Innovation

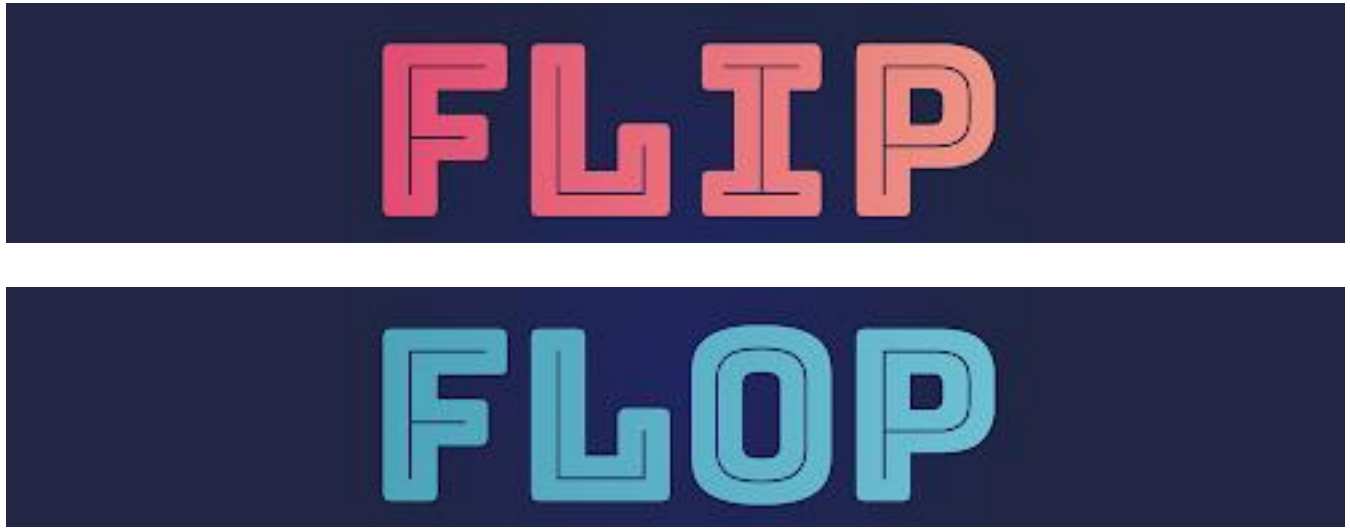
Mahesh & Himanshu

Reference

TOPICS	READINGS
Who Develops Breakthrough New Products and Services - Users or Manufacturers?	von Hippel, Eric. “Overview” and “Users as Innovators.” Chapters 1 and 2 in *The Sources of Innovation*. Oxford University Press, 1988. ISBN: 0-19-504085-6.
Finding out What Users Really Need: The “Sticky Information” and “Learning by Doing” Problems	von Hippel, Eric. “Sticky Information and the Locus of Problem Solving: Implications for Innovation.” *Management Science* 40, no. 4 (Apr 1994): 429-439.von Hippel, Eric, and Marcie Tyre. “How ‘Learning by Doing’ is Done: Problem Identification in Novel Process Equipment.” *Research Policy* (Jan 1995): 1-12
Systematic Generation of Incremental Improvements to Existing Products and ServicesTraditional Marketing Research Concept Generation Techniques	Dahan, Ely, and John Hauser. “Product Development - Managing a Dispersed Process.” MIT Sloan School of Management working paper, 2003: 9-25.
Resistance to Adopting Radically New Innovations - Even in Firms that “Want To”	Groopman, Jerome. “Annals of Medicine: The Reeve Effect.” *The New Yorker*, Nov 2003, 82-93.Morrison, Elting E. “Gunfire at Sea.” Chapter 2 in *Men, Machines and Modern Times*. Cambridge, MA: MIT Press, 1966. ISBN: 0-262-13025-4.

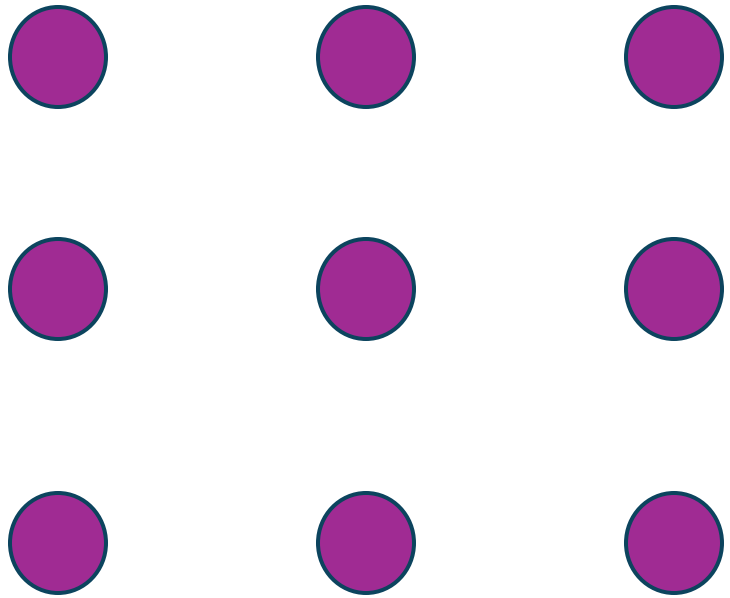
Mind Exercises

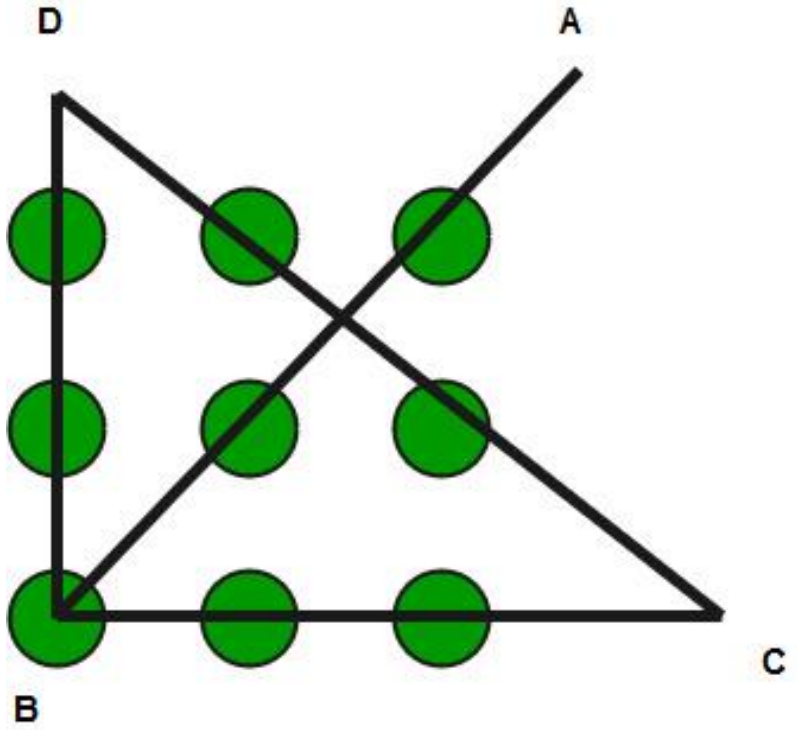
- **I have everything I need to [insert goal here] because...**
- **I can...**
- **I will...**
- **I am...**
- **I deserve...**
- **I love to...**
- **It is possible because...**



- **I should...**
- **I can't...**
- **I won't...**
- **I'm not...**
- **I don't...**
- **It is impossible because...**
- **I don’t have enough...**

Can you join all the dots?





