

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.”

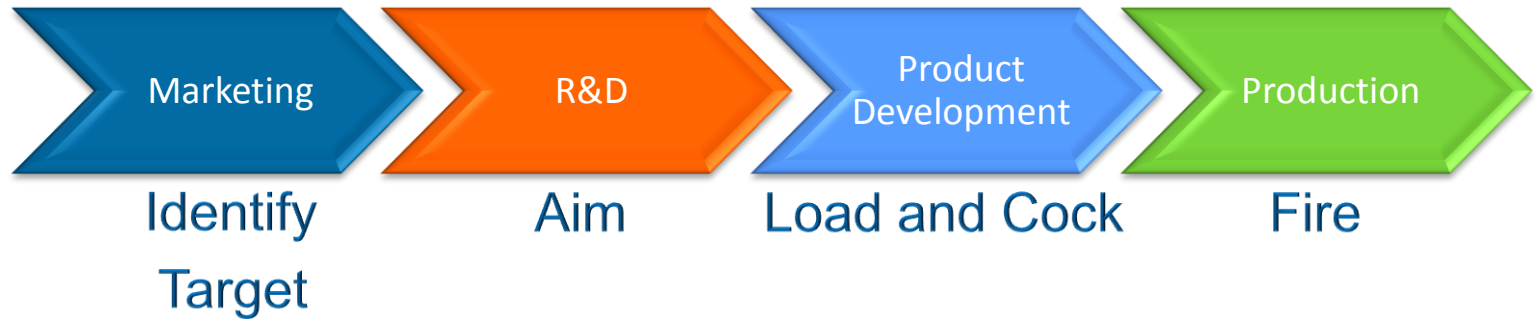
Levitt

- 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



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

Project “management”

“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 decisively.”

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

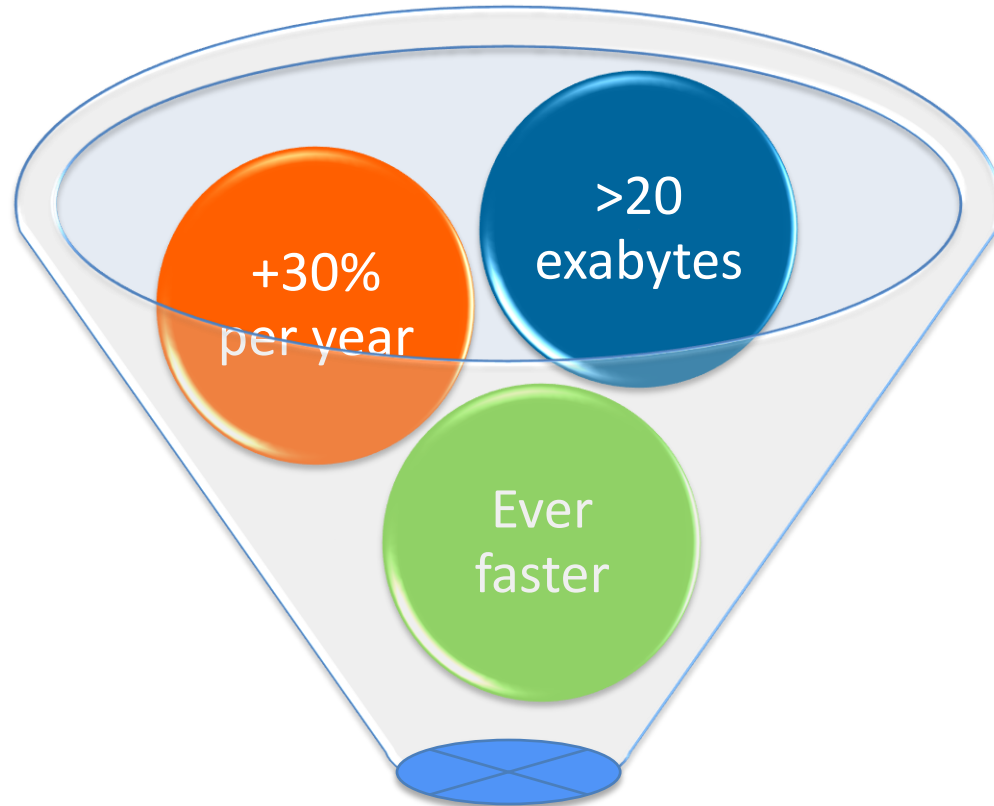
“The next best thing to knowing something is knowing where to find it.”

