

Product Development Intoduction



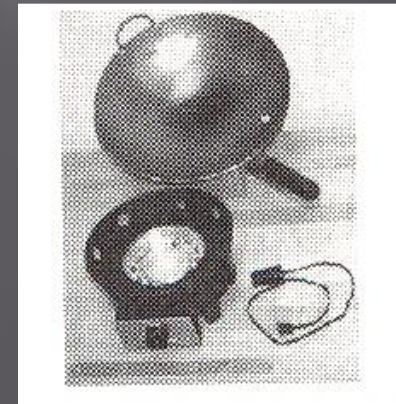
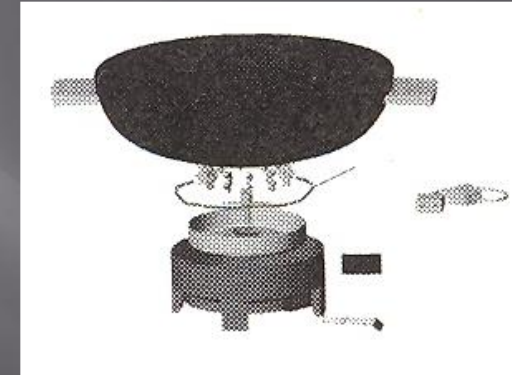
Product Development Process

A product development process is the entire set of activities required to bring a new concept to a state of market readiness.

A design process is the set of technical activities within a product development process. It does not include business, financial, or marketing activities.

Product Design Process

- Understanding the Opportunity
- Develop a Concept
- Implement a Concept



Understanding the Opportunity

Characterized with four activities

- ▣ Develop a vision
- ▣ Market opportunity analysis
- ▣ Customer/user need analysis
- ▣ Competitive products analysis

Develop a vision

The first step in product development is to have a vision.

What product do we like to be out there?

Why does it not do something we want it to?

What is difficult with the current product we use?

Develop a vision

Visions are a dime a dozen

- ▣ Every user has thoughts on how they wish their device would work.
- ▣ Every research scientist has a vision for how their technology can be applied.
- ▣ Every manager has a vision for command of a market.

The question is whether any vision can be transformed into a successful realization.

Can it be developed and implemented into a profitable product?

Market opportunity analysis

Go/No-Go decision on a new product

- ▣ S-Curves
- ▣ Technical questioning
- ▣ Mission statement
- ▣ Product development economic analysis

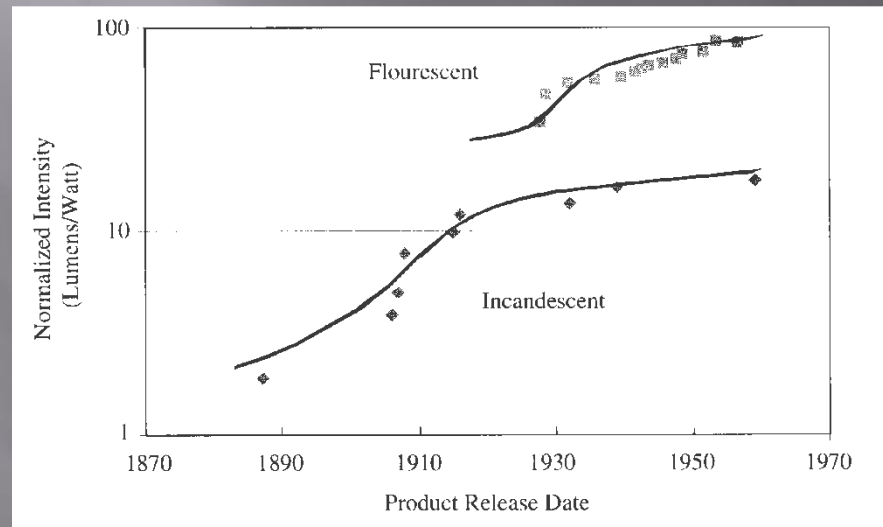
Determining What to Develop

- ▣ Should a completely new product be designed (*original design or invention*)?
- ▣ Should the existing product be redefined and modified to better satisfy the customer (*adaptive design, evolving a known design*)?
- ▣ Should the product be expanded to variant forms to more comprehensively cover the market (*variant design; involves varying parameters, size, shape, materials,....*)?