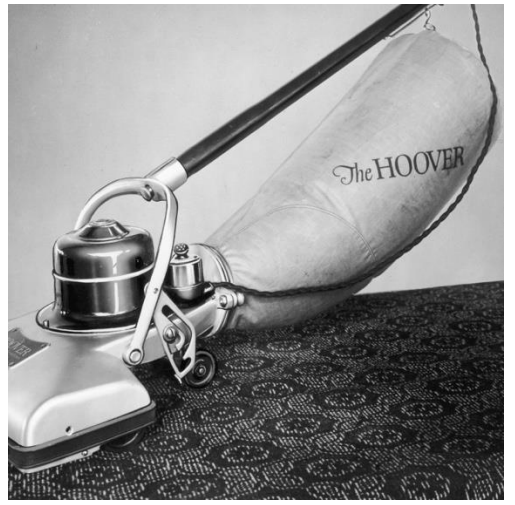
Essential Definitions

- **Invention :** The act of creating something new, like a product, idea, or process, that has never been made before. For example, the light bulb and the internet are inventions
- An **INNOVATION** is anything new that is actually used ("enters the marketplace") – whether major or minor. The process of improving or introducing something new to the market, or finding new uses for existing products, ideas, or processes. For example, smartphones are an innovation based on the invention of the mobile phone.
- The "functional" source of innovation depends upon the *functional* relationship between innovator and innovation:
  - An innovation is a **USER innovation** when the developer expects to benefit by ***using*** it;
  - An innovation is a **MANUFACTURER innovation** when the developer expects to benefit by ***selling*** it.

What is invention and what is innovation?

James Spangler

William Hoover

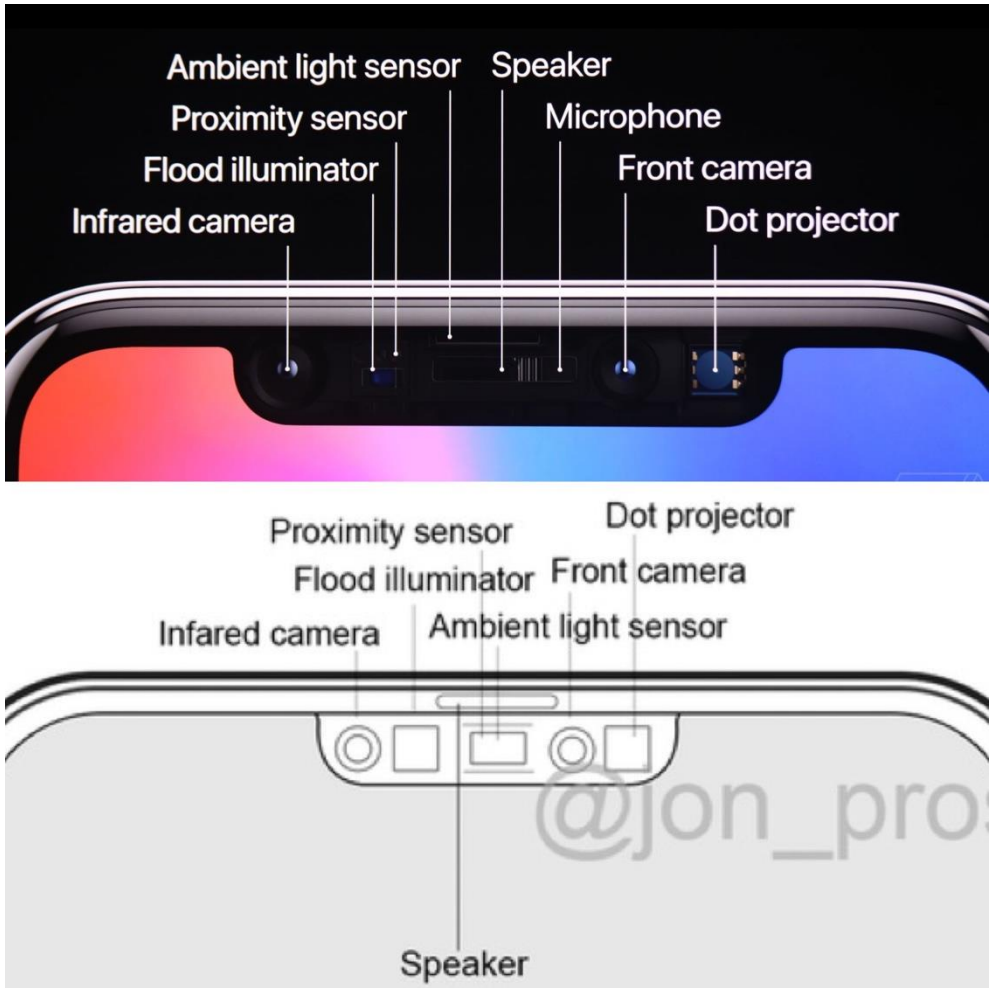


?

Invention is the creation or discovery of a new product or process; innovation is the successful introduction and adoption of a new product or process in the commercial marketplace. Innovation is basically the economic application of inventions.

Invention vs. Innovation – Another Example.

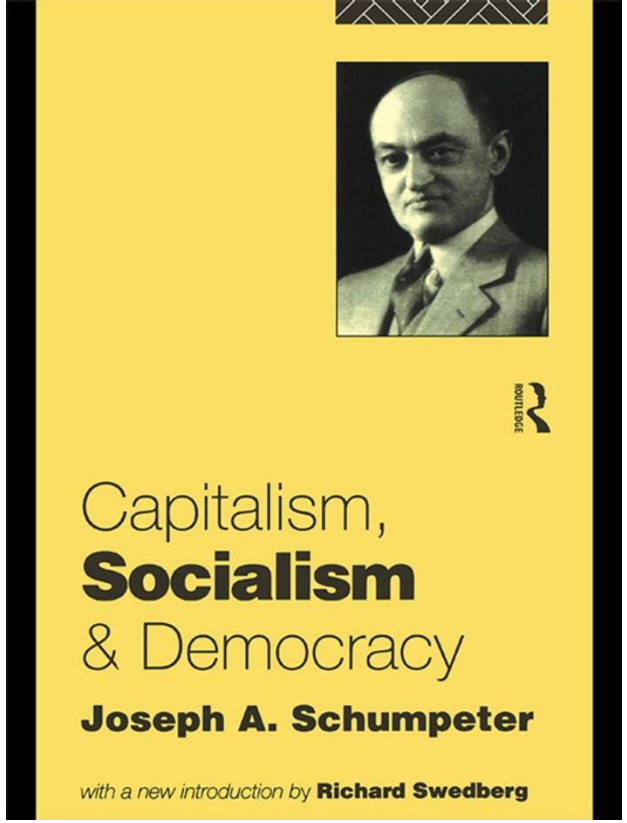
Unpacking the Mobile Phone



- Accelerometer
- Ambient Light Sensor
- Ambient Temperature Sensor
- Air Humidity Sensor
- Barometer Sensor
- Finger Print Sensor
- Gyroscope Sensor
- Harmful Radiation Sensor
- Magnetometer
- NFC Sensor
- Proximity Sensor
- Pedometer Sensor

What is entrepreneurship?

