



creativity

innovation

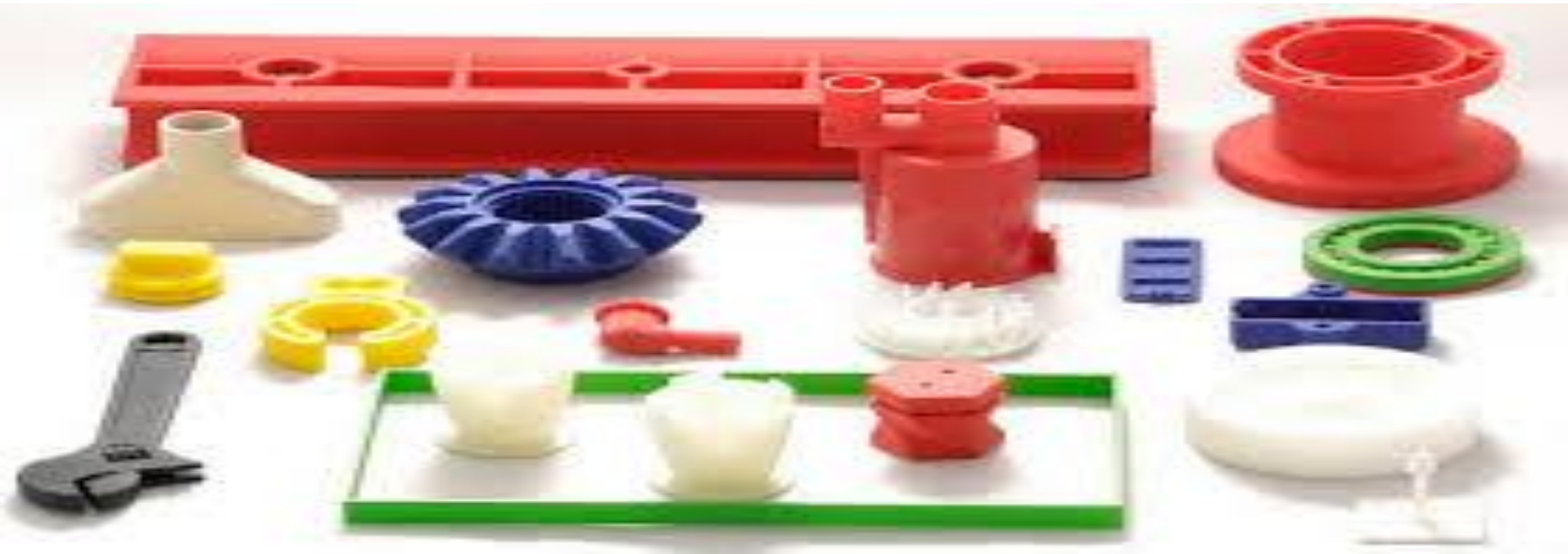
Topic Outline

- What is Prototypes?
- A Framework for Understanding Prototype
- Why Use Prototypes?
- Problems with Prototypes



Lesson Outcomes

- Identify the different categories of prototypes
- Explain what makes prototypes so invaluable to innovation



What is Prototypes?

'Prototypes can be anything from crude gadgets to elaborate mock-ups'

Hardagon and Sutton (2000)

- The team started with mood boards to capture the essence of what the new car was to be about
- This was translated into a 'cardboard buck' which gave a first impression of the overall lines of the car
- Once this was refined a 1:3 scale clay model was built – but for presentation purposes a plaster case was made which in turn was used to build a fibreglass model which would be much more realistic than the duffer clay model.
- There were several iterations of the 1:3 model, which was also used for testing in the wind tunnel
- The development of a full-size clay model using digital technology (the model is cut directly from the digitised drawings), which was then refined by hand

The Different Kinds of Prototypes Used During The Development of The Car Body Shell

What is Prototypes?