S-Curves

Technological innovations typically manifest themselves into a market along an “S-curve” timeline behavior.

The S-curve displays the performance of a product over time with respect to one variable.



Stage I - characterized by relatively low performance, not much innovation.

Stage II – rapid growth due to many innovations, many products introduced into the market.

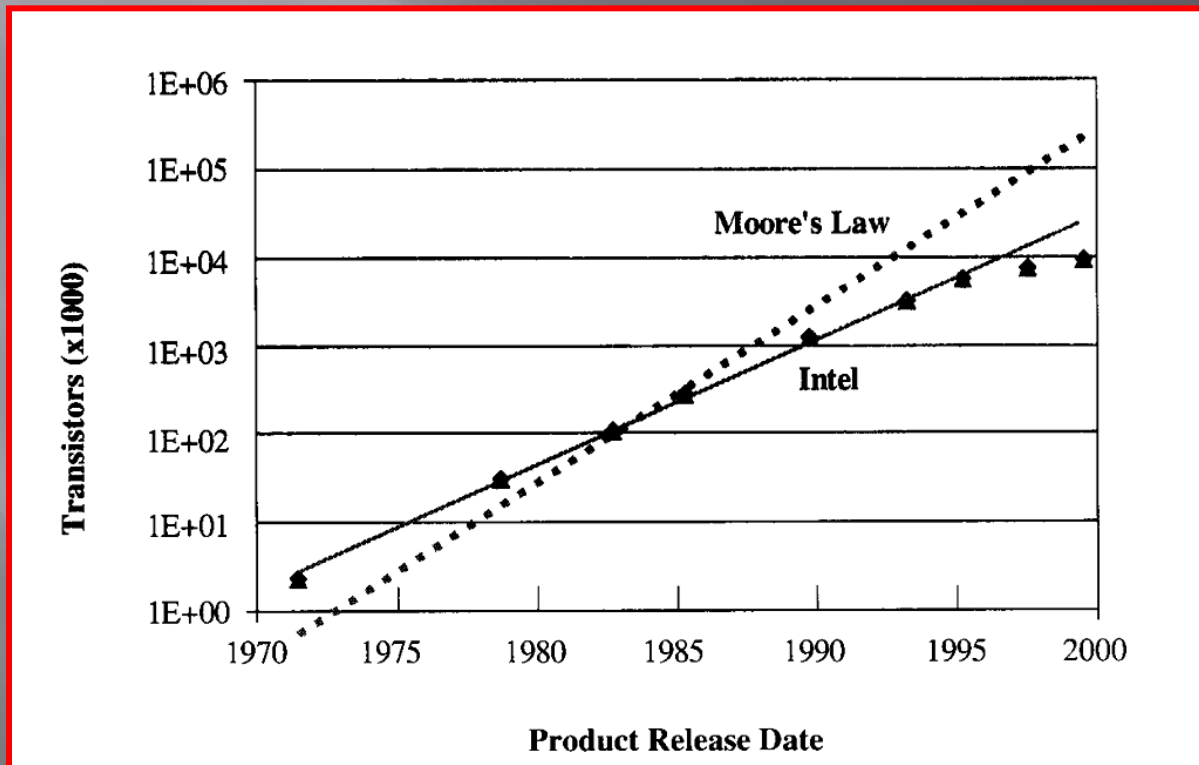
Stage III – technology tops out, product may become obsolete

Comments on S-Curves

- ▣ S-Curves show the market behavior of most technologies
- ▣ A switch to a better technology is known as jumping the S-curve.
- ▣ The newer S-curve is a disruptive technology that requires changes in the market system to succeed (VHS, DVD, HDTV,)
- ▣ The industry is constantly jumping the S-curve
- ▣ Design team should consider the technology environment in introducing new product.

