15.351 Managing Innovation and Entrepreneurship
Spring 2008

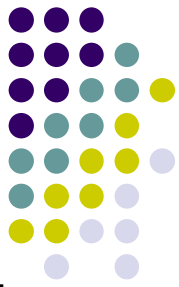# 15. 351 Managing Innovation & Entrepreneurship

Fiona Murray

MIT Sloan School of Management

2008

Wrap Up
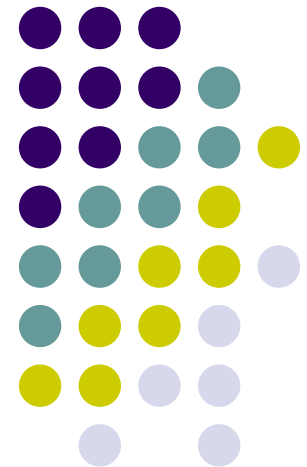
From Vision…

To innovation…

"Build a better mousetrap, and the world will beat a path to your door" wrote Ralph Waldo Emerson.

Jack Hope found that what Emerson really wrote was: "If a man has good corn, or wood, or boards, or pigs, to sell ... you will find a broad hard-beaten road to his house." (which might be true!!) but for a better mousetrap…you need more!

Innovation as management
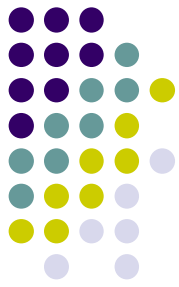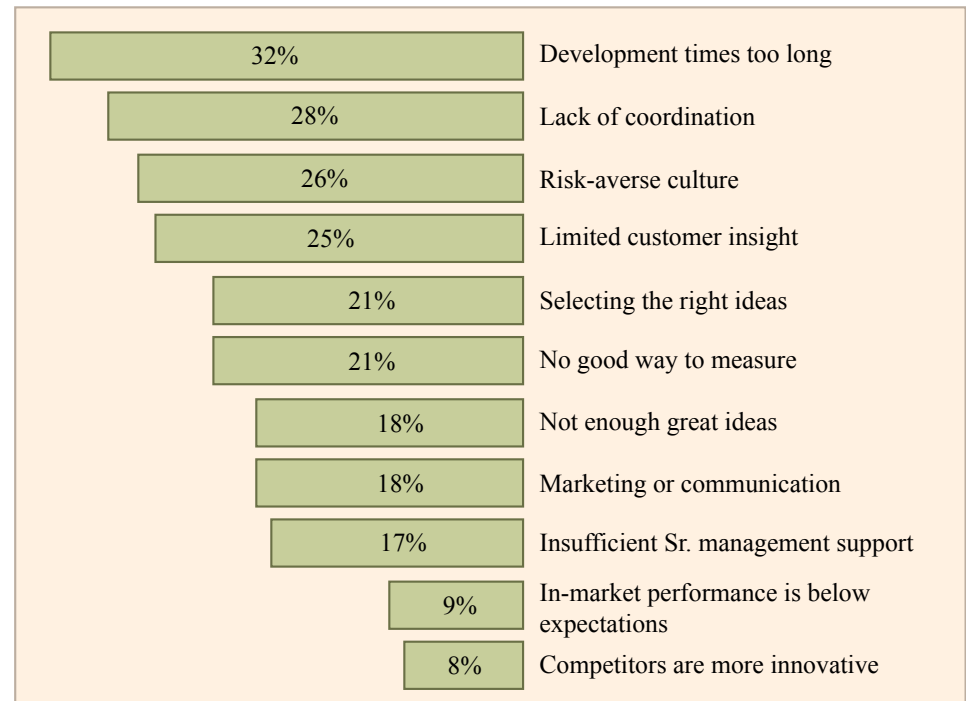
A Working Definition

- *Innovation* is the entire process by which an organization generates creative new technological ideas (invention) and converts them into novel, useful and viable commercial products, services, and business practices for (potential) economic gain

Who Cares?

- **Top managers & entrepreneurs -** "competitive advantage lies in the ability to create an economy driven not by cost efficiencies but by ideas and intellectual know-how" (HBR 2007)

- **National Leaders** - "economic growth comes from effectively linking the twin powers of the competitive market & the scientific method" (Romer, 2004)

Image by MIT OpenCourseWare.

