



## **Visiting Professors in Innovation Workshop**

Sir Colin Campbell Building  
University of Nottingham  
26th March 2009



### **Objectives**

- To establish a common understanding of Innovation
- To identify routes to 'best' practice
- To consider future events
- To network

## Why this Particular Initiative?

- The Royal Academy Report on 'Educating Engineers for the 21. Century' and 'Educating Engineers in Design' both recognised the formative role that the RAEng VP scheme has had in embodying current industrial practice into university courses
- Consequently the desire to extend this through The Visiting Professors scheme in Innovation

## Why Innovation

- Economic prosperity depends upon business **innovation** which is unlocked by **design** -*Design Council*
- Quality of Life depends upon public services that can be enhanced through **innovation** '*Innovation Nation*' published by DIUS March 2008
- **Innovation** needed in Engineering Education to ensure that graduates are equipped to meet future challenges - *Educating Engineers for the 21<sup>st</sup> Century, Royal Academy of Engineering*

## What is it?

- **Creativity**

The generation of new ideas – either new ways of looking at existing problems, or of seeing new opportunities, perhaps by exploiting emerging technologies or changes in markets.

- **Design**

Design links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end.

*To devise the optimum artefact, component, system, or process to satisfy customer needs*

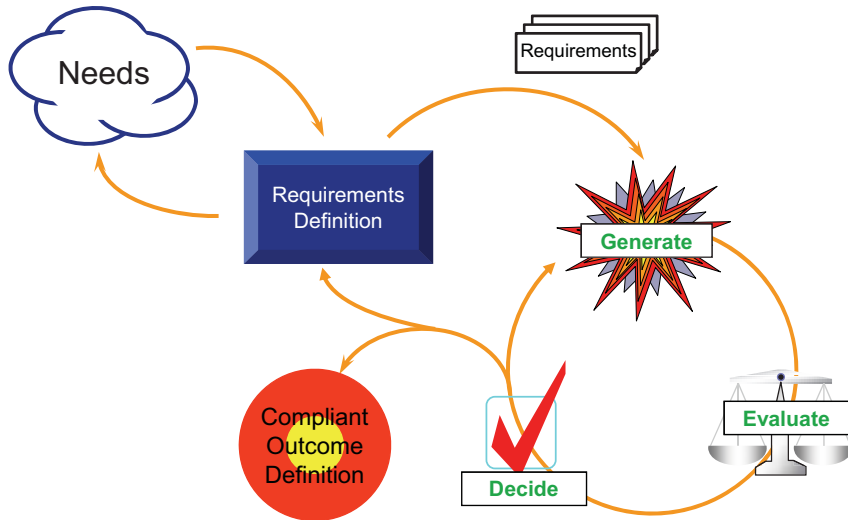
- **Innovation**

Innovation is the successful exploitation of new ideas. It is the process that carries them through to new products, new services and new ways of running the business or even new ways of doing business.