Discovery and commercial application of a new combination of resources. Every day entrepreneurs hunt for profitable new possible combinations of productive resources. To Schumpeter, being an entrepreneur was not synonymous with just owning, running, or investing in a business. What he thought distinguished entrepreneurs from other actors in the economy is their testing and experimentation to discover new possible combinations of productive resources in the pursuit of profit and success – ***Joseph E. Schumpeter, Theory of Economic Development***



Creative Destruction

We tend to think of entrepreneurship as creative—the creation of something new. In Schumpeter's words it is the creation of a new combination of resources.

We also think of it as progress—something that makes the future better than the past: like the invention of the time-saving clothes dryer, microwave oven, or the rapid transportation afforded by the airplane.

What we do not always remember is that it is destructive in that the old way of doing things often dies off as a result. Perhaps the most well-known contribution of Joseph Schumpeter is his discussion of this evolutionary process and the term "***creative destruction***"

How does need arise?

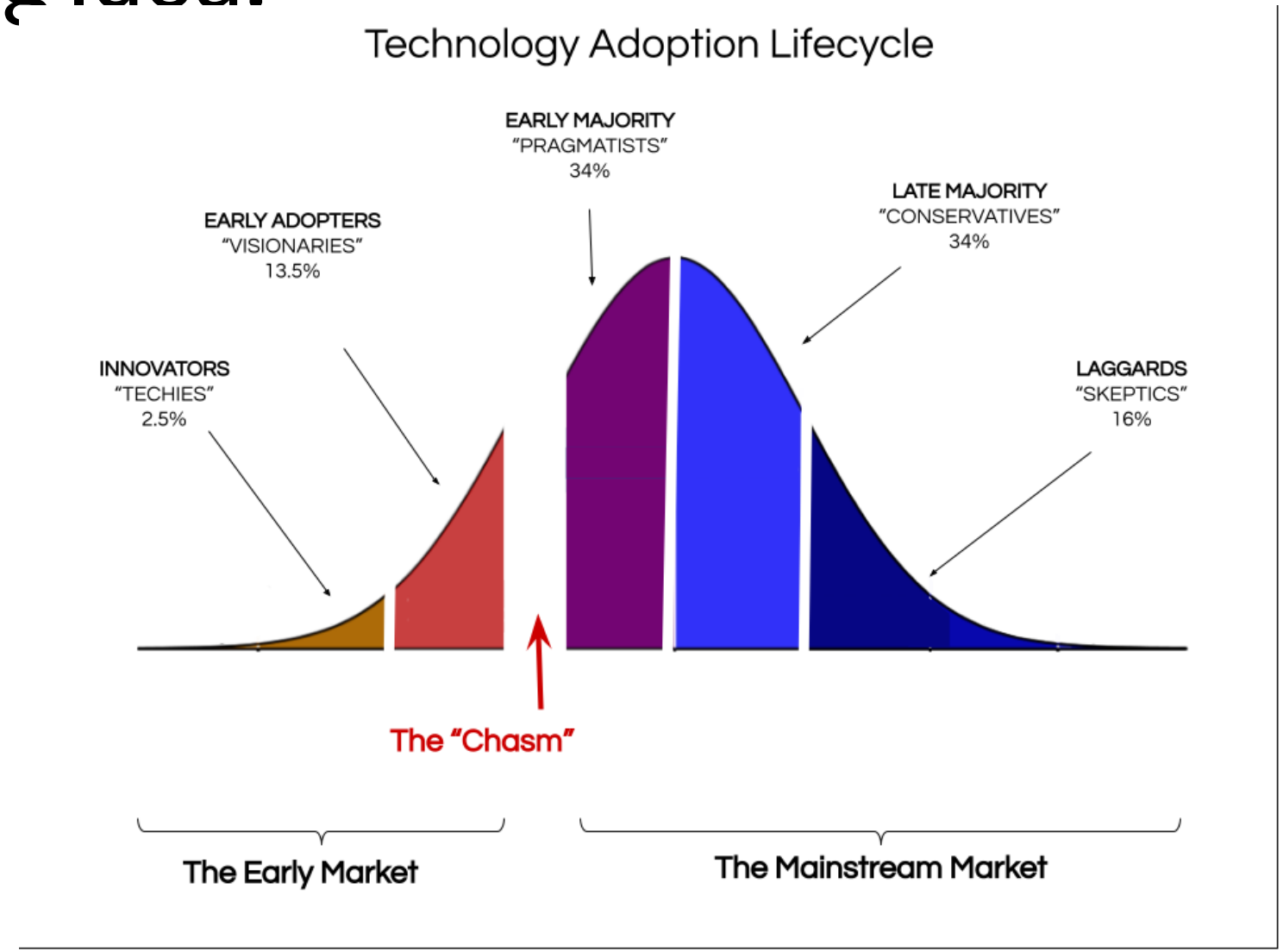
“A need is a state of dissatisfaction or frustration that occurs when an individual’s desires outweigh the individual’s actualities. An individual may develop a need when he or she learns that an innovation exists. Therefore, innovations can lead to needs, as well as vice versa. Change agents may create needs among their clients by pointing out the existence of desirable new ideas. Thus, knowledge of the existence of an innovation can create a motivation to learn more about it and, ultimately, to adopt it.”

Exercise…

- Write a few unmet needs which could be solved through innovation
- Write a few technologies which could generate a need

An example...

The Big Idea!


Technology Adoption Lifecycle
EARLY MAJORITY
"PRAGMATISTS"
34%
LATE MAJORITY
"CONSERVATIVES"
34%
EARLY ADOPTERS
"VISIONARIES"
13.5%
INNOVATORS
"TECHIES"
2.5%
LAGGARDS
"SKEPTICS"
16%
The "Chasm"
The Early Market
The Mainstream Market