If you are not completely satisfied with the return on your investments in innovation, what are the obstacles you face?

| %	Obstacle
32%	Development times too long
28%	Lack of coordination
26%	Risk-averse culture
25%	Limited customer insight
21%	Selecting the right ideas
21%	No good way to measure
18%	Not enough great ideas
18%	Marketing or communication
17%	Insufficient Sr. management support
9%	In-market performance is below expectations
8%	Competitors are more innovative

Data: Boston consulting group

My Goals designing the course Managing Innovation & Entrepreneurship
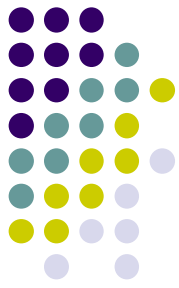
- Analyze the key elements that together make entrepreneurial organizations more effective at technological innovation

- Build on ideas that you have learned in other classes (e.g. teams, leadership, networks etc.)

- Serve as the foundation for other courses on innovation & entrepreneurship

- Provide "action-relevant" knowledge & skills to go into a firm and <u>diagnose</u> its innovation challenges & to organize your own innovative projects
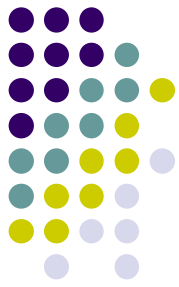
Course Organization

Technologies

Markets
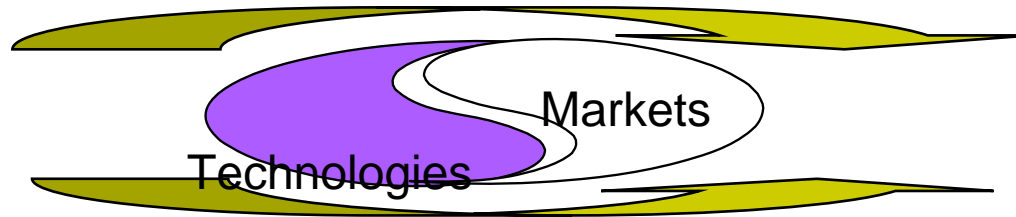
Exploring Innovations

Key processes

Executing Innovations

Key organizational choices
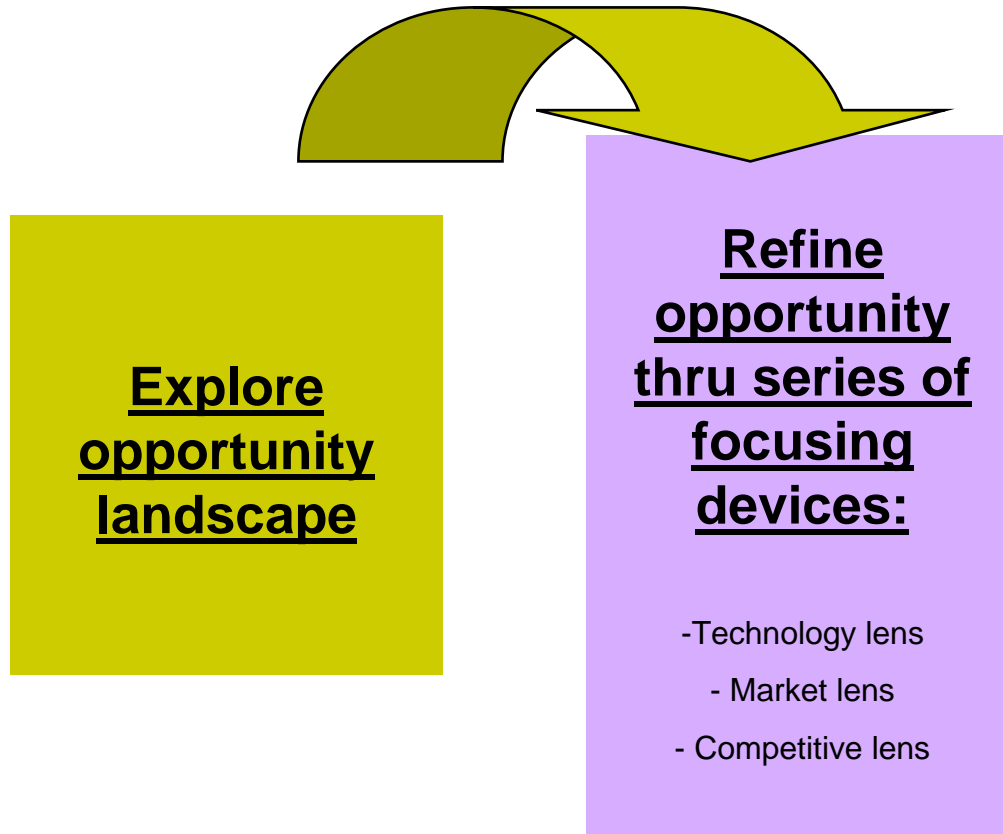
Exploiting Innovations