## Outcomes of the Design Process

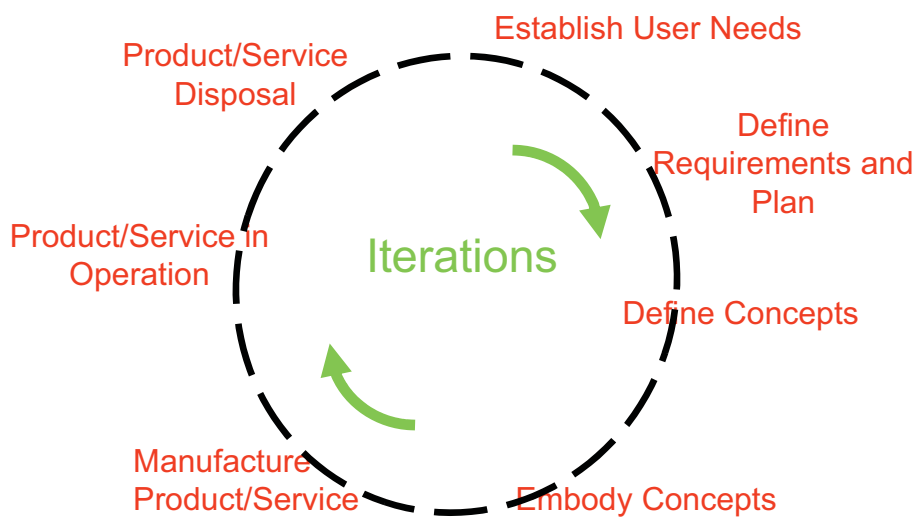


## A Generic Design Process Model

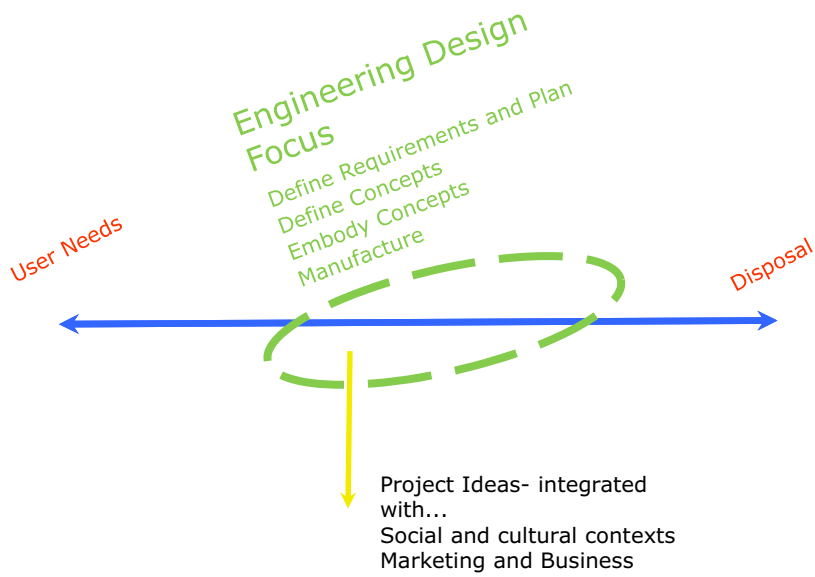


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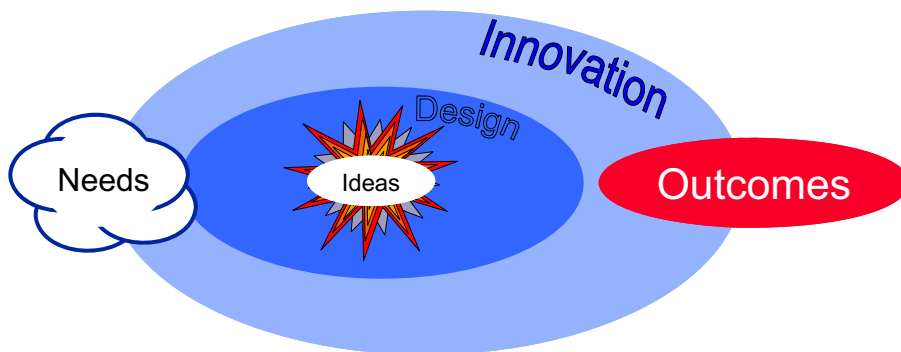
## The Seven Ages of a Product or Service



## Innovation – Extending the Focus



## Creativity, Design and Innovation



### **Do I hear?**

- 'We do some... much... most... of this already'!
- Happily- yes, we do- so we don't need to re-invent the wheel.
- .... but we can just check that the wheels are connected and all rolling in the same direction....
- ... and show just how good we all are at steering