Open Innovation

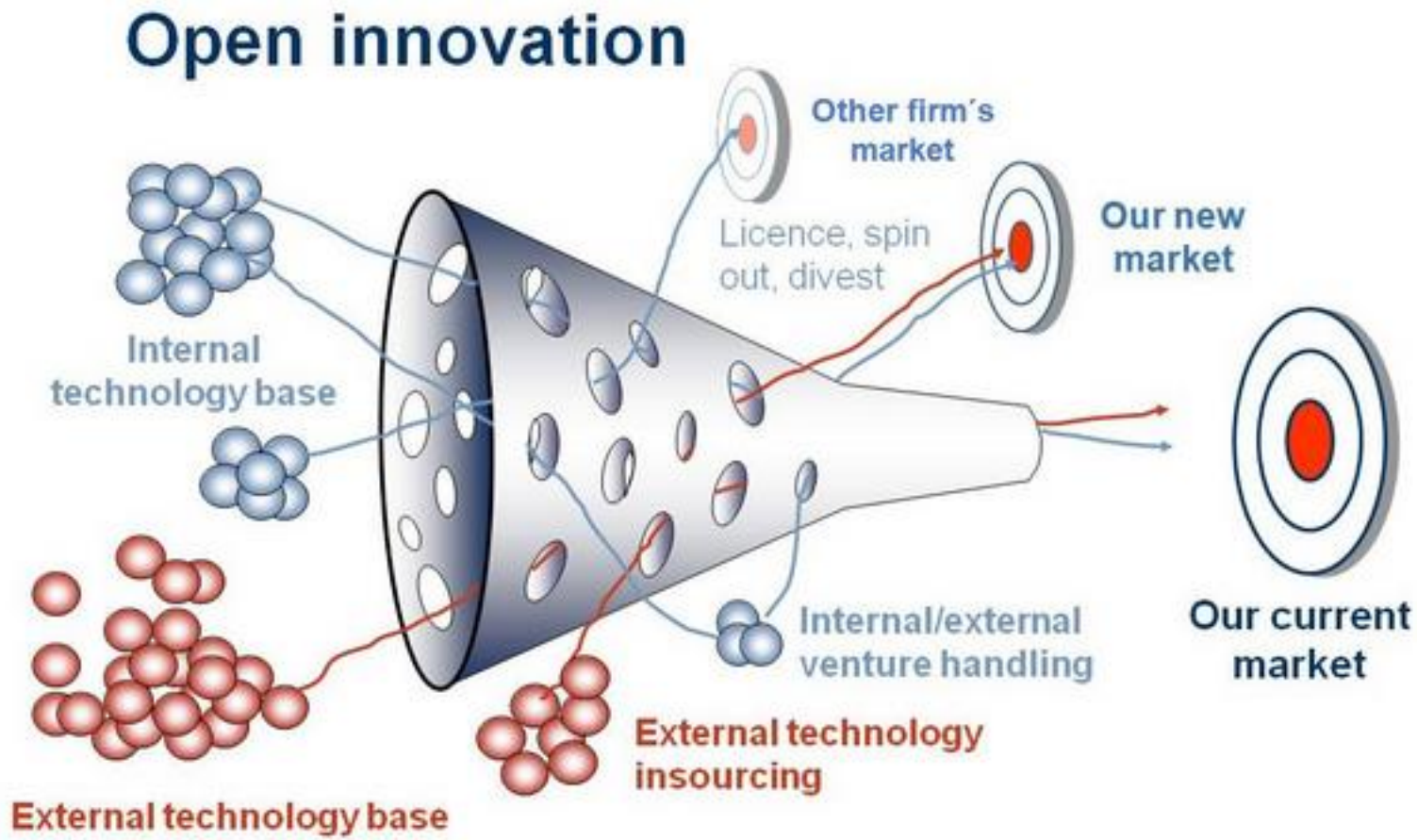
Outside-in and inside out also referred to as inbound and outbound open innovation, respectively.

The outside-in part of open innovation involves opening up a company's innovation processes to many kinds of external inputs and contributions. It is this aspect of open innovation that has received the greatest attention, both in academic research and in industry practice.

Inside-out open innovation requires organizations to allow unused and underutilized ideas to go outside the organization for others to use in their businesses and business models. In contrast to the outside-in branch, this portion of the model is less explored and hence less well understood, both in academic research and also in industry practice

A distributed innovation process based on purposively managed knowledge flows across organizational boundaries. – Henry Chesbrough, 2003