Key strategic choices

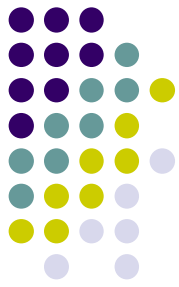# To put it another way

- Industry dynamics create a wealth of opportunities for entrepreneurs – particularly at the start of S-curves when industries are in "ferment"

- Full of opportunity for "creative destruction" **but** full of risk - Detroit saw over 700 auto companies founded between 1900 – 1920!

- Effective management of technological innovation helps you mitigate & manage those risks

Entrepreneurs must first source and refine innovation opportunities

Explore opportunity landscape

Refine opportunity thru series of focusing devices:

-Technology lens

- Market lens

- Competitive lens

Exploring

Can we generate novel ideas (technologies & markets) that create new & potentially valuable concepts)?

Exploring opportunity landscape

Key processes & analyses

A variety of methods

- Opportunity identification methods, brainstorming (IDEO)

- Idea hunts (BIG) - search versus recognition view of idea generation

- Lead user generated opportunities (Innovation @ 3M) & technology-push based opportunities (Aluminum!)

- The Bakeoff - pits three alternatives for opportunity generation – dream team vs. expert vs. complementary team

KEY – diversity, team composition, incentives, learning, failure

Refining

Can the ideas that we have generated be exploited to make money?
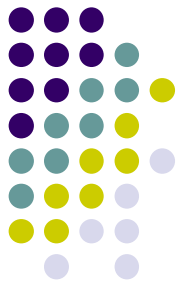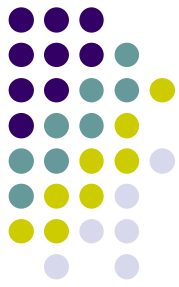
Refining opportunity thru series of focusing devices:

-Technology lens

- Market lens

- Competitive lens

Three big questions

- *Technology lens* – what are the proposed features of the technology, advantages compared to other approaches or to substitutes. **S curve for hearts**

- *Market lens* – what group of customers want this – are lead users representative of larger markets? **Chasm**

- *Competitive lens* - recall that inventor & entrepreneur don't always capture the value from ideas (Bob Kearns; Pedro & Gaston; Ric)

  - Do I control my ideas?

  - Do I control other assets in the value chain? If not, who does, what are the dynamics?

Articulate an innovation opportunity

Exploring opportunity landscape

Key strategic process

Refining the opportunity

-Technology lens

- Market lens

- Competitive lens
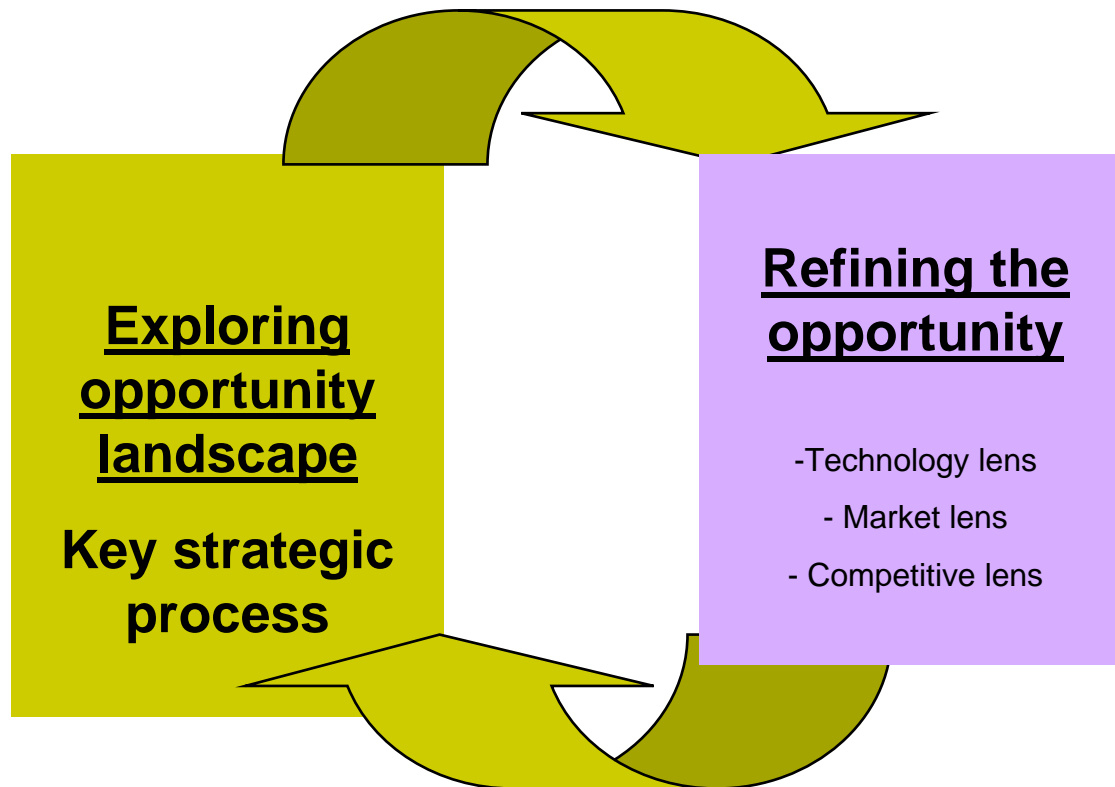
Having articulated an innovation opportunity (business plan) power of an effective entrepreneurial execution is flexibility to explore, test potential and adapt if early plans fail
-e.g. **TNZ, A123 NOT Iridium**