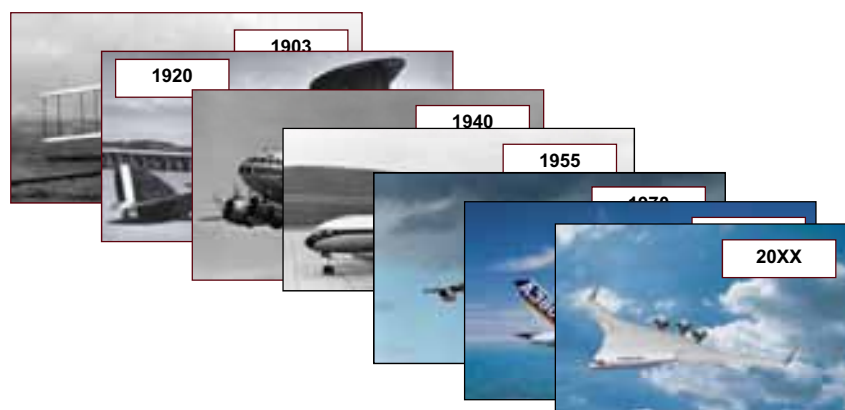
### **What do the VP and VTF roles entail?**

- Participation in course development to situate innovation within each year of the course culture
- Heightening awareness of business and commercialisation within engineering design projects
- Promoting cross-departmental collaboration
- Reporting, adapting and incorporating best practice from centres elsewhere

## The VP Scheme in Innovation : Objectives

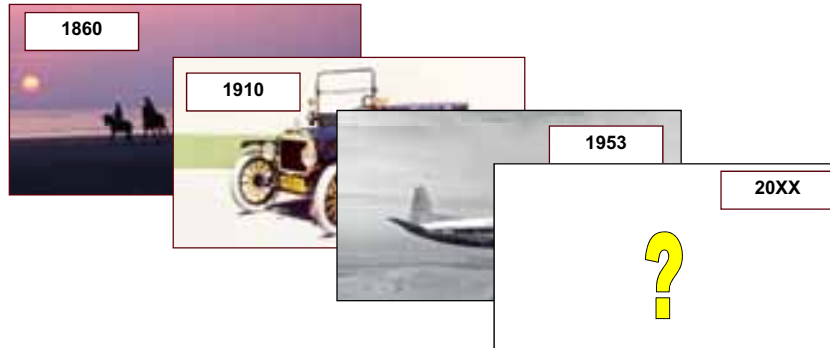
- Enhance the innovation content in undergraduate teaching
- Develop a better understanding of the innovation process in business contexts
- Encourage inter-disciplinary design activity
- Develop greater awareness of, and contact with, industry and business
- Encourage undergraduate endeavour in developing creative, innovative design proposals

## Continuous Innovation



- Responsive to problems, opportunities or trends
- Maintains or enhances competitive position
- Lower risk
- Most common form of innovation

## Discontinuous Innovation



- Creative thinking that challenges paradigms
- Higher risk but required for the long term
- Goes beyond competitive positioning
- Potential to significantly impact the way the world operates
- Less common

## How Innovative - Can it be Measured?



New concept. Voted the winner in the BBC Great British Design Quest, 16 went into service, now out of production

Incremental concept. Failed original objective, but over 1500 in service. Still being developed and in production



