Innovation
CHARACTERISTICS OF SUCCESSFUL Innovating Organizations

• Systematic collection of all impulses that could lead to innovation
• Creativity of participants/culture
• Ability to evaluate the possibility of the innovation idea
• Good team work
• Project-based approach and ability to manage projects
CHARACTERISTICS OF SUCCESSFUL Innovating Organizations

• Cooperation with external experts (Stakeholders)
• Risk-taking
• Motivation (tolerance of failure)
• Focus
Definition of innovation (Technical)

- New products and processes or
- Modifing existing products and processes and

- Introduced to the market or
- Changed Production process or
- Changed Marketing process
Innovation

• **Product innovation**
  - A good or service that is new or significantly improved
    - Performance
    - Components and materials
    - Software in the product
    - User friendliness
    - Cost

• **Process innovation**
  - production or delivery method. This includes significant changes in techniques, equipment and/or software.

• **Marketing innovation**
  - A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

• **Organizational innovation**
  - business practices, workplace organisation or external relations.
Innovation

• Product, Process or Marketing

• Sometimes Context changes – Enablers such as computation, data availability, zero cost of memory, cultural or social change
DEGREE OF NOVELTY

• Incremental innovations
• Radical innovations
• Systemic innovations
INNOVATION PROCESS

- Research and development (R&D)
- Production
- Marketing

Innovation is an opportunity for something new, different. It is always based on change.

Innovators do not view any change as a threat but as an opportunity.
FOCUS for this Class

• Don’t try to plough the sea
• Honor/develop stakeholders. partners
• Recognize your limitations (partner is Apple)
• Balance short/long term
• Rethink how to do things
• Appreciate risk but don’t be overwhelmed by fear
Focus for this Class

1. Solve the correct problem correctly – be effective and efficient
2. Manage innovation as a project
3. Analyze risks
4. Use models, scenarios, computer simulation
5. Study examples of successful and unsuccessful innovation projects - particularly in your space
Focus for this Class

6. Iterate the project and your thoughts rapidly as new information is acquired

7. Fast and approximate beats slow and exact
WHAT TO DO

1. Start with analysis and study of opportunities.
2. Go among people, ask questions, listen
3. Effective innovations are surprisingly simple. They must be focused on specific needs and on specific final products.
4. Effective innovation starts on a small scale.
5. A successful growth innovation always tries to win a leading position, otherwise you create opportunities for your competitors.
WHAT TO AVOID

1. Don’t try to be too “clever”. All that is too sophisticated will almost certainly go wrong.

2. Don’t try to do too many things at once. Focus on the core (or an important aspect) of the general problem.

3. Don’t try to make innovations for the future but for today. An innovation can have a long-term impact but there must be an immediate need for it.
Three conditions for innovations

1. Innovation means work, hard, concentrated and thorough work. If these qualities are lacking then there is no use for the big talent, cleverness or knowledge.

2. Successful innovations must build on your strong points. The innovation must be important to the innovator.

3. Innovation must focus on a market, must be controlled by the market (market-pull).
• We have begun
Brief one sentence description of the product

–Key business goals
  • Timing
  • Profitability
  • Market share

–Target Markets for the product
  • Primary
  • Secondary

–Assumptions that constrain the development effort

–Stakeholders

Work iteratively!
Creativity

• Present at all stages of the Process

• Economic Analysis

• Project Planning

• Consider Process front end

• Identifying Customer Needs

• Establishing Target Specs

• Analysis of Competitive products

  Concept generation

  Concept selection

  Spec Refinement
Where would you put

- Semiconductors
- Automobiles
- Big Data
- Biotech
- Aerospace
- Communications
- Computers
- Toys
- Agriculture
- Education

Functional Performance of a Technical System

New

Infancy

Rapid Evolution

Maturity

Old Age

Time
What are examples of Breakthrough technologies?
Where to look for Breakthrough Products

- Rapidly evolving underlying or enabling technology (Smart phones, Biotech)
- Product which serve areas of rapid social/economic change (meet new needs)
- Clearly recognizable problem with current products (e.g. air bags, traffic congestion, personal device profusion)
- Bottleneck products (clothes dryers)
- Bottleneck parts (e.g. batteries)
- Niche areas in developing countries which have not gotten attention
- Exploit diffusion lag of new technologies into developing countries
“The formulation of a problem is far more essential than its solution which may be merely a matter of mathematical or experimental skill”

- Albert Einstein

*ask what problem you are trying to solve*
Trial and Error: The "Thomas Edison" Approach

- The trial and error approach has been adopted for use in today's corporate R&D programs.
- "Trial and Error" produces too many "errors" - useless, wasted trials or avenues toward design solutions.
- "Good" trials do not often result in high-level, breakthrough designs.
- The trial and error approach results in excessive use of corporate resources: human resources, time, money, materials and equipment.
- Trial and Error is unable to successful address the needs of (1) rapid technological implementation, and (2) the marketplace.

What major industry still roughly depends on "Trial and Error?"