Open Innovation and Open Business Models: The Next Frontier

*Presentation to*

*SPIE Photonics Innovation Summit*

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The Current Paradigm: A Closed Innovation System

Science & Technology Base

Research Investigations

Development

New Products & Services

The Market

R → D&E
Great Successes from the Closed Innovation Model

- The Chemicals Industry – Germany and later US
- Edison, GE, and the rise of electrification
- Rockefeller and Standard Oil
- World War II scientific achievements
- Chandler: Internal R&D key to the rise of the modern US corporation in 20th century
Rising Costs of R&D

Then (25 years ago)
- <$ 30 million for a fab
- <$ 50 million for a new drug
- <$ 10 million for a new consumer product

Now
- > $ 3 billion for a fab
- > $ 800 million for a new drug
- > $50 million for a new consumer product
Shorter Shipping Lives

- Disk drives
- Cell phones
- Generic drugs
- “80% of the senior executives we surveyed indicated that the productive lives of their strategies were getting shorter.”

» Chris Zook, HBR April 2007
## Diminishing Economies of Scale: US Industrial R&D by Size of Enterprise

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<tr>
<td>&lt; 1000 employees</td>
<td>4.4%</td>
<td>9.2%</td>
<td>22.5%</td>
<td>22.5%</td>
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<tr>
<td>1,000 – 4,999</td>
<td>6.1%</td>
<td>7.6%</td>
<td>13.6%</td>
<td>14.8%</td>
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<tr>
<td>5,000 – 9,999</td>
<td>5.8%</td>
<td>5.5%</td>
<td>9.0%</td>
<td>7.5%</td>
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<tr>
<td>10,000 – 24,999</td>
<td>13.1%</td>
<td>10.0%</td>
<td>13.6%</td>
<td>13.4%</td>
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<tr>
<td>25,000 +</td>
<td>70.7%</td>
<td>67.7%</td>
<td>41.3%</td>
<td>40.9%</td>
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What changed?
Five Erosion Factors

1. Increasingly mobile trained workers
2. More capable Universities
3. Diminished US hegemony
4. Erosion of oligopoly market positions
5. Enormous increase in Venture Capital
Hidden Assumptions in the Internally-Focused Innovation System

If I discover it, I will find a market for it.

If I discover it first, I will own it.

The important technologies I will need can be anticipated in advance.

“Misfits” are regrettable, but are a cost of doing business.

The best people in this field work for us.
Type I and Type II: Xerox and PARC

- Designed to minimize “false positive” errors
- Ignores risk of “false negative” errors
The Business Model

• Identifies a market segment
• Articulates the value of the proposed offering
• Focuses on the key attributes of the offering
• Defines the value chain to deliver that offering
• Creates a way for getting paid
• Establishes the value network needed to sustain the model
Why Business Models are Hard to Manage:  Mapping Across Domains

Technical Inputs:
e.g., feasibility, performance

Business Model
• target market
• value prop.
• key attributes
• value chain
• how paid
• Value network

Economic Outputs:
e.g., value, price, profit

Measured in technical domain

Measured in social domain
A Classic Example: the Xerox 914 copier

- Chester Carlson develops electrostatic method to place toner on paper, a “dry” process for copying documents.
- In 1955, existing processes (wet or thermal) used to make 15-20 copies per day. Machines cost ~ $300.
- Wilson seeks manufacturing and distribution partners
  - IBM, Kodak, GE
- IBM engages ADL to study: “Although it may be admirably suited for a few specialized copying applications, the Model 914 has no future in the office-copying-equipment market.”
Wilson’s Business Model

• ADL’s study (and the other companies) viewed the dry process technology through a traditional business model
  – charge for the equipment (dry technology very high cost)
  – charge for the supplies as needed (no savings vs. wet)

• Joe Wilson ignored these rejections, and took the technology to market through a new Business Model
  – $95/ month for first 2000 copies, 4 cents each for additional
  – Low barrier for customer trial, Haloid/Xerox bore the risk
  – Enormous usage: 2000 copies per day
  – Revenues grow 41% compounded for next 20 years
3Com

- Metcalfe left PARC in Jan. 1979
- Did consulting work until Feb. of 1981
  - DEC, GE, Exxon
- Brokered alliance between Xerox, DEC, and Intel for IEEE 802 (aka Ethernet)
- Initial plan: sell to Unix workstations, via direct sales force
Then....

