The Future of Informatics:
Products, Services & Platforms

Based on <u>Staying Power: Six Enduring Principles for Managing Strategy & Innovation in an Uncertain World</u> (Oxford, 2010)

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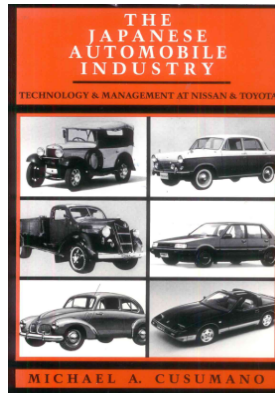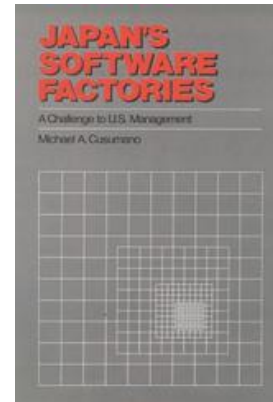**Dept. of Informatics 40th Anniversary Symposium**
September 24,2010

STAYING POWER

SIX ENDURING PRINCIPLES FOR MANAGING
STRATEGY & INNOVATION
IN AN UNCERTAIN WORLD

MICHAEL A. CUSUMANO

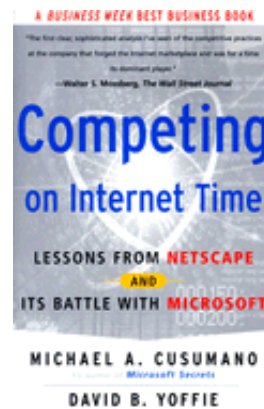THE JAPANESE AUTOMOBILE INDUSTRY
TECHNOLOGY & MANAGEMENT AT NISSAN & TOYOTA
MICHAEL A. CUSUMANO

1985

JAPAN'S SOFTWARE FACTORIES
A Challenge to U.S. Management
Michael A. Cusumano

1991

Microsoft SECRETS
How the World's Most Powerful Software Company Creates Technology, Shapes Markets, and Manages People
Michael A. Cusumano
Richard W. Selby

1995

A BUSINESS WEEK BEST BUSINESS BOOK
Competing on Internet Time
LESSONS FROM NETSCAPE AND ITS BATTLE WITH MICROSOFT
MICHAEL A. CUSUMANO
Microsoft Secrets
DAVID B. YOFFIE

1998

THINKING BEYOND LEAN
HOW MULTI-PROJECT MANAGEMENT IS TRANSFORMING PRODUCT DEVELOPMENT AT TOYOTA AND OTHER COMPANIES
MICHAEL A. CUSUMANO and KENTARO NOBEOKA

1998

MITSloan Management Review
STRATEGIC THINKING
for the NEXT ECONOMY
EDITED BY
MICHAEL A. CUSUMANO
CONSTANTINOS C. MARKIDES

2002

PLATFORM LEADERSHIP
HOW INTEL, MICROSOFT AND CISCO DRIVE INDUSTRY INNOVATION
ANNABELLE GAWER
MICHAEL A. CUSUMANO
HARVARD BUSINESS SCHOOL PRESS

2002

THE Business OF Software
What Every Manager, Programmer, and Entrepreneur Must Know to Thrive and Survive in Good Times and Bad
Michael A. Cusumano
CO-AUTHOR OF THE NATIONAL BESTSELLER MICROSOFT SECRETS

2004

STAYING POWER
MICHAEL A. CUSUMANO
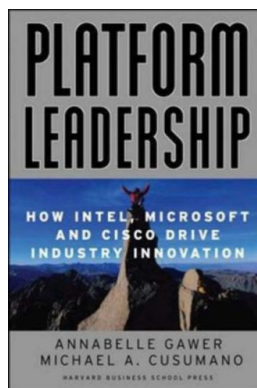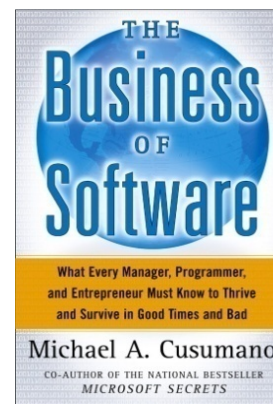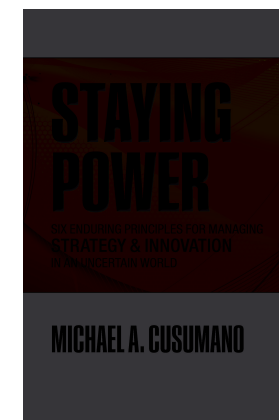
2010

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The Big Picture

- Now in an age of *innovation & commoditization* in high-tech businesses, both products & services
- Long history, recently accelerated
  - **Hardware Products**: Mainframes to minicomputers to PCs, cell phones and other devices
  - **Software Products:** Prices dropped for PC software products, but not for enterprises (products or services), until recently
  - **Manufacturing**: China's prices becoming the world's prices
  - **Services**: India's prices becoming the world's prices
- **What to do strategically and operationally?**
- **Not much room for error!**

Great Companies (and CEOs)?