Executing

Build organization to execute innovation opportunities that accommodates focus & flexibility

- <u>Processes</u> for experimentation & iteration

- <u>Structures</u> for effective iteration, adaptation & stabilization

- <u>Incentives</u> for execution- rewards – both financial & intrinsic

- <u>Boundaries</u> of execution – internal versus external innovators

- <u>Culture</u> of execution - learning, adaptation & decision-making

- Executing single innovation project
- Executing asset building to support innovation
- Executing portfolio of innovation opportunities to sustain the firm

Processes
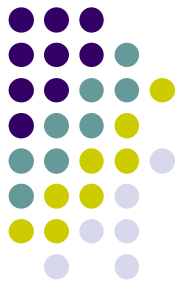
• Iterative experimentation cycles to maximize information generation & learning from the information (Team New Zealand, IDEO, Bank of America)

•Design, build, test, learn cycles – not only applied to technology adaptation but also to market learning e.g. daily builds, alpha & beta testing – compare to Iridium
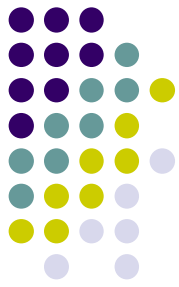
• Team-based learning e.g. SCRUM & XP

Structures

• Milestone-driven execution processes - along technical, market & competitive dimensions (Advanced inhalation research)

• Stage-gate versus flexible overlapping innovation structures (Managing on internet Time exercise!!)

• Contingency of structure & commercial environment – speed of change

• Structure of product/knowledge & its impact on org structure (open-source work on Netscape)

• Multiple structures - allowing for both entrepreneurial risky projects & traditional projects (XNE)
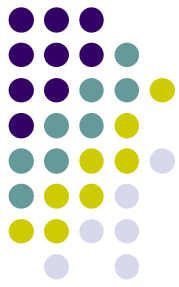
Incentives
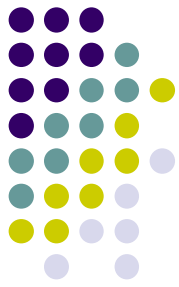
• Creating incentives to provide entrepreneurial focus & coordination between different members of an innovation team (GSK ; XNE, GE-IB)

• Create incentives to generate & act upon information (as you iterate between exploring and exploiting)

• Incentives to participate on innovation projects for those outside – not only money also "challenge" of exciting work

  • Academics (SpudSpy, A123)

  • Communities (Linux community, gaming)

•Create incentives to execute on b'thru innovation opportunities (GE, Google, DuPont)

Boundaries

- Role of external versus internal innovators (D-Wave, Intel, Linux, InnoCentive)

    - Access individuals w/ best talent (InnoCentive)

    - Design modes of collaboration that align incentives (SpudSpy)

    - Use multiple modes of external interaction to match with strategic goals (Intel)

- Issues

    - Don't loose sight of competitive lens (e.g. IP) when working outside boundaries (i.e. GPL restrictions)

   - Is project sufficiently modular?