• As part of consulting, created directory of LAN dealers and VARs across US
  – first of its kind
  – sold many hundreds of copies at $125 each
  – did this for 5 years
• IBM PC took the world by storm
• 3Com formed, Krause joined from HP
  – VCs financed:
• New plan: add-on boards for IBM PCs, sold through IBM retailers and VARs
Adobe

- Warnock and Geschke at PARC
  - creating fonts for Star Workstation
  - wanted to make into a standard
  - Xerox said no: “how can we make money if we give it away?”
- They leave, and form Adobe
- Initial plan: turnkey publishing system, complete with own hardware, software, and fonts
“We were originally going to supply a turnkey systems solution including hardware, printers, software, etc.

“Steve Jobs and Gordon Bell were key ingredients in getting things going...

Gordon said, “don’t do the whole system”

Steve said, “just sell us the software”.

That’s how the business plan formed. It wasn’t there in the beginning.”

- Charles Geschke

Today, Adobe’s market value exceeds that of Xerox
Different Financial Processes

Chess: Type I errors
- Plan several moves ahead
- No new information needed
- You know what you’ve got, what opponent has
- NPV

Poker: Type II errors
- Pay to play
- Pay for new information
- You discover what you’ve got, what other players have
- Options
Xerox: Great at Chess, Lousy at Poker

![Graph showing growth in US dollars for various companies over the years.](image)

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The Open Innovation Paradigm

- **Internal Technology Base**
- **External Technology Base**
- **Technology Insourcing**
- **Licensing**
- **Technology Spin-offs**

- **Current Market**
- **New Market**
- **Other Firm’s Market**
Open innovation

Our current market

Our new market

Other firm’s market

Licence, spin out, divest

Internal technology base

External technology base

Internal/external venture handling

External technology insourcing

Stolen with pride from Prof Henry Chesbrough UC Berkeley, Open Innovation: Renewing Growth from Industrial R&D, 10th Annual Innovation Convergence, Minneapolis Sept 27, 2004
The Logic of “Open Innovation”

• Good ideas are widely distributed today. No one has a monopoly on useful knowledge anymore.

• Financial managers must play poker, as well as chess, to capture the value in false negatives.

• We must manage IP in order to manage research:
  – need to access external IP to fuel our business model
  – need to profit from our own IP in others’ business model

• Not all of the smart people in the world work for us.
What is Innovation?

Before
- Invention
- Product
- Technology-driven
- Internally generated
- Engineering’s job
What is Innovation?

**Before**
- Invention
- Product
- Technology-driven
- Internally generated
- Engineering’s job

**After**
- Commercialization
- Business, including process and biz model
- Business/value-driven
- Internal Integration of int. and ext. stuff
- Everyone’s job
A New Perspective Towards R&D

R.I.P 2007

Not Invented Here 2007

Proudly Found Elsewhere!
Procter & Gamble

• P&G used to be a VERY closed organization
  – “We invented Not Invented Here” – J. Weedman

• P&G financial crisis, in 2000
  – Missed a series of quarterly financial estimates
  – Stock market lost confidence in the company
  – Stock price fell by more than half in 4 months!
  – CEO (Jagr) was fired
Searching for the Root Cause

• “We fundamentally had a growth problem. Our current brands were performing well. But we weren’t developing many new brands.” – C. Wynett

• To get new brands, P&G needed to open up.

• Connect and Develop
  – SpinBrush, Swiffer, Regenerist
The New P&G

• Many processes to enable open innovation
  – Technology scouts
  – Legal templates for IP, partnering
  – Investments in Innovation Intermediaries

• The Goal Now: Become the open innovation partner of choice
Balancing Internal and External R&D Funding: P&G

Balancing Internal and External R&D Funding: P&G

% from External

% from internal

Another Example: BP

- British Petroleum (BP) is one of the world’s largest and most profitable companies
- Yet fossil fuels are not a renewable nor inexhaustible resource
- Both economic and political factors make renewable biofuels an area of long term strategic importance for BP
- Yet internally, there are only 3 biologists among BP’s 100,000 person staff!
Key Issues for BP to Address