LUCKY: **E.g., Right place, Right time**

	Yes	**No**
Yes	Microsoft, Apple, Intel, Google, Toyota, Cisco, Sony, JVC, et al.	
No		

GOOD:
E.g., Mix of Capabilities & Flexibility

My Six "Enduring" Principles

1. *Platforms*, **Not Just Products**

2. *Services*, **Not Just Products (or Platforms)**

3. *Capabilities*, **Not Just Strategy**

4. *Pull*, **Don't Just Push**

5. *Scope*, **Not Just Scale**

6. *Flexibility*, **Not Just Efficiency**

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1. Platforms, Not Just Products

- Managers, when possible, should **move beyond conventional thinking about strategy and capabilities** to compete on the basis of **platforms**, or **complements**.

- **Requires an external ecosystem** to bring different parties together to generate complementary innovations and build "positive feedback" between the complements and the platform.

- The effect is **much greater potential for growth and innovation** than a single firm can generate alone.

"Platforms" Intellectual History

In-House Product **Platforms &** *Product* **Modularity**

Meyer & Utterback (1993), Ulrich (1995), Sanchez & Mahoney (1996), Cusumano & Nobeoka (1998), Meyer & Lehnerd (1997)**,** Baldwin & Clark (1999), etc.

Product then Industry-Level Platform Standards, Dominant Designs or Technologies, with Network Effects

Utterback & Abernathy (1975), David (1985), Farrel & Saloner (1986), Arthur (1989), Katz & Shapiro (1992), Shapiro & Varian (1998), Bresnahan & Greenstein (1999), Gawer &Cusumano (2002), Gawer, ed. (2009), etc.
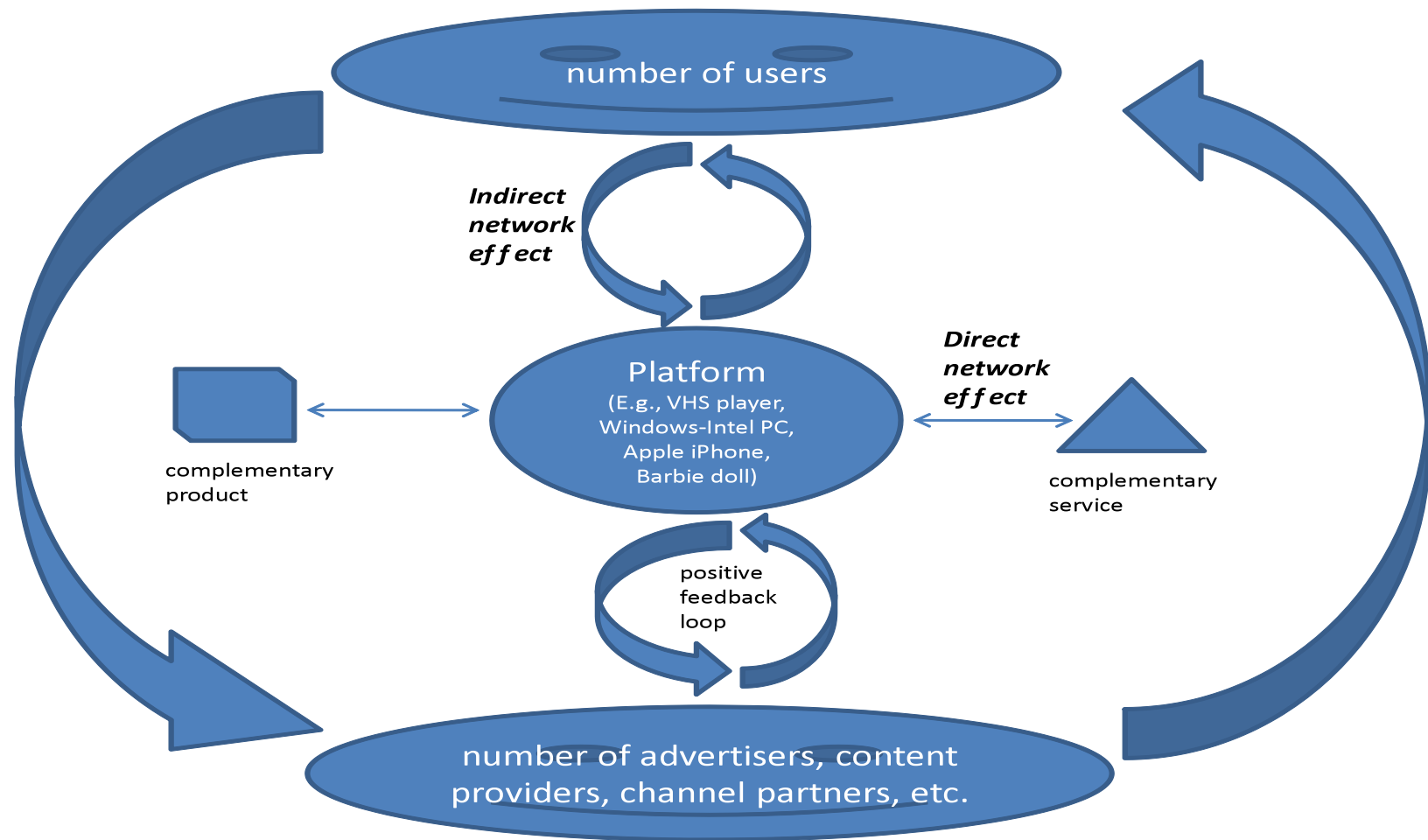
Forum for Multi-Sided Markets (*Industry* **Platform + Many Types of Complementors; Winner-take-all dynamics)**

