firms honestly and continuously to take account of rapidly evolving competitive threats. But cut through the clutter of PowerPoint presentations and faddish slogans, and a number of things become clear.

All that jazz

For a start the debate over creativity versus execution should be put to rest: firms need to do both. But that does not mean they have to do it all themselves. On the contrary, the double act is best managed with a loose and open approach during the wild and woolly idea-generation phase, and a tighter, more concentrated one to turn ideas into products or services. John Kao, author of "Jamming: The Art and Discipline of Business Creativity", likens the process to playing jazz: there is no fixed score in any given improvisation, but that does not mean there are no underlying principles either.

P&G is a good example of an inward-looking firm that has embraced creativity and openness with some success. But Mr Lafley, its chairman, makes clear this is no mystical process. He argues that even a process that is open to fresh thinking from the outside, as P&G's is, can be run the same way as a factory: "It is possible to measure the yield of each process, the quality and the end product."

On the flip side, a firm known for emphasising execution over creativity is GE. Its focus on the practical application of new ideas, rather than invention itself, goes all the way back to its founder, Edison. Indeed, he commercialised but did not invent the light bulb.

GE's strength is not in breakthrough inventions but, to use Mr Immelt's words, "in turning \$50m ideas into billion-dollar ideas." His way of doing that is a highly structured process that involves a mix of management training, increased exposure to outside ideas (for example, his firm is starting a venture capital fund to get "early visibility" of clever inventions) and continuous funding for the development of new ideas. He also emphasises that the acceptance of failure is an integral part of the effort, as long as it is "fast failing".

It is the last bit of Mr Immelt's process that points to one of the biggest thoughts emerging from innovation research in recent years: neither idea generation nor execution is as important or as tricky as the filtering process that links the two. Harold Sirkin, of the Boston Consulting Group, is the co-author of "Payback", a book on innovation strategy. He scoffs that "firms have too many ideas and too much emphasis on creativity—more ideas merely choke the funnel even more." In fact, the more ideas a firm comes up with, the more important it is for bosses to decide early on which of them to kill off. This is to avoid heading down countless and costly dead ends. As Ron Adner of Insead, a French business school, puts it, "Innovation is a loser's game, as we know most initiatives fail. But the truly innovative companies know how to deal with losing."

That is why failing fast and learning from those failures is so important for companies. Niklas Savander, of Nokia, argues that given today's accelerating pace of global innovation firms "need really harsh discipline to weed out ideas quite quickly—we are working at fast failing, but are not there yet." He thinks his own company's legacy as a hardware manufacturer—a capital-intensive and slow-moving sector compared with software or services—is holding it back.

Turf wars are another obstacle to fast failing. Employees in one part of a company often reject ideas and advice from a different part. Mark Little, GE's head of research, confesses that getting his boffins to kill off unviable projects is the hardest task he faces: "Like a dog with a bone, people don't want to give them up."

Even if firms can overcome the stigma of failure, how exactly are bosses to know which potential innovations to kill? Mr Christensen, author of "The Innovator's Dilemma", believes he has cracked the code. He says it can require unlearning some of the things that managers often accept as golden rules. The chief one is the belief in listening and responding to the needs of your best customers.

Siren songs

This seemingly sensible strategy can be a dangerous siren song, Mr Christensen argues. His influential book shows how even successful firms can get into trouble by trying to please their best customers. Because there may be only a handful of highly profitable, high-end buyers who want and can afford more features and better performance, firms can invest heavily in trying to deliver what this elite group wants even though the resulting products may end up beyond the reach of the majority of their customers.

That, argues Mr Christensen, allows upstarts to enter the market and offer inferior (although perfectly adequate) technologies and products at much cheaper prices and push incumbents into ever smaller niches—and ultimately out of business altogether. He cautions this "disruptive" innovation is not the same thing as "radical" or "breakthrough" innovation, although the notions are often conflated. In his view, personal computers disrupted IBM's mainframe computers and Digital Equipment's mini-computers, as did Nucor's highly efficient mini-mills to US Steel's blast furnaces.

Now Chinese and Indian firms are poised to disrupt established companies everywhere in much the same way, he argues. Their impact, he says, will be even more traumatic because both countries have a large pool of domestic customers—many of whom have only just begun consuming and do not have the same high expectations as Western customers typically have. Chinese and Indian companies can practise on their domestic customers while they improve quality to the point they can begin to export. South Korean firms have already gone through much the same process with consumer-electronics and cars—and in the process have frightened many of their Japanese rivals.