Comments on S-Curves and Technology Forecasting

Although most technologies follow this path of market behavior, there are exceptions. Moore's Law (transistor density on microprocessors doubles every 18 months).



Technical Questioning and Mission Statement

The mere formulation of a problem is far more often essential than [is] its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science.—Albert Einstein

Product development Risks

Any new product development project faces risk from two independent sources.

- ▣ *Is the product technically feasible? Can we make it in a reasonable time?*
- ▣ *Is the product economically feasible? Will people buy it at a reasonable profit to us?*

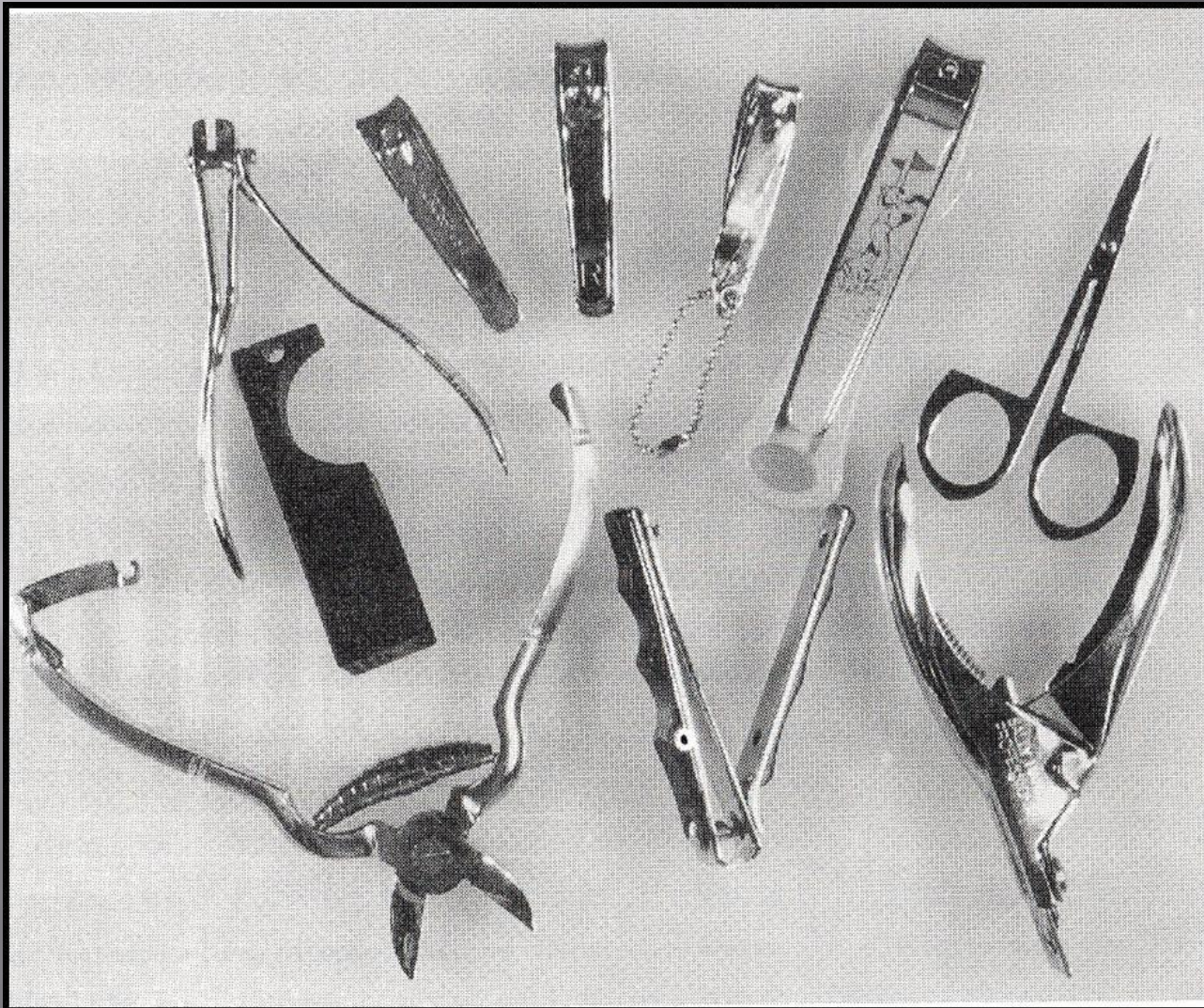
Technical Questioning and *Mission Statement* are two processes used to answer these questions.