Parker & Van Alstyne (2005), Eisenmann (2006), Evans, Hagiu & Schmalensee (2006), Eisenmann, Parker &Van Alstyne (2006), Yoffie & Kwak (2006), Adner (2006), etc.

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Industry Platform Definition

- A basic technology (or service) used beyond a single firm, whose value increases geometrically with complementary products & services
  - **Which means:** *The more users & complementors who adopt the platform, the more valuable the platform (and the complements) become!*

- **Historical Examples**: Railroad, Telegraph, Electric Power (AC vs. DC), Radio, TV, Mainframe Computers, VCRs, Personal Computer OS, CD/DVD, Internet Browsers

Platform Ecosystem: Platform + Complements + Network Effects

number of users

Indirect network effect

Direct network effect

Platform
(E.g., VHS player, Windows-Intel PC, Apple iPhone, Barbie doll)

complementary product

complementary service

positive feedback loop

number of advertisers, content providers, channel partners, etc.

Source: M. Cusumano, *Staying Power* (2010)

Ongoing Platform Battlegrounds

- **Web Search**   Google vs. Bing/Yahoo, foreign engines
- **Smart PhoneOS**   Apple vs. RIM, Nokia/Symbian, Android, Microsoft, Palm, Linux, ARM, Intel Atom)

- **Digital Media**   Apple (iPod, iPad & iTunes) vs. Microsoft (Media Player, Zune) vs. Real?

- **Social Network'g** Facebook, Twitter, LinkedIn, etc.

- **Video Games**   Sony, Nintendo, Microsoft
- **Enterprise s/w** SAP vs. Oracle/Sun, Microsoft, IBM
- **Micropayment**   Sony Felica vs. PayPal, credit cards
- **Displays**   E-Ink vs. LCD (Sharp, Sony, Samsung, others)
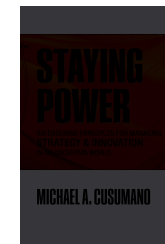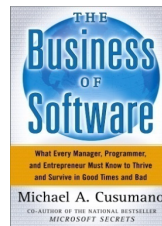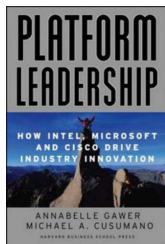- **Batteries**   Sony vs. Panasonic, Sanyo, A123, others

And many more platforms, or platforms within platforms, in smaller or emerging markets

Some Key Questions

- **Possible for firms to think "platform first" and still develop "great" products?**
  - Sony and Apple –traditionally have thought "product first"
  - JVC, Microsoft, Intel – generally have thought "platform first"
  - Google, Qualcomm, EMC, Cisco, Facebook, et al.?