Executing

Build organization to execute innovation opportunities that accommodates focus & flexibility

- <u>Processes</u> for experimentation & iteration

- <u>Structures</u> for effective iteration, adaptation & stabilization

- <u>Incentives</u> for execution- rewards – both financial & intrinsic

- <u>Boundaries</u> of execution – internal versus external innovators

- <u>Culture</u> of execution - learning, adaptation & decision-making

• Executing single innovation project
• **Executing asset building to support innovation**
• **Executing portfolio of innovation opportunities to sustain the firm**

# Executing asset building to support innovation opportunity
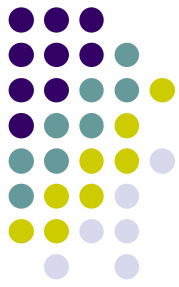
Controlling the Assets

	Tightly held by others	Free or don't yet exist
Strong	Innovators & Asset holders share profits	Innovators in strong position to profit
Weak	Hard for innovators to profit	Innovators can profit

Controlling the Ideas

- Strategic decisions over asset building to support innovation opportunity

  - Interplay of competitive & technology dynamics (A123, semiconductor IP firms; video game studios)

  - Issues of incentives & processes – can they work across firm boundaries?

- Building innovation across multiple verticals – economies of scale and scope (Surface Logix; A123)

TECHNOLOGY → PRODUCT → MANUFACTURING → MARKETING → DISTRIBUTION
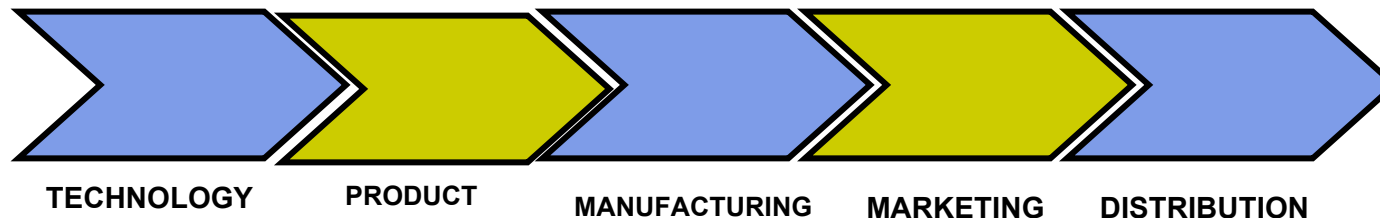
Executing portfolio of innovation opportunities to sustain firm
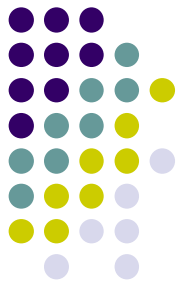
- Strategic value of portfolios

  - Balancing risk across types of innovation (**LePetit Chef**, A123s continued "b'thru" research)

- Executing mixed portfolios – incremental vs. b'thru opportunities

  - Sourcing innovation opportunities- internal versus external research (Intel, PARC etc., A123)

  - Executing innovation – internal, external, integrated, separate (XNE, corporate venturing, GE IBs)

Executing
## Balancing incremental versus breakthru innovation opportunities

Processes	Top down vs. bottom up; random or structured processes
Structures	Distributed throughout firm (e.g. Google, GE IBs) or dedicated units e.g. XNE, IBM-EBO
Incentives	Metrics & performance evaluations vs. market-based incentives thru stock-options etc.
Boundaries	Source innovation opportunities (inventions & more formulated opportunities) outside or inside the firm; execute inside or outside
Culture	Create firm-wide culture for breakthru innovation projects or "protected" organizational space for this culture

Building an Engine for Innovation

Building an organizational engine for innovation depends upon the strategy & stage of your business

- Equally critical for start-ups & mature firms
- Focus beyond the technology, the spreadsheets & the business plan
- Execute thru carefully articulated choices of structures, incentives, & boundaries
- Dynamic process –revisit choices regularly as innovation challenges & competitive context changes
- Have fun!!!
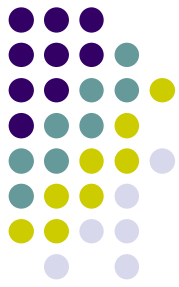
Where to go from here?

Strategy & Innovation oriented

15.912 Technology Strategy
15.936 Strategic implementation
15.365 Disruptive Technologies

15.369 Corporate Entrepreneurship
15.352 Innovation on the Internet
15.356 Breakthru Products

People oriented

15.394 Designing & Leading the Entrepreneurial Org

15.Xxx Innovative Organizations

15.660 Strategic HR

Practice-oriented

i-Teams/New Product Development/ X-Prize/ 100K

E-Lab/ G-Lab/ S-lab