INNOVATION IN INDUSTRY

all talk and no action...
Who is this guy?

- Over 15 years of experience in innovation and industry: Cookson, YKI, Electrolux, BASF & Hybrid Plastics
- Serial innovator: many inventions, 13 patents & 2 Innocentive cash awards
- Papers, articles, book chapters, presentations & workshops
- Fellow of the Royal Society of Chemistry & Chartered Chemist
Introduction

• What is innovation?
• Why do we need it?
• How do we approach it now?
• What are the weak points?
• How can we prevent or ameliorate them?
• What the future holds: new tools
• Conclusions
What is innovation?

“ideation and innovation are not synonyms. The former deals with the generation of ideas; the latter, with their implementation.”

Levitt

- Generate ideas
- Pick the best ones
- Generate new products and processes
Why do we need innovation?

• The market is dynamic so new products are always necessary
• Competitors do not stand still
• Stock holders demand a return on investment
• 30-80% of a companies valuation is based on anticipated profits from innovation
• Even the most successful companies do poorly just 5 years later (so there is no winning formula)
Product development scheme

- Marketing: Identify Target
- R&D: Aim
- Product Development: Load and Cock
- Production: Fire
What are the weak points?

• Identifying the market needs
• R&D effectiveness
• Project transfer between functions
• Project monitoring systems
• Time to market
• In short: everything!
Innovators

“The opportunities of man are limited only by his imagination. But so few have imagination that there are ten thousand fiddlers to one composer.”

Charles F. Kettering

- Anyone can have ideas
- However, only a very few will consistently generate valuable ideas
- Look after your innovators
- Gain access to a larger pool (shown later)
R&D – basic research

“Basic research is like shooting an arrow in the air and, where it lands, painting a target.”

Homer Adkins (Nature, 1984)

• Many scientists look down upon applied research
• The Nobel Prize is awarded for “cool” work of doubtful utility
• Large companies are safe havens for scientists to play
R&D – applied research

“Knowledge has no value except that which can be gained from its application toward some worthwhile end.”

Napoleon Hill

• Applied research is more challenging and more personally rewarding

• Done under constraints on time, money, safety and practicability

• It gives tangible products to help companies, people and mankind
“So much of what we call management consists in making it difficult for people to work.”

Peter Drucker

- Project management tools work well for repetitive or predictable activities
- They do not help in innovative processes as they are, by nature, unpredictable
- So, why do we use them?
Project “management”

“When you do not know what you are doing, do it neatly, efficiently, and decidedly.”

anon (Guidelines for Successful Planners)

• Project monitoring tools give management an overview

• By implementing procedures, one creates the illusion of control

• The net effect is to slow development and shift focus from actual work to paperwork
Idea filtering

“The best way to have a good idea is to have a lot of ideas.”

Linus Pauling

• Generating ideas is not that hard
• Good ideas are however, hard to find
• Filtering the ideas is key
• Experienced staff with commercial awareness are needed
New information paradigm

“The next best thing to knowing something is knowing where to find it.”

Samuel Johnson

• The information now available far outstretches mankind’s ability to remember it

• We have to shift our focus from memorization to:

  – storage
  – searching & networking
  – filtering
  – critical thinking
New information paradigm

Information worldwide

+30% per year

>20 exabytes

Ever faster

Useful output

1 exabyte = 10^{18} bytes
Time and timing

- Innovation needs to be correctly timed to hit the market window
- The market clock ticks independently from the company clock
- Projects need be accelerated
- Initiate projects immediately
- Run activities concurrently
- Fewer, faster projects
- Leads to increased return
World-scale woes

“There is no greater barrier to innovation than a paid-off plant.”

• Economies of scale are needed to compete in any market
• This means ever increasing investments needed just to stay in the game
• Introducing a new process is almost impossible:
  – existing process has been tuned for decades
  – no viable mechanism to scale up gradually
Talent and productivity

Talent = initiative x drive x ability x focus  \textit{but}  
Productivity = \underline{initiative} x \underline{drive} x \underline{ability} x \underline{focus}  
\underline{selfishness}

• Companies all know that they need talented staff
• Unfortunately, those they get are average
• Better employees can be hired with the aid of simple tools
• Get better staff and...
• Avoid problem people
Large company syndrome

“In any great organization it is far, far safer to be wrong with the majority than to be right alone.”

John Kenneth Galbraith

• Almost no contact to the customer
• All contacts are internal (politics rule)
• No chance to affect the bottom line
• Decision making problems
• Wrapped in red tape
The safety seesaw

safety

output
What does the future hold?

New tools include:

• Virtual marketing
• Open innovation
• Innovation indexing
Virtual marketing

The old way:
• Hardcopy market studies
• Limited dataset
• Subjective analysis
• Out of date information

The new way:
• Instant internet access
• Vast dataset of potential customers
• You can analyze and tune the analysis
• Up to date information
Open Innovation

The old way:
• Maintain a large corporate R&D department (fixed cost)
• Rely on internal ideas
• Low chance of out-of-the-box ideas

The new way:
• Maintain a small corporate R&D
• World-wide ideas and more ideas
• Multidisciplinary with breakthrough potential
Innovation Index

Purpose: Screening collaboration partners, optimizing structure

Input parameters:

Number of employees (⇒ number of chances to innovate, N)
Annual Sales (⇒ chance to affect the bottom line, P)
Number of levels in hierarchy (⇒ decision making ability, D)
R&D spending as % of sales (⇒ resources allocated, R)
Market share yet to win (⇒ incentive level, M)
Employee fraction next to customers (⇒ market contact, E)

Innovation Index \( I_x = N \times P \times D \times R \times M \times E \)
Conclusions

• We need innovation to grow and thrive
• Most companies are very poor at delivering innovation
• The process is flawed and must be changed
• New tools allow major improvement:
  – personality profiling for better employees
  – virtual marketing for real-time market info
  – open innovation for better, cheaper, results
  – innovation index to select partners
Further reading