- **When does a "product" or product platform have "<u>industry-level platform</u>" potential?**

- **How best use the different levers and concepts in the emerging "platform strategy toolkit" to:**
  - maintain a leadership position
  - overtake an existing leader, or
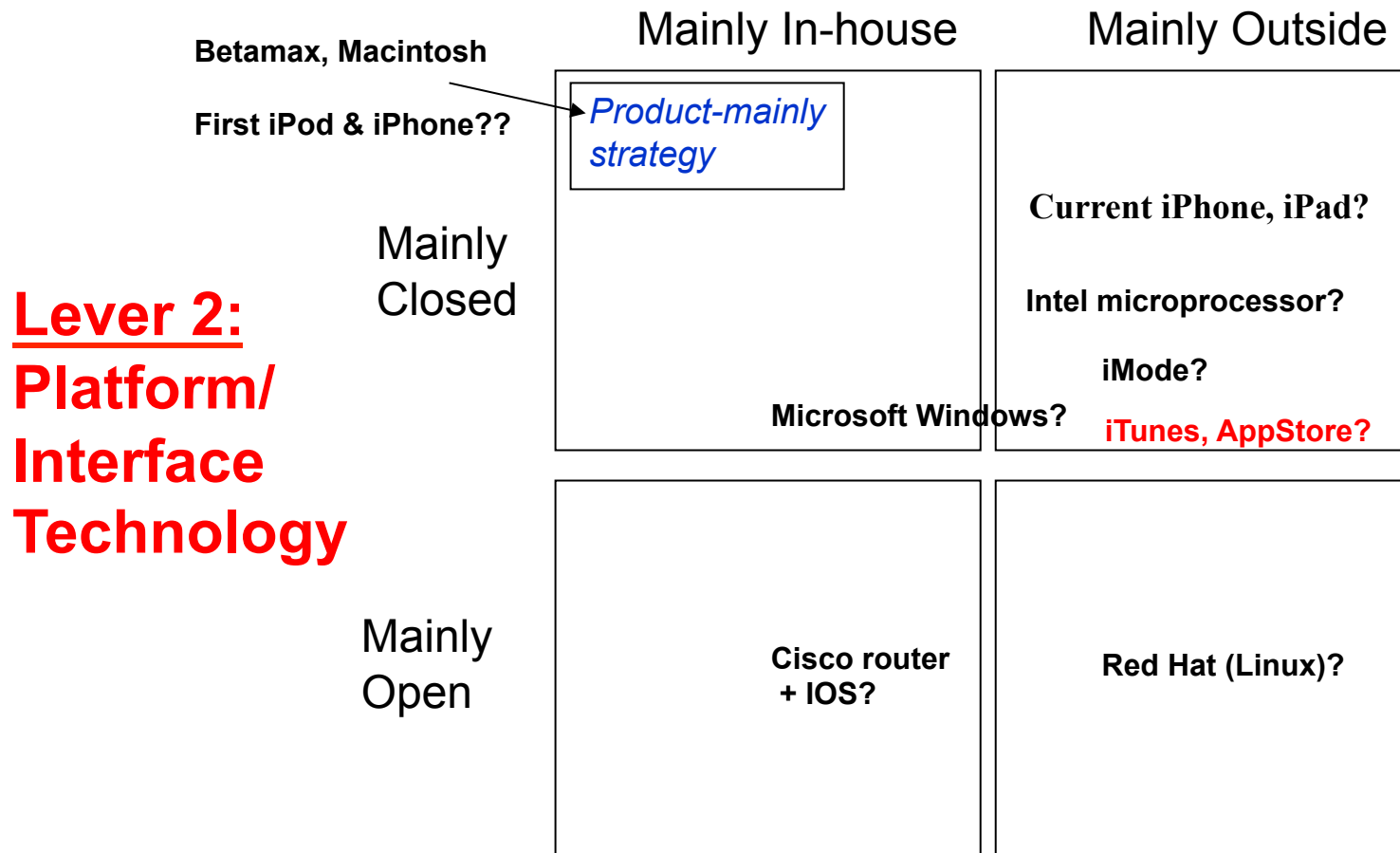 - create a platform where one has not existed before?

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A Platform Strategy Toolkit?

- **4 Levers** (Scope, Technology, External, Internal) – broad strategic categories for a platform strategy

- **Coring** – Set of strategies to try to create a platform market where one does not yet exist

- **Tipping** – Set of strategies to help push a market toward you when multiple platforms compete

- **WTAoM** – 3-lens framework to understand the dynamics of platform markets, potential for the winning share, and ways to influence outcomes

Product vs. Platform Strategy?

Lever 1: Source of Key Complements

Mainly In-house   Mainly Outside

Betamax, Macintosh

First iPod & iPhone??

Product-mainly strategy

Lever 2: Platform/ Interface Technology

Mainly Closed

Current iPhone, iPad?

Intel microprocessor?

iMode?

Microsoft Windows?   **iTunes, AppStore?**

Mainly Open

Cisco router + IOS?

Red Hat (Linux)?

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Apple:
Before = Product Over Platform
Since 2003 = Product + Platform!