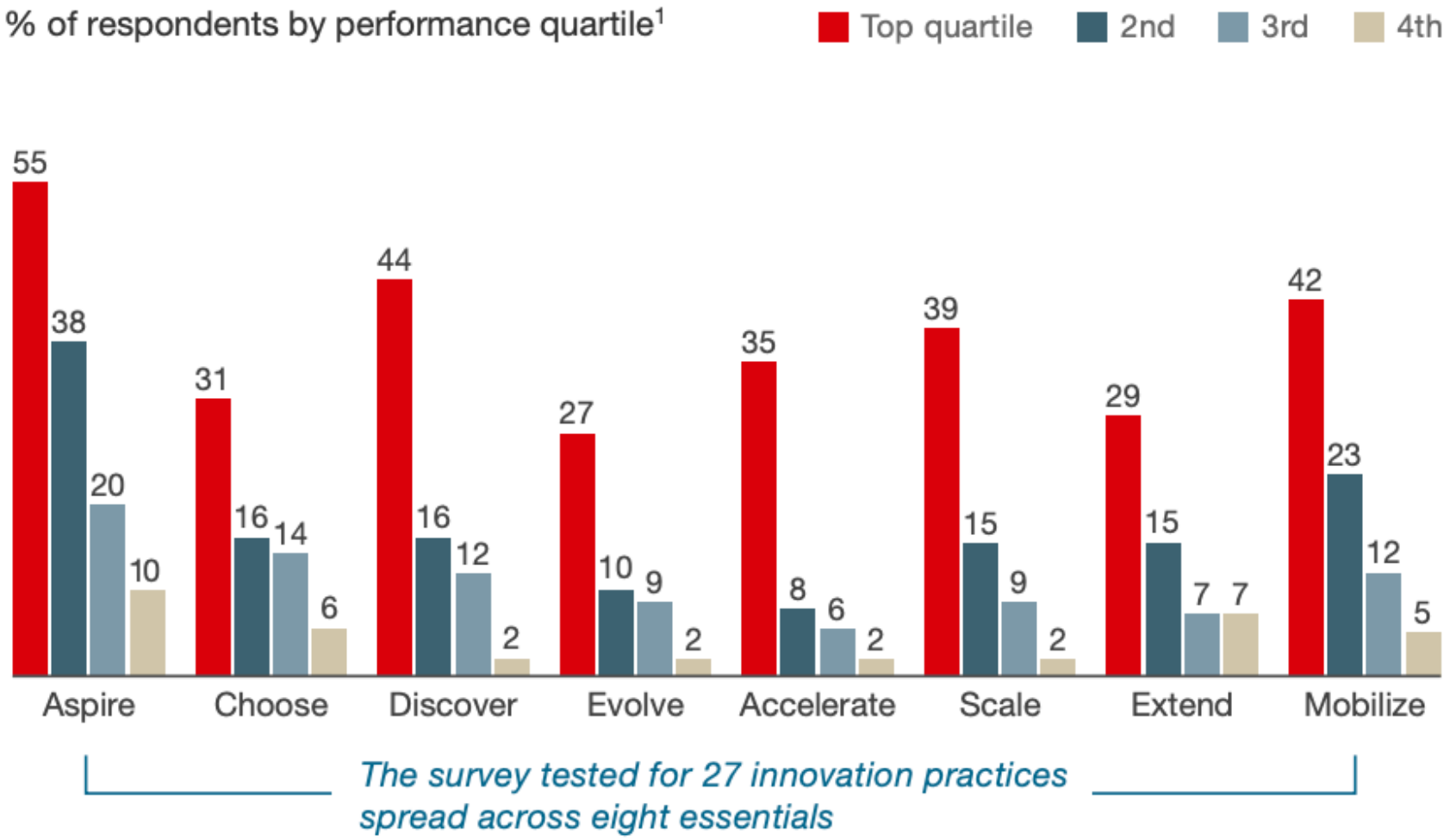
Open Innovation Funnel



In words of the founder of Open Innovation

An example from FMCG

Eight Essentials of Innovation

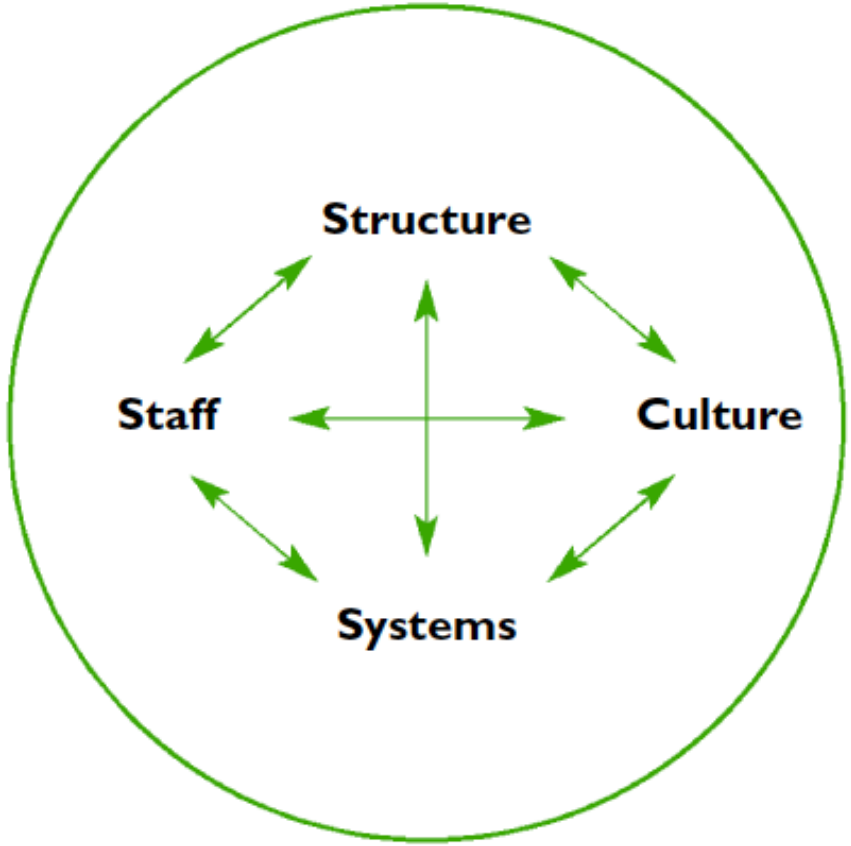


https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-eight-essentials-of-innovation

Organizational DNA for Strategic Innovation

Structure Formal reporting structure, decision authority, information flows, task/process flows

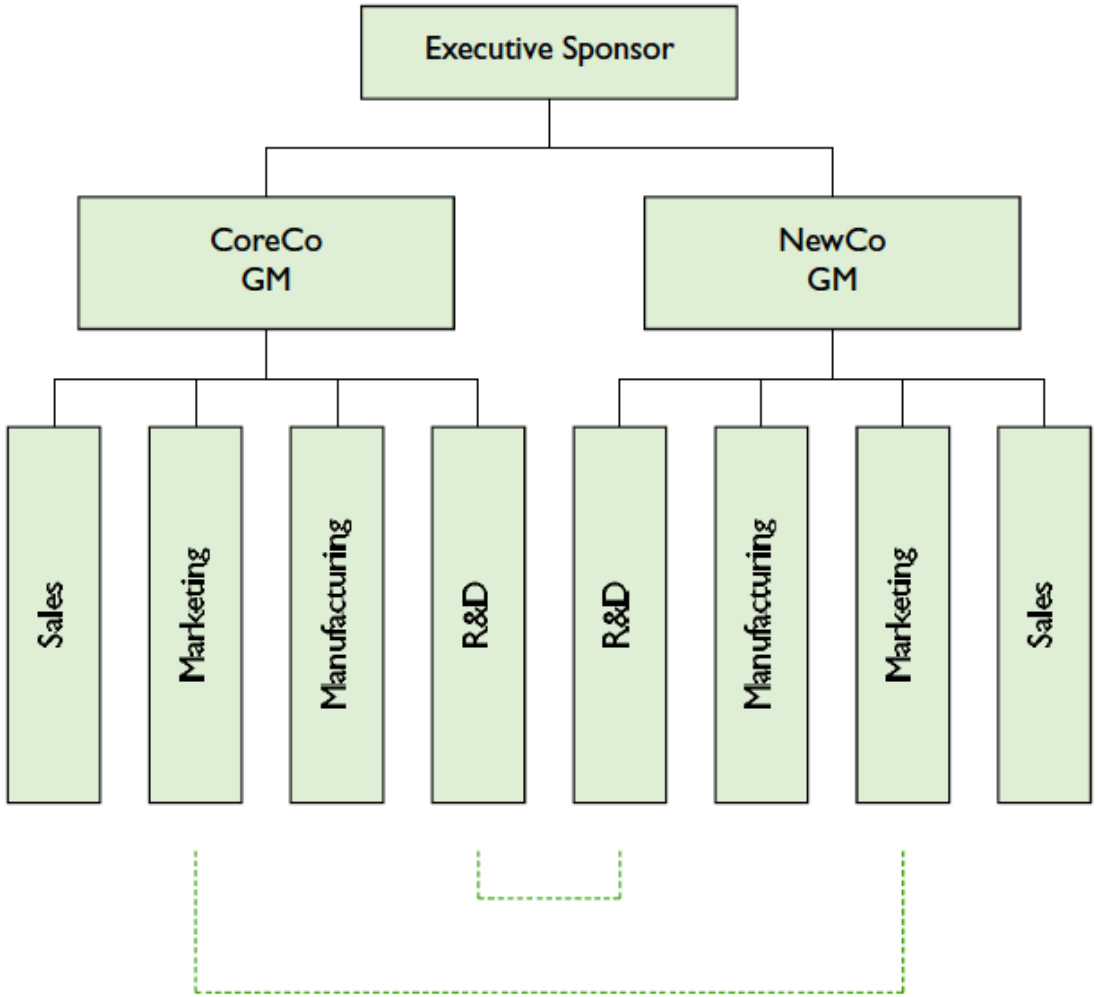
Staff Leadership traits, staffing policies, competencies, promotion policies / career paths



Systems Planning, budgeting, and control systems; business performance evaluation criteria; incentive/compensation systems

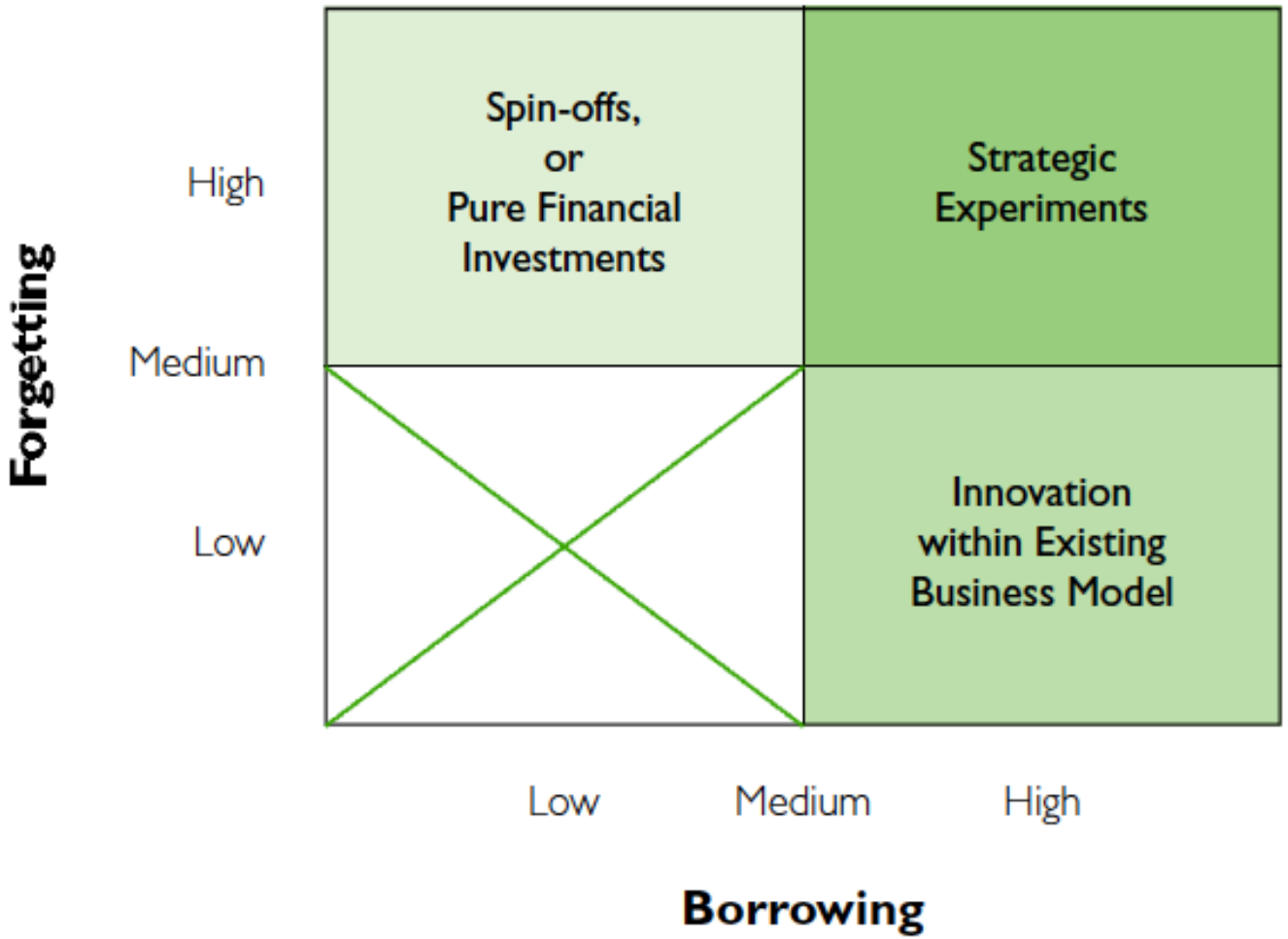
Culture Notions about behaviours that are valued; embedded business assumptions; decision biases