Technical Questions

- ▣ Technical questions are needed to clarify the task.
- ▣ To keep focus, one should question the current understanding of the development.
- ▣ Questions should be asked and answered, not once, but continually through the life cycle of the design process.

Example – Design a new fingernail clipper

Existing fingernail clippers in the market



Technical Questioning fingernail clipper example

- ▣ *What is the problem really about?*
Clumsy operation of a typical clipper, nail clippings all over
- ▣ *What implicit expectations and desires are involved?*
Remain a manual clipper that can be operated by oneself, collect clippings,
- ▣ *Are customer needs, requirements, and constraints truly appropriate?*
Consumer studies have noted clumsy operation. A detailed assessment will be made post-consumer interviews
- ▣ *What avenues are open for creative design?*
Can modify any and all parts, use different materials besides metals. Add functionality, such as the ability to store and dump nail debris

Technical Questioning fingernail clipper example

- ▣ *What avenues are limited for creative design?*

No electrical power, size, weight, cost

- ▣ *What characteristic/properties must the product have?*

Durable, safe, easy to use

- ▣ *What characteristic/properties must the product not have?*

Should not be heavy and bulky

- ▣ *What are the technical conflicts inherit in the design task?*

Compact size vs. large surface area for grasping and large mechanical advantage.

Technical Questioning fingernail clipper example

- ▣ *What aspects of the design task should be quantified now?*

Customer needs analysis, fingernail characteristics; size and strength, human hand and finger size and strength, required profit to cover development cost.

Research, estimates and simple calculations should be performed to understand these issues.

Mission Statement

The tangible result of the technical questioning should be a precise and clear statement of the design team's mission.

Also called, *Product Plan, Market Attack Plan, Vision Statement*

Mission Statement Template

Mission Statement: XXXX Product

Product Description	one concise and focused sentence
Key Business or Humanitarian Goals	<ul style="list-style-type: none">• schedule• gross margin/profit or break-even point• market share• advancement of human needs
Primary Market	<ul style="list-style-type: none">• brief phrase of market sector/group
Secondary Market	<ul style="list-style-type: none">• list of secondary markets, currently or perceived
Assumptions	<ul style="list-style-type: none">• key assumptions or uncontrolled factors, to be confirmed by customer(s)
Stakeholders	<ul style="list-style-type: none">• 1-5 word statements of customer sets
Avenues for Creative Design	<ul style="list-style-type: none">• identify key areas for innovation
Scope Limitations	<ul style="list-style-type: none">• list of limitations that will reign back the design team from "solving the world"

Mission Statement Example

Mission Statement: Fingernail Clipper Product

Product Description	Remove and file excess fingernail length.
Key Business or Humanitarian Goals	<ul style="list-style-type: none">• 6 month development of beta prototype• 30% profit margin• Initial 5% market share• Supplement fingernail polish business
Primary Market	<ul style="list-style-type: none">• Adults of all ages, focusing on fingernail polish users
Secondary Market	<ul style="list-style-type: none">• Knife collectors• Business executive
Assumptions	<ul style="list-style-type: none">• Small, compact stowage volume• Long life (10-20 years)
Stakeholders	<ul style="list-style-type: none">• XXX Corporation; user; salons, retailers
Avenues for Creative Design	<ul style="list-style-type: none">• ergonomic shape; store/capture of nails; compact stowage; ease of cutting
Scope Limitations	<ul style="list-style-type: none">• Materials: steel processing and moldable plastics.