- Apple through 2009 still ½ the sales and ¼ the profits of Microsoft, but catching up. *And **surpassed Microsoft in market value on May 27, 2010.***

- Enormous increase in Apple's sales, profits, and market value since introducing great new products and adopting more of an **open but not open (or closed but not closed)** platform strategy with iPod, iTunes & iPhone since 2003

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	Microsoft				Apple		
	Revenues	Operating Profits (%)	Year-End Market Value		Revenues	Operating Profits (%)	Year-End Market Value
2009	$58,437	34.8%	$246,630		$36,537	21.0%	$180,150
2008	60,420	37.2	149,769		32,479	19.3	118,441
2007	51,122	36.2	287,617		24,006	18.4	74,499
2006	44,282	37.2	251,464		19,315	12.7	45,717
2005	39,788	36.6	233,927		13,931	11.8	29,435
2004	36,835	24.5	256,094		8,279	3.9	8,336
2003	32,187	29.7	252,132		6,207	(loss)	4,480
2002	28,365	29.2	215,553		5,742	0.3	4,926
2001	25,296	46.3	258,033		5,363	(loss)	7,924
2000	22,956	47.9	302,326		7,983	6.5	5,384
1995	5,937	35.3	34,330		11,062	6.2	4,481

"Winner Take All" (or Most) if…

1) **Very strong direct or indirect network effects**

2) **Little room to distinguish among different platforms (few niches or differentiation opportunities for your competitors!)**

5) **Difficult or costly to use more than one platform ("multi-homing" rare for users & app developers or advertisers)**

Reference: Eisenmann et al., *Harvard Business Review* (2006)

Why Did VHS Win 100% of the Consumer VCR Market?

1. **<u>Strong network effects?</u>** – **Yes.** VHS and Beta machines similar technology but incompatible. Beta first, but more open licensing of VHS led to more vendors, then more prerecorded tapes, then more sales to users, ad infinitum

2. **<u>Little differentiation?</u>** – **Yes.** Initial difference in recording time, but soon eliminated. Same prerecorded tapes available. Quality better with Betamax but not better enough.

3. **<u>High cost of multihoming?</u>** – **Yes.** Machines were expensive in the 1970s and 1980s, so <u>users chose one</u>.

Why Did Windows Win up to 95% of Desktop OS Market?

1. **Strong network effects?** – **Yes.** Many more apps for Windows; incompatibility of the Mac meant that Apple could not benefit from this broader PC ecosystem (until recently, with the switch to Intel chips & virtual s/w)

2. **Little differentiation?** – **Yes.** Growing similarity with the Mac; rivalry among PC manufacturers and low entry barriers also kept bringing PC prices down. *Mac survived in a niche – desktop publishing & extreme ease of use, such as for schools*

3. **High cost of multihoming?** – **Yes.** The Mac usually cost 2x a WinTel PC. Both are costly so users choose one.

Why No **Permanent** Winner in Video Game Console Market?

1. **Strong network effects?** – **Yes.** Strong direct network effects tying specific games to each platform (Sony PlayStation, Nintendo Wii, Microsoft Xbox). Some network effects tying game developers but often do multiple platforms.

2. **Little differentiation?** – **No**. Each vendor exploiting a niche or differentiation strategy – Sony and high-end gamers, Nintendo and non-traditional audiences and h/w innovations, Microsoft and PC/internet platforms. Also "hit" games or features or consoles vary a lot by generation.

3. **High cost of multihoming?** – **No.** Consoles relatively cheap. Often subsidized by makers. Serious game users buy more than one platform. Some games on multiple consoles.

Why Has Google Most (65%) But Not All the Search Market?

1. **Strong network effects?** – **No**, for users – no direct network effects, easy to switch. Google portal (email, etc.) "stickier." Stronger indirect network effects for advertisers and app developers tied to Google search.

2. **Little differentiation?** – **Yes, and no**. Search engines similar. But some specialties or niches by geography and language (e.g. China, Brazil), and technology (e.g. video)

3. **High cost of multihoming?** – **No.** Users can easily use several search engines. Some multi-homing costs for advertisers, but not much. More for app developers.

Will There Be <u>One Winner</u> in the Global Smart-Phone Market?

1. **<u>Strong network effects?</u>** – **Yes.** Direct network effects tying specific applications and some services to each platform (Nokia/Symbian, RIM/Blackberry, Apple iPhone , Google Android, NTT Docomo, Microsoft Windows CE)

2. **<u>Little differentiation?</u>** – **No.** Different vendor strengths (e.g. business/email vs. consumer functions, computer-like, social networking, etc). Different operator strengths, politics, and bundles in different regions.