# Successful Innovations



MRI Scanner



Mobile phone



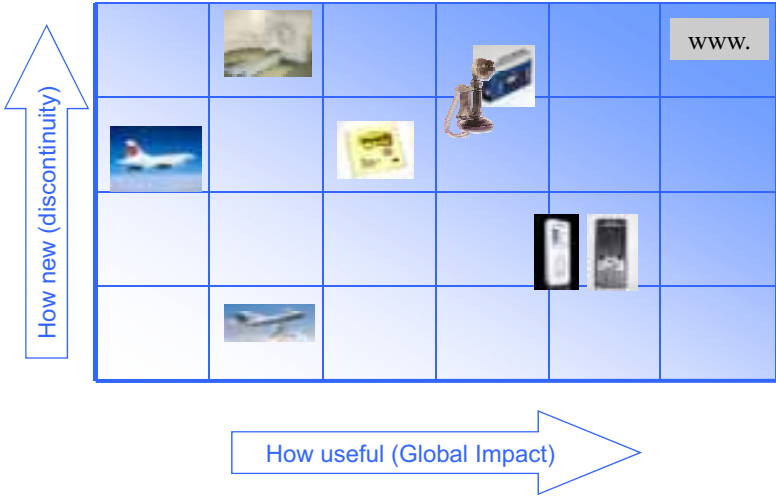
Apple iPod

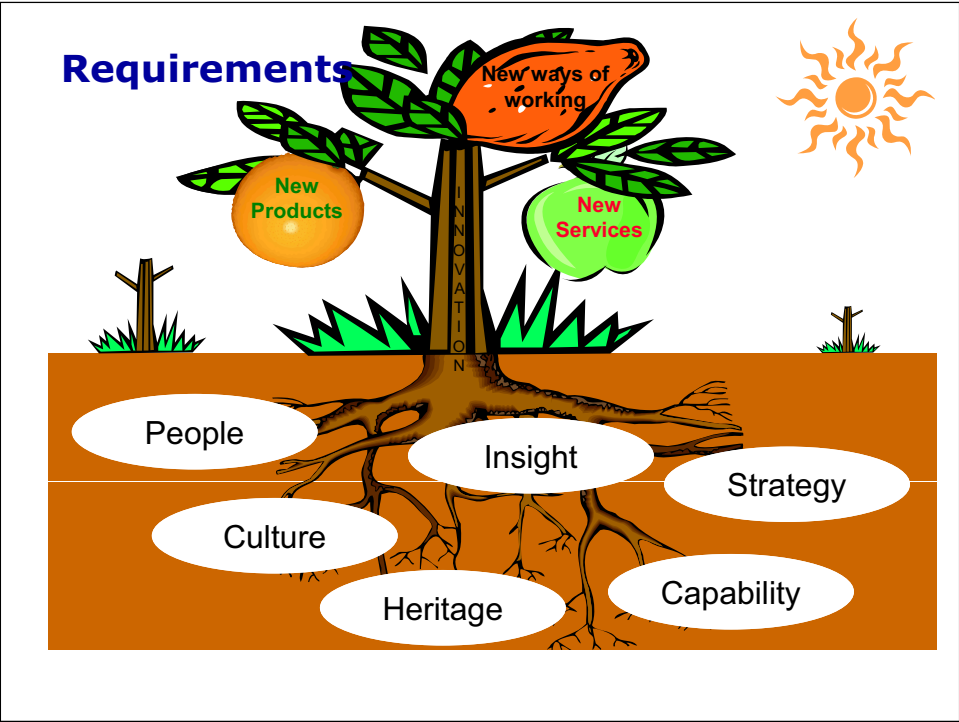
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# Novelty and Usefulness

How new X How useful





# Unsuccessful Innovation?

This section displays several examples of products or initiatives that are considered unsuccessful innovations:

- The Sinclair C5 1985**: A small, white, three-wheeled personal transporter.
- The Apple Newton 1993**: A handheld PDA with a screen and a stylus.
- The Ford Edsel 1958**: A classic red Ford sedan.
- The Apple Portable 1989**: A portable computer with a keyboard and screen.
- Sony Betamax 1975**: A VCR and a Betamax tape.
- Canada**: A collection of beverage cans, including Dr. Pepper and Coca-Cola.

## The Carbon Composite (Hyfil) Fan



- RB211-22B for Lockheed Tristar
- Offered a 263lb weight and 2% fuel benefit
- Experienced integrity problems replaced by a clapped titanium blade in Spring 1970
- Company in receivership Feb 1971, engine entered service mid 1972)
- The original objective remained

## The Fan Blade



## **Summary**

- Design is an integral part of the Innovation process
- There is still a need to understand the early activities, the collisions and precursors, of the Innovation process.
- Engineering education needs to introduce more challenging and exciting tasks by using indeterminate (open ended) tasks
- How do we improve Innovation teaching at undergraduate level



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