How does one organize for innovation?



Marcus by Goldman Sachs

Borrow, Experiment, Forget …



3 Box Solution...

1. Manage the present

Keep the current business going

2. Selectively forget the past

Forget what made the business successful in the past

3. Create the future

Create the new model

https://www.3boxsolution.com/

In words of the founder of 3 Box Solution

A few examples ...

Is this Innovation?

The Lead User idea generation method

Professor Eric von Hippel
MIT Sloan School of Management

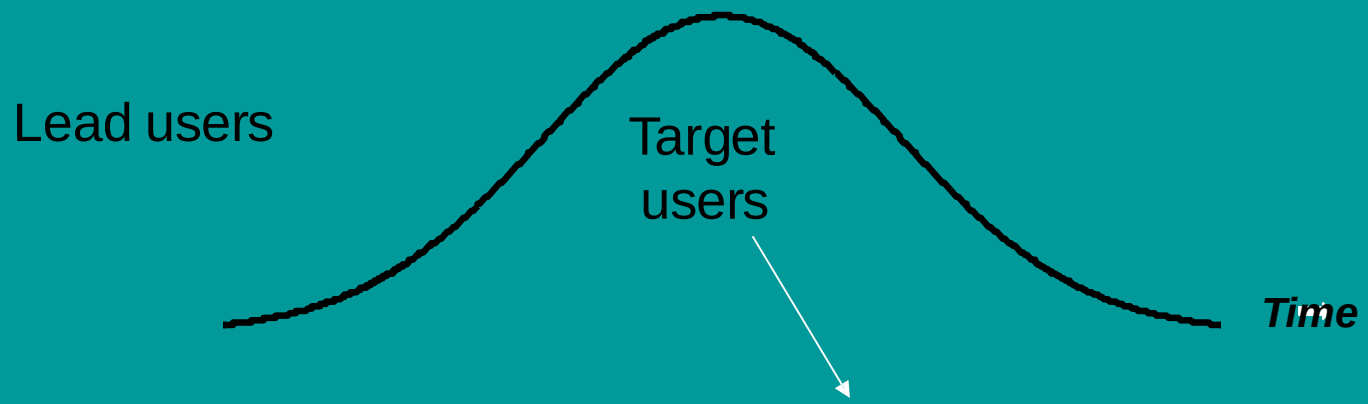
Overview of the Lead User process, including a brief description of an actual 3M project >

How to choose the right topic for your Lead User project >

How to identify Lead Users >

Contrasting innovation methods

Need and market life cycle curve



New methods are based on finding / encouraging and commercializing ***solutions*** developed by users themselves

Traditional methods are based on "find a need and fill it" (Target users provide ***needs***; Manufacturer develops solutions)

Essential Definitions

“Breakthrough:”

- Determines Future Business Growth and Margins
- Major Product line >20% of Division Sales

Incremental improvement:

- Valuable to existing business
- Extension to existing line

Many industrial and consumer products have roots in user innovation.

Consumer product examples:

Category	Example
Health Products	Gatorade
Personal Care	Protein-base Shampoo Feminine Hygiene
Sports Equipment	Mountain Bike Mountain Climbing-Piton
Apparel	Sports Bra
Food	Chocolate Milk Graham Cracker Crust
Office	White-out Liquid
Software	Electronic Mail, Desk Top Publishing

The World Wide Web – A Lead User Innovation

- "Berners-Lee did not set out to invent a contemporary cultural phenomenon; rather, he says, "it was something I needed in my work." He wanted to simply to solve a problem that was hindering his efforts as a consulting software engineer at CERN.

- Berners-Lee's innovation was to apply hypertext to the growing reality of networked computers. He expanded the idea he had developed at CERN and made it available on the Internet in the summer of 1991.

  - *Technology Review*, July 1996, p.34

ACTIVITY: Think about possible Lead Users in*your* markets

- Select a specific market & specific *major* trend to think about
- Brainstorm possible lead users *within* that target market
- Which types of individuals or firms have needs at the leading edge of the trend
- Which ones have a high incentive & the resources to solve their leading edge needs?