3. **<u>High cost of multihoming?</u>** – **Yes.** Phones often subsidized, but service contracts expensive. Most users chose one vendor. But users can and do switch over time.

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Lessons for Managers

- Huge potential differences in **strategy & implementation challenges** for a platform vs product strategy
  - 4 levers, Coring & Tipping, WTAoM Dynamics

- Huge potential differences in **economic value creation** from the different strategies

- But staying power still requires understanding the **interrelationship** between *product and platform*
  - Platform battles seem to be won by having (1) the **best "platform"** (open interfaces & modular architectures that are easy to build on and extend), though *starting with a very good product helps – e.g. iPod, iPhone*, and (2) the most **compelling complements** within a vibrant ecosystem

2. Services, Not Just Products

- Firms, when possible, should use **service capabilities and innovations to sell, enhance, and even "de-commoditize" product offerings** or standardized services as well as create **new sources of revenues and profits**, such as an ongoing maintenance stream.

- Need to find the right **revenue balance** and then **"servitize" products** to create new value-added opportunities and **"productize" services** to deliver them more efficiently and flexibly, using information technology & service automation.

"Services" Intellectual History

Struggle over How to Define *Services* versus *Products*

Judd (1964). Rathmell (1966), Bell (1973), Levitt (1972, 1976)

Theories of *Service Innovation* (in contrast to "Products")

Barras (1986), Thomke (2003), Mansharamani (2007 – lit. review), others

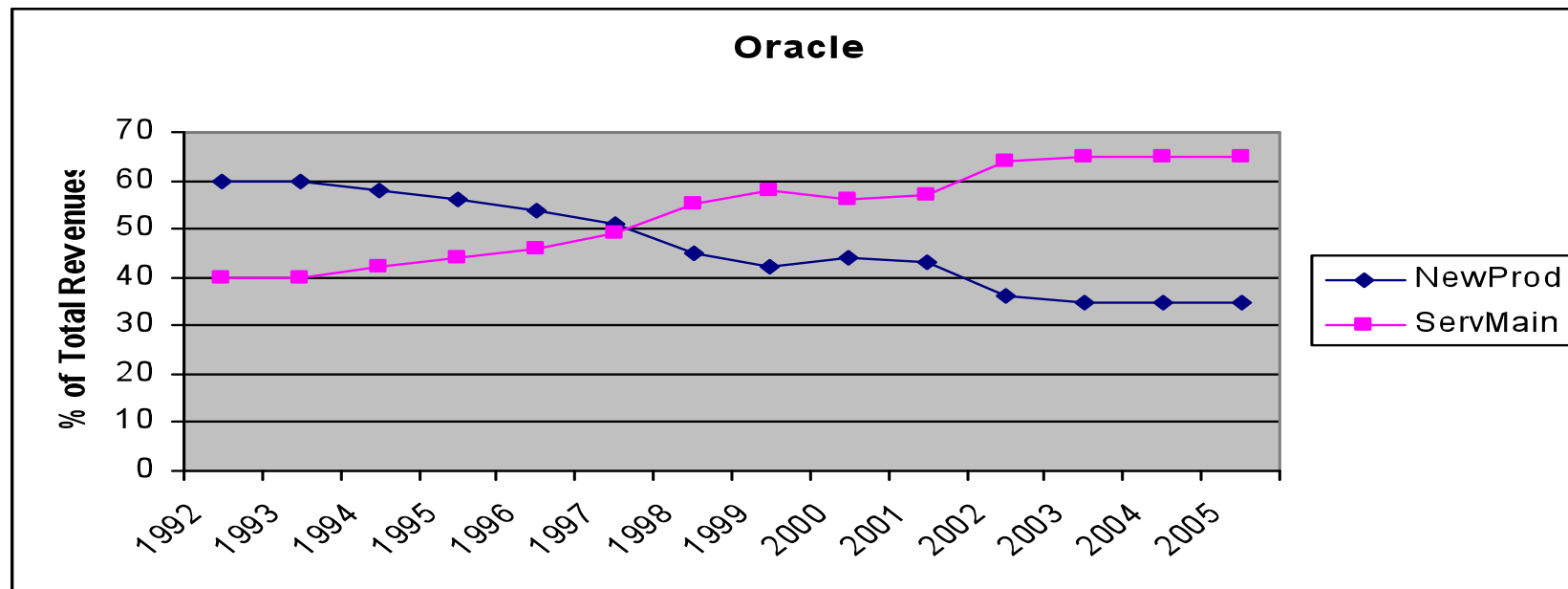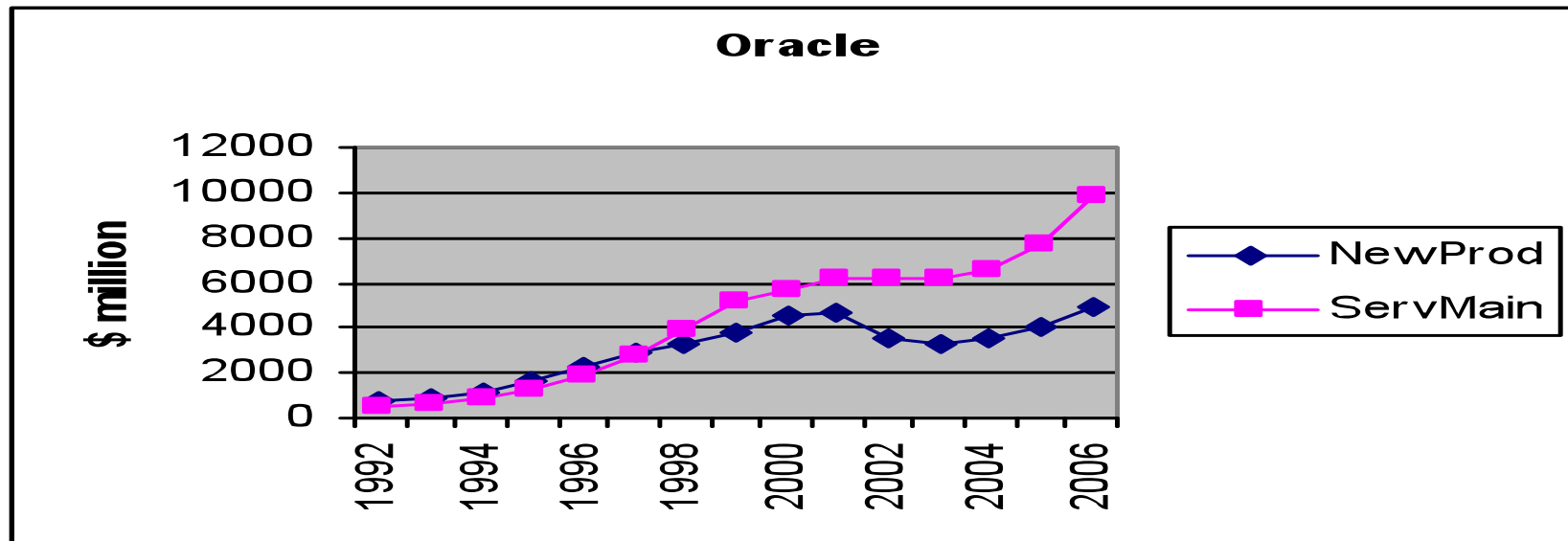**Services Over the Product Lifecycle ("Servitization" & Value)**

Teece (1986), Potts (1988), Bowen et al. (1991), Quinn (1992), Knecht et al. (1993), Gadiesh and Gilbert (1998), Nambisan (2001), Oliva & Kallenberg (2003), Slack (2005), Neely (2009)
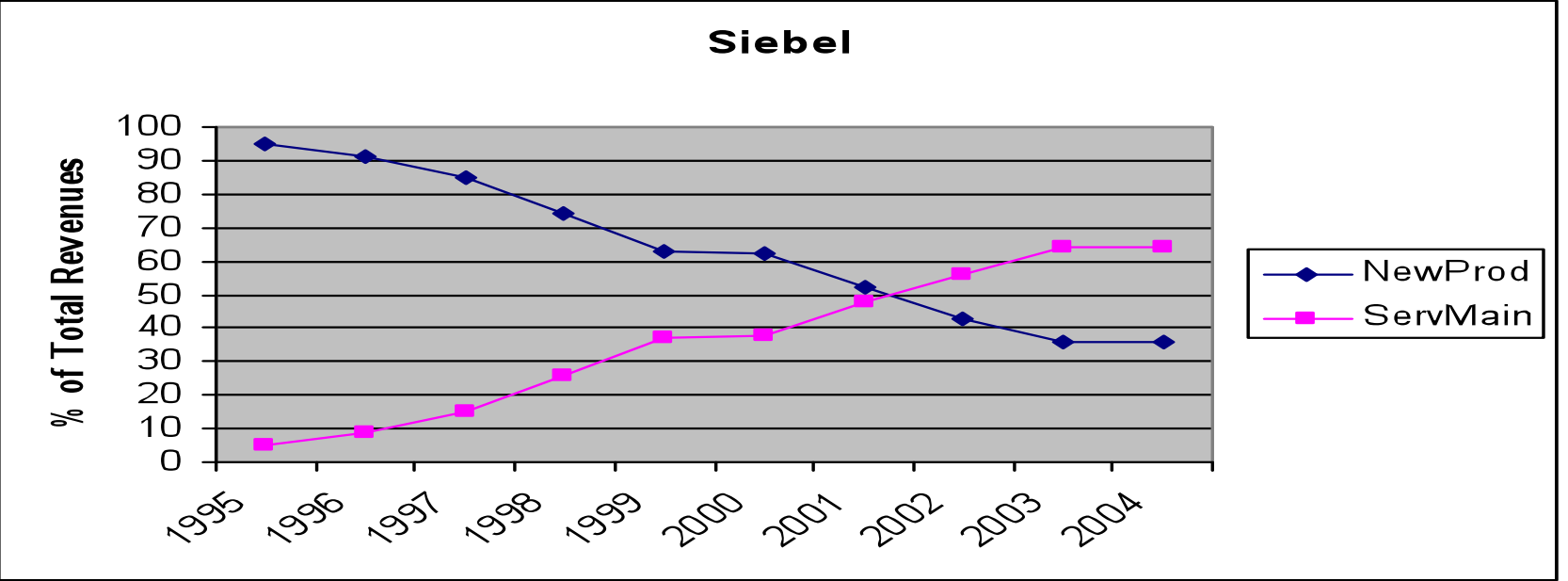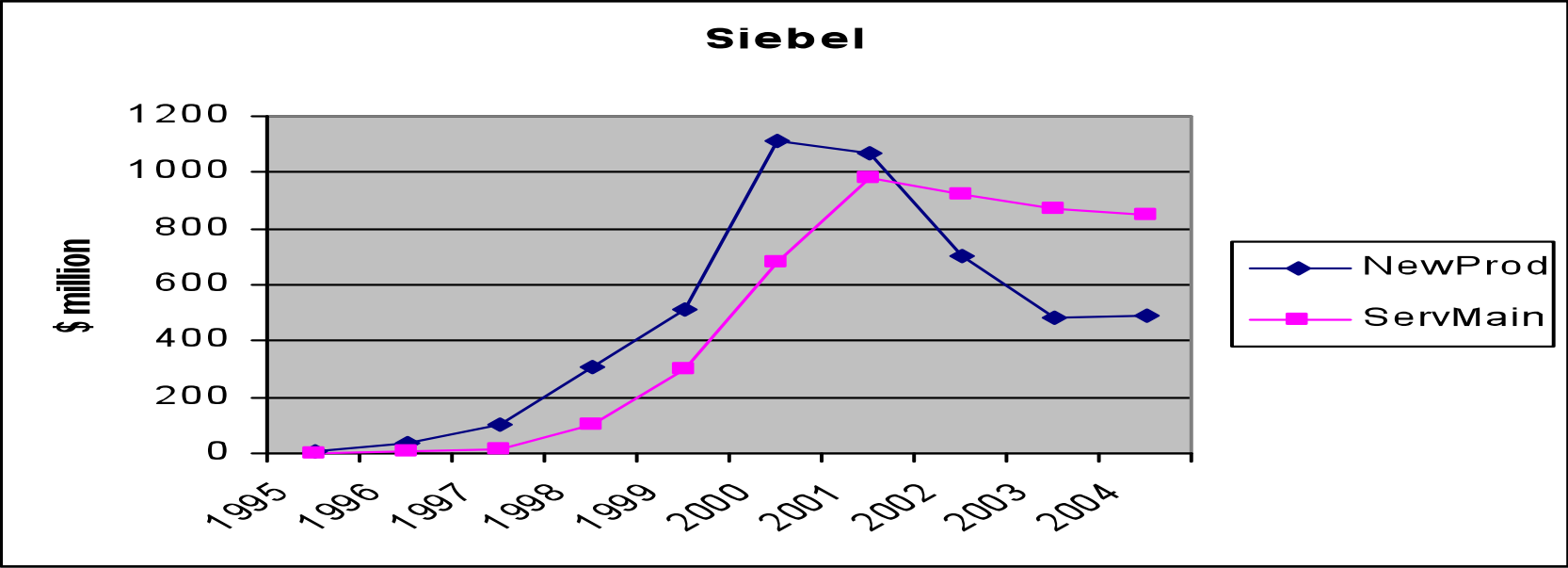
Common Case (or Extreme?): Computers & Software Industry

Campbell-Kelly and Aspray (1996), Gerstner (2002), Campbell-Kelly (2004), Cusumano (2004), Campbell-Kelly and Garcia-Schwartz (2007)