- How to rapidly access world class biologists in high quantity?
- How to develop the internal capabilities to absorb biology into BP’s DNA over time?
- How to shape the intellectual property that must arise for any initiative to be effective?
- Who can BP partner with externally?
  - Biology, but also agricultural science
The Solution? The Energy and Biosciences Initiative (EBI)

• A $500 million partnership (over ten years) between BP, UC Berkeley, and U Illinois
• Significant funding for basic research in biosciences and biofuels
• Onsite group of BP staff to conduct applied research
• Governing board of UCB, UI, and BP staff to select research projects to support
The Open Innovation Promise in Action: The iPod—An Example of Collaborative Innovation

An entrepreneur with an idea comes to Apple
Independent contractor Tony Fadell develops iPod/iTunes product solution in eight weeks

Steve Jobs takes personal interest
Apple hires Tony to create and lead 35-person team from Philips, IDEO, General Magic, Apple, Connectix, and WebTV
Apple developed the user interface and design

PortalPlayer manages technical design
PortalPlayer provided platform and produced reference design in collaboration with Apple and manages the design process
PortalPlayer makes $15/iPod sold 6 months!!!

Critical success factors:
- Openness of development process
- Fast decision making
- Iterative collaborative relationship with PortalPlayer and other partners

Sources: Electronics Design Chain magazine, August 17, 2004; Wired magazine, July 21, 2004; Forbes magazine, February 16, 2004; and interview with Tony Fadell
"Open Innovation" beyond the Product: iPod’s Open Business Models

RESULT: Real Fiscal Impact!

Apple’s iPod powers record Q1 profit, revenue
January 17, 2007—San Jose Business Journal

Powered by seemingly endless demand for its iPod digital music player, Apple Inc. on Wednesday reported record first-quarter profit of $1 billion or $1.14 cents a share, almost double the year-ago period’s $565 million or 65 cents a share.

The Cupertino-based company (Nasdaq AAPL)—which recently dropped “Computer” from its name—shipped 21 million iPods in the holiday quarter and raked in a record revenue of $7.1 billion compared to $5.7 billion in first quarter of 2006.

Step 3: iPod + Nike: New products through partnership and more new business models
Graphic Illustration of a Generic Airline Business Model

- Passengers
- Air Travel
  - Costs
    - Airport
      - Runway
      - Checkin
      - Jetway
      - Aircraft, Fuel
    - Food
    - Cleaning
  - Revenue
Ryan Air

• Ryan Air is a regional low-fare airline operating in the United Kingdom and northern Europe.
  • Only flies into regional airports, no landing fees.
  • Guarantees airport certain # passengers in their terminal
  • Airport pays Ryan Air to operate out of its airport
  • Airport provides Ryan Air a percentage of the revenues from shops, restaurants, car hire and hotels at airport.
The Ryan Air Business Model

- Air Travel
  - Revenue
  - Air Travel
  - Passengers
  - Airport
    - Car Hire
    - Shopping & Food
    - Parking
  - Hotels
  - Aircraft, Fuel
  - Food

- Jetway
- Checkin
- Cleaning

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A Second Example: Radiohead’s “In Rainbows”

- Prior Radiohead albums had sold around 200-300,000 copies each
- In 2007, Radiohead decided to open up sales of its next album “In Rainbows” to its fans
  - Fans decide how much (if anything) to pay!
  - Range of offerings, from individual tracks to full CD, to collector’s CD

The Result?

• After being made available for free for 3 months the album was no.1 in the UK and in the US
  • 1st Radiohead album on iTunes – no.1 album selling 30,000 units in the US in the first week
  • The physical CD has sold 1.75 million to date
  • They sold 100k boxsets
  • Nearing 17 million plays on last.fm
  • 1.2 million fans will see the tour

  – More than 3 million units sold across all channels!

Who Owns Business Model Innovation?

- Marketing?
- Research and Development?
- Operations?
- Corporate Strategy Office?
- Business Development?
- Finance?

Business Unit GM?
CEO/COO?
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OPEN Business Models
How to Thrive in the New Innovation Landscape

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