Example of searching for lead users *outside* your target market

Medical X-Ray

Instead of a “board of leading radiologists”…

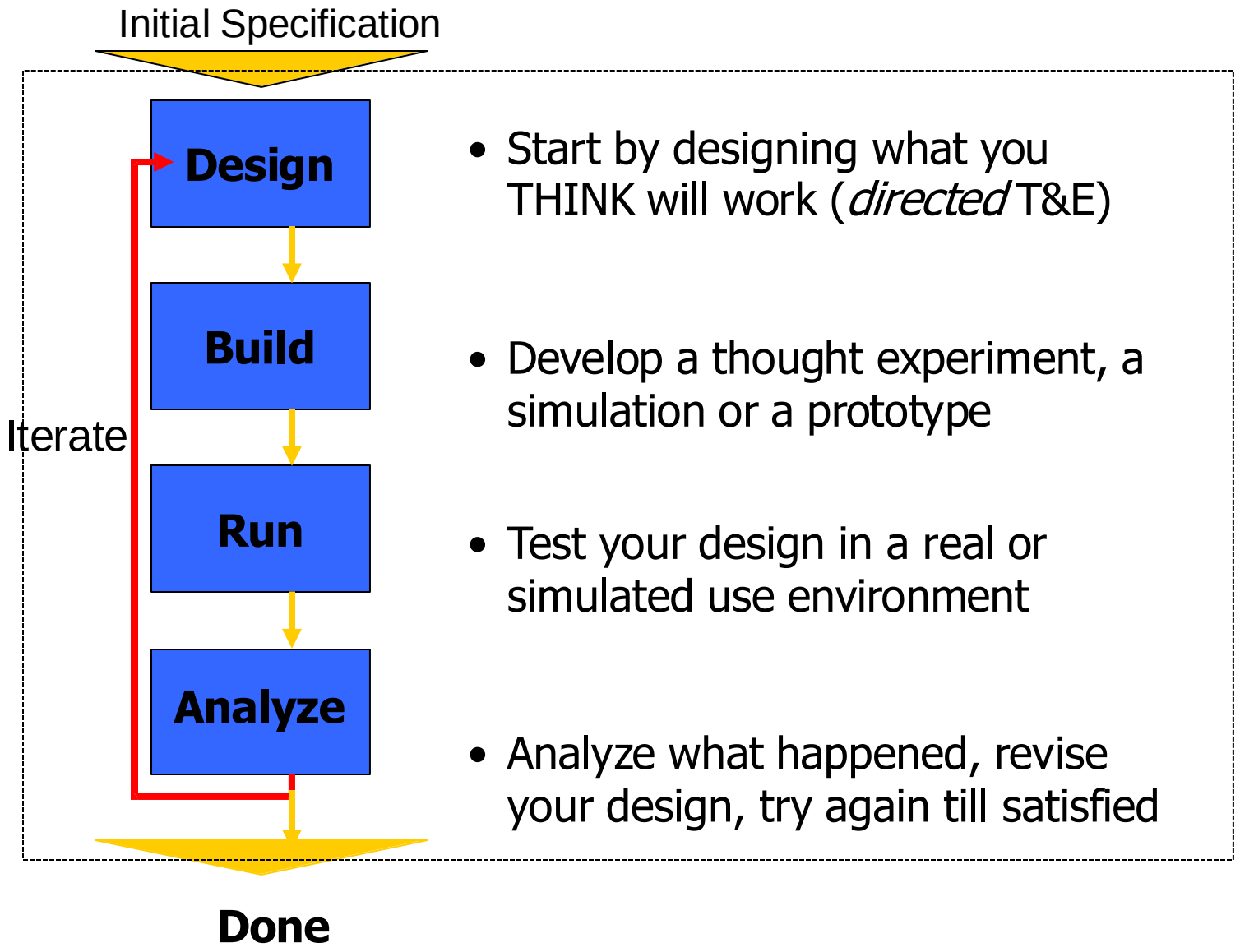
Look for users facing *higher* needs than anyone in target market:	**Examples:**
People who need even high resolution than anyone doing medical imaging	Experts in semiconductor chip imaging
Image enhancement (“pattern recognition”) specialists	Experts who process photographs from space probes

Finding out what users *really* need: “trial and error” and “sticky information”

Innovation is:

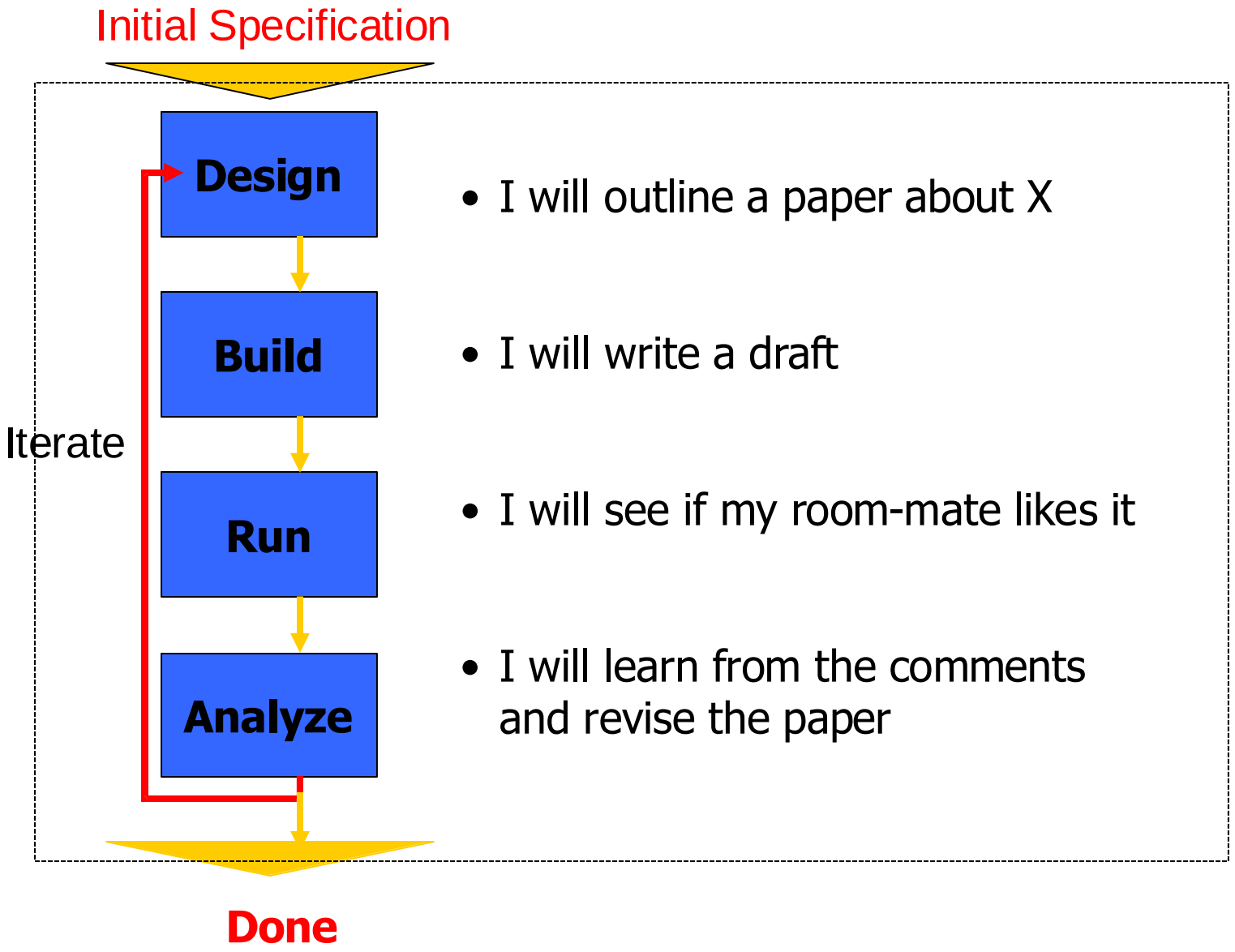
- A problem-solving process based upon directed trial- and-error
- Carried out at the site of “sticky information”