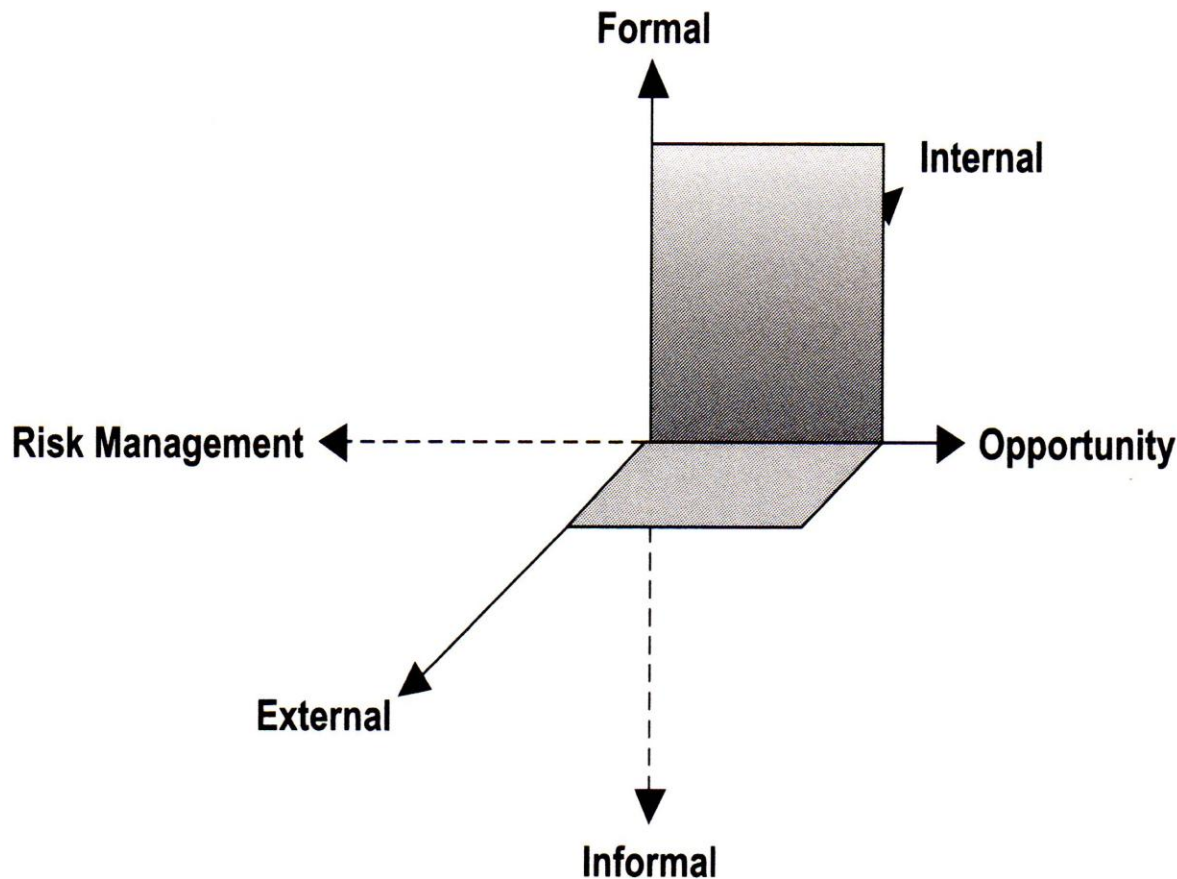
2-D (flat) models	Non-functional 3-D models		Functional prototypes	User test models	Organisation/System models
<ul style="list-style-type: none"> • Concept sketches • Drawings • Blueprints • Specifications • Engineering layout 	<ul style="list-style-type: none"> • Mock-ups • White models • Simulations • Site models • 'Soft' models 	<ul style="list-style-type: none"> • Simulations • CAD models • Finite element analysis – graphical representation 	<ul style="list-style-type: none"> • Engineering prototypes • Feasibility models • Simulations • CAD models • Finite element analysis – graphical representations 	<ul style="list-style-type: none"> • Working prototypes 	<ul style="list-style-type: none"> • First production units • Pilots • Production models • 'First article' • 'First article'
Generally require some understanding of 'expert speak'	Emphasis on form and aesthetics, how it feels and looks		Emphasis on functionality/how it operates	Combining form and function; foretelling interaction between user and product	Primarily focusing on the interaction between product and company (e.g. manufacturing)

Categorization of Prototypes

A Framework For Understanding Prototype

- Prototype will vary from stage to stage and audience to audience
- By looking at a company's use of prototypes one can tell much about the company's culture and whether or not it is innovative
- Prototype can be looks at 3 different axes:
 - a. **Formal versus Informal** – refers to the degree to which the prototype is polished and comprehensive
 - b. **Risk Management versus Opportunity** – do we use the prototype to explore and understand potential risks and problems or to identify opportunities
 - c. **External versus Internal** – is it to be used within the company or shown to the outside world

A Framework For Understanding Prototype



Internal – External:

Determines whether insiders or outsiders see the prototype

Risk Management – Opportunity:

Determines whether the prototype is designed to create opportunity or manage risk

Formal – Informal:

Demarcates between 'rough' prototypes that the group knows are unfinished and more polished prototypes that adequately embody design issue

Examples:

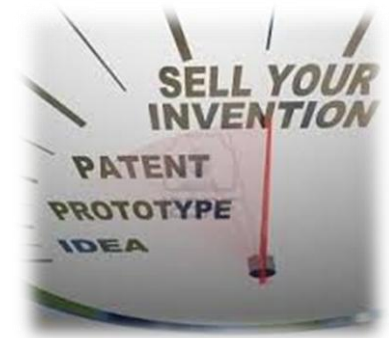
- Risk, internal, formal: traditional company, prototype is end result of agreed specification
- Opportunity, internal, formal: more structured prototype review

Why Use Prototypes?

1. It helps to bridge language barriers between departments and create a shared vision
 - Diverse people involved in NPD who perceived a different aspect of the whole.
 - ‘Get physical’ as early as possible make sure members of project team share the same vision for the outcome.
2. It provides focus
 - Prototypes are tangible and easy to understand.
 - Useful for resolving crucial questions quickly and unambiguously.



Why Use Prototypes?



3. It allows failure at the early stages
 - Getting early feedback from a wide range of audiences (internal and external).
4. It saves time
 - Rapid prototyping – generate prototypes directly from 3-D CAD data cut between 10 to 15% of development time.
5. It helps to communicate the unknown
 - The more radical an innovation, the harder it is to understand the value and potential the product had.
6. It works for services too
 - E.g. use of paper-based prototypes for the development of software and websites.

Problems with Prototypes

The need to manage expectations

- ✓ External and unfamiliar to prototypes of internal audiences might expect working prototypes to go into production shortly.
- ✓ Tooling, resourcing and manufacturing are time consuming.
- ✓ Needs to make quite clear of what the purpose and scope of it is.

The need to manage intellectual property rights

- ✓ Patent registration prevents competitors from picking up unique aspects and using them in their products.