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



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 *but*

Productivity = initiative x drive x ability x focus
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

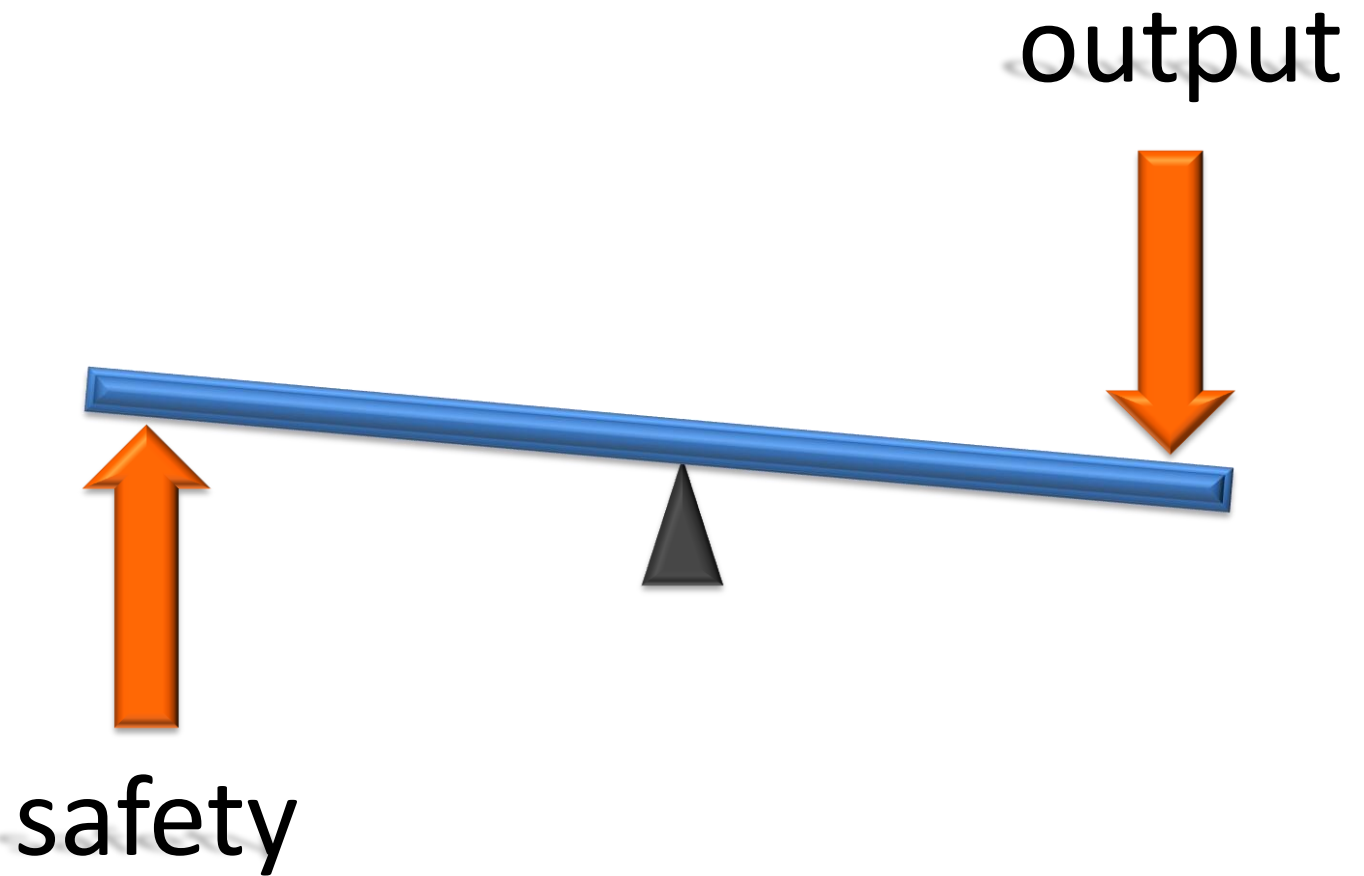
Large company syndrome

“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



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 (\Rightarrow number of chances to innovate, **N**)

Annual Sales (\Rightarrow chance to affect the bottom line, **P**)

Number of levels in hierarchy (\Rightarrow decision making ability, **D**)

R&D spending as % of sales (\Rightarrow resources allocated, **R**)

Market share yet to win (\Rightarrow incentive level, **M**)

Employee fraction next to customers (\Rightarrow market contact, **E**)

$$\text{Innovation Index } I_x = N \times P \times D \times R \times M \times E$$

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

1. P. Doyle, *Marketing Management & Strategy 3rd Edition*, Prentice Hall, Essex, UK, 2002.
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3. C. M. Christensen, M. E. Raynor, *The Innovator's Solution*, Harvard Business School Publishing Corporation, Massachusetts, USA, 2003.
4. P. G. Smith, D. G. Reinertsen, *Developing Products in Half the Time 2nd Edition*, John Wiley & Sons New York USA 1998.
5. M. Michalko, *Thinkertoys 2nd Edition*, Ten Speed Press, California, USA, 2006.