Trial and error is THE fundamental problem-solving process

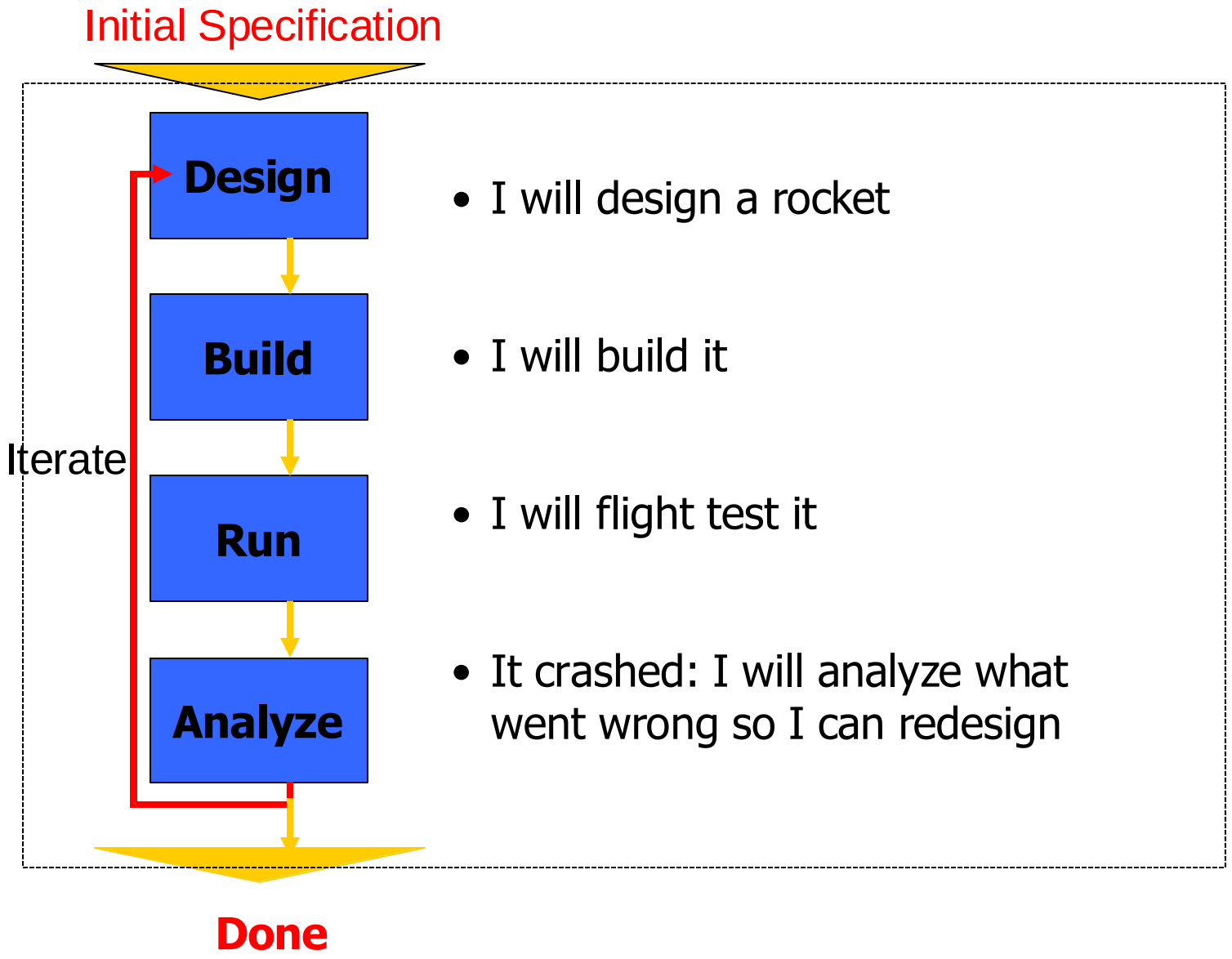


- Start by designing what you THINK will work (*directed* T&E)
- Develop a thought experiment, a simulation or a prototype
- Test your design in a real or simulated use environment
- Analyze what happened, revise your design, try again till satisfied

Directed trial and error is THE fundamental problem- solving process

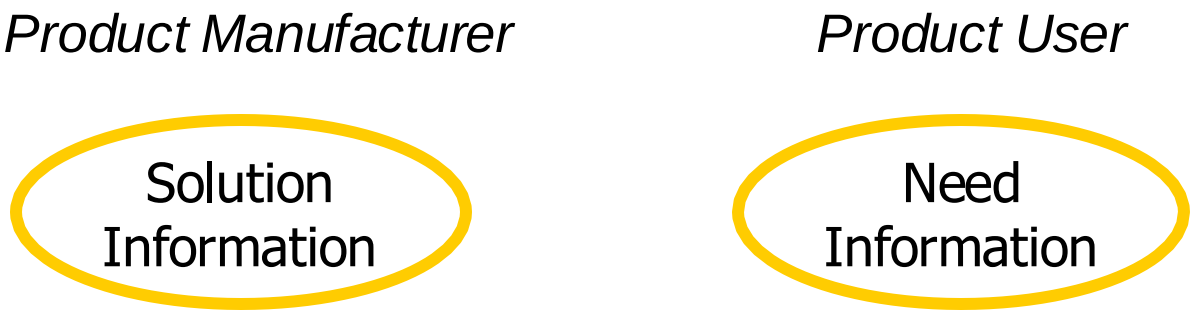


Directed trial and error is THE fundamental problem- solving process



Innovators / problem-solvers require information about both a need and a solution approach

- **Need** information is usually found at user sites.
- **Solution** information is usually found at manufacturer sites.



But bringing full and accurate need and solution information together is often *VERY* difficult

Why? Because information is often “sticky” - very costly to transfer from place to place

- Information needed by developers may be ***tacit***
  - Can you tell your child how to ride a bike?
- A ***lot*** of information is often needed by developers
  - “You didn’t tell me you were going to use the product *that* way!”

A result: user and manufacturer innovations differ in *kind*

Users tend to develop **Functionally Novel** innovations:

- The first sports-nutrition bar
- The first scientific instrument of a new type

Manufacturers tend to develop **Dimension of Merit Improvements:**

- A better-tasting sports-nutrition bar
- Improvements to an existing type of scientific instrument

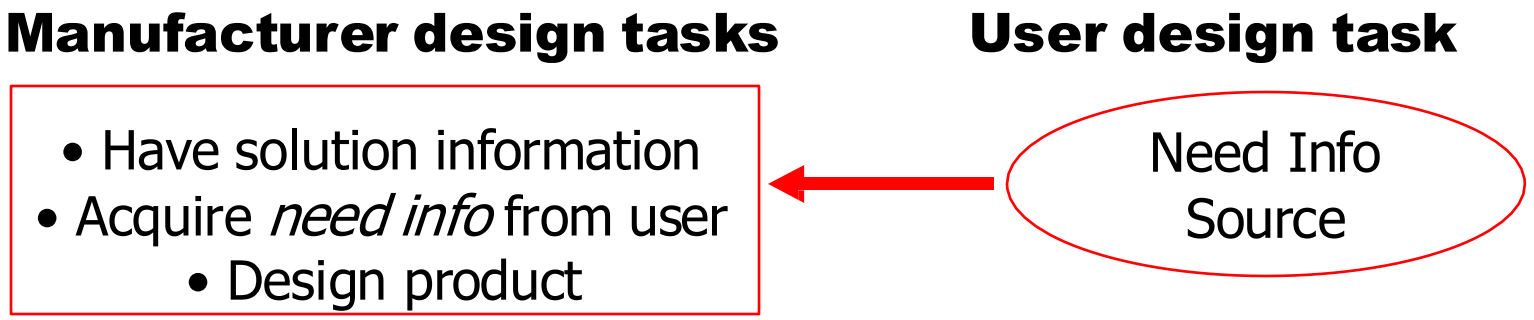
Example of the impact of sticky information on the locus of innovation:

Fifty percent of all prescriptions written in the U.S. are written for “off-label” uses of prescription drugs

- **New prescription drugs are generally developed in the labs of pharmaceutical firms** – sites where much specialized information about drug development has been build up over the years.

- **Off-label applications are generally found by patients and physicians.** They apply the drugs many times under widely varying field conditions – and discover unanticipated positive (or negative) effects thereby. (“Doctor: this blood pressure medication you gave me is causing my hair to reg

Product or service design tends to move to the site of the crucial sticky information



User-Based Design (Functionally novel products)