Snap, and it's too late

In a sense, Mr Christensen's management myths echo a sentiment expressed by Edwin Land, the inventor who founded Polaroid. "People who seem to have had a new idea have often simply stopped having an old idea," he said. Alas, his successors at Polaroid did not pay attention. The firm stuck by its successful old idea for film-based instant photography and stubbornly ignored the disruptive potential of digital imaging until it was too late. Polaroid went bust in 2001.

Mr Christensen's alternative innovation strategies include watching out for new technologies or new business models which are designed to attract customers who may not be using your product today because it too expensive or too complicated. Sony's early transistor radios were tinny compared with RCA's big home versions, but teenagers who never had radios loved these cheap devices.

He also thinks it is better to make things simpler and easier for the bottom and middle of the market, as personal computers did, rather than add needless bells and whistles for the handful of top customers who can afford and demand them. And he says companies should act decisively to co-opt or pre-empt disruptive ideas themselves, even if it threatens their core businesses in the short run.

Executives at US Steel, a traditional integrated steel-firm nervously eyeing the threat from new mini-mill technology, nearly built a cheap and cheerful mini-mill themselves to compete against the upstart Nucor. However, recounts Mr Christensen, those aspiring innovators within US Steel were forced to halt the profitable project by bean counters, who argued that it was cheaper just to produce more steel from the firm's existing blast furnaces (since their capital costs had been paid for and steel could be produced for merely the marginal cost of cranking out an extra tonne). That short-term thinking scuppered the giant firm's best chance for reinventing itself.

Peter Drucker, an eminent management guru, argued decades ago that innovation and entrepreneurship are “purposeful tasks that can be organised—are in need of being organised” and should be treated as part of an executive’s job.

Is there a risk that with too many rules, firms could lose out to serendipity? Ask Mr Lafley how he intends to keep P&G’s edge if innovation becomes less ad hoc and he immediately points to Toyota’s embrace of total-quality management as a model. Many firms have studied the Japanese carmaker’s legendary methods, as P&G’s rivals are even now studying its innovation model, but none has really been able to copy it. That is because Toyota’s real edge is the strong culture which drives its unrelenting quest for quality.

Bill Reinert, a senior Toyota official based in North America, explains it thus: “What’s discontinuous about our firm is the very long view of management. That vision has pushed us from being a closed company to one with continuous information flows, both into the company and within it, about market, regulatory and geopolitical trends.”

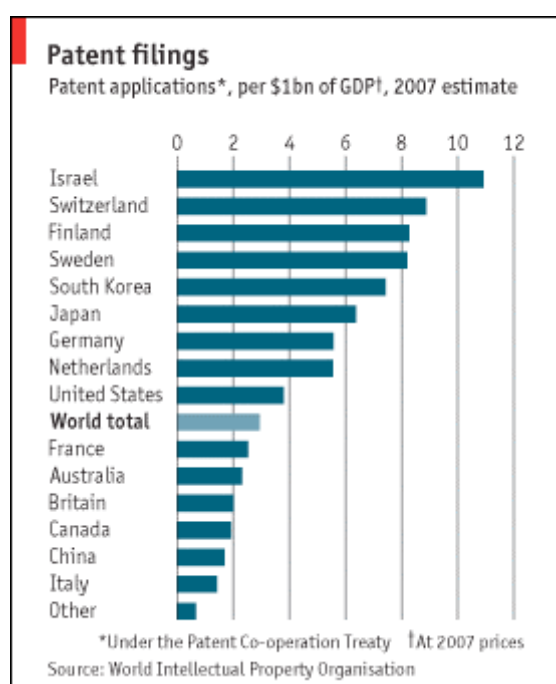
A symbol of this is Toyota’s Prius hybrid-electric car. It was a risky bet on an unproven technology, but it has been a huge success. It was a long-term vision, says Mr Reinert, that overcame the firm’s innate caution. And in the future the company is going to have to make similar bets again. “We are convinced that we are entering a disruptive future, and we want to be ready for it,” he says. He is not alone in taking that view.

Patent filings

Feb 28th 2008

From *The Economist* print edition

The World Intellectual Property Organisation estimates that 156,100 patent applications were filed under the Patent Co-operation Treaty in 2007. Israel, Switzerland, Finland and Sweden all generated a good many patent applications given their size, whereas China, a much larger economy, makes up a small—albeit rapidly increasing—share of total submissions. America accounted for over a third of total patent filings in 2007. Although its contribution appears modest compared with its share of global income, the number of patent filings adjusted for national income is only a crude indicator of a country’s ability to generate ideas. That is because the usefulness of each patent can vary widely.



Homework:

Do entrepreneurs always innovate? Find examples to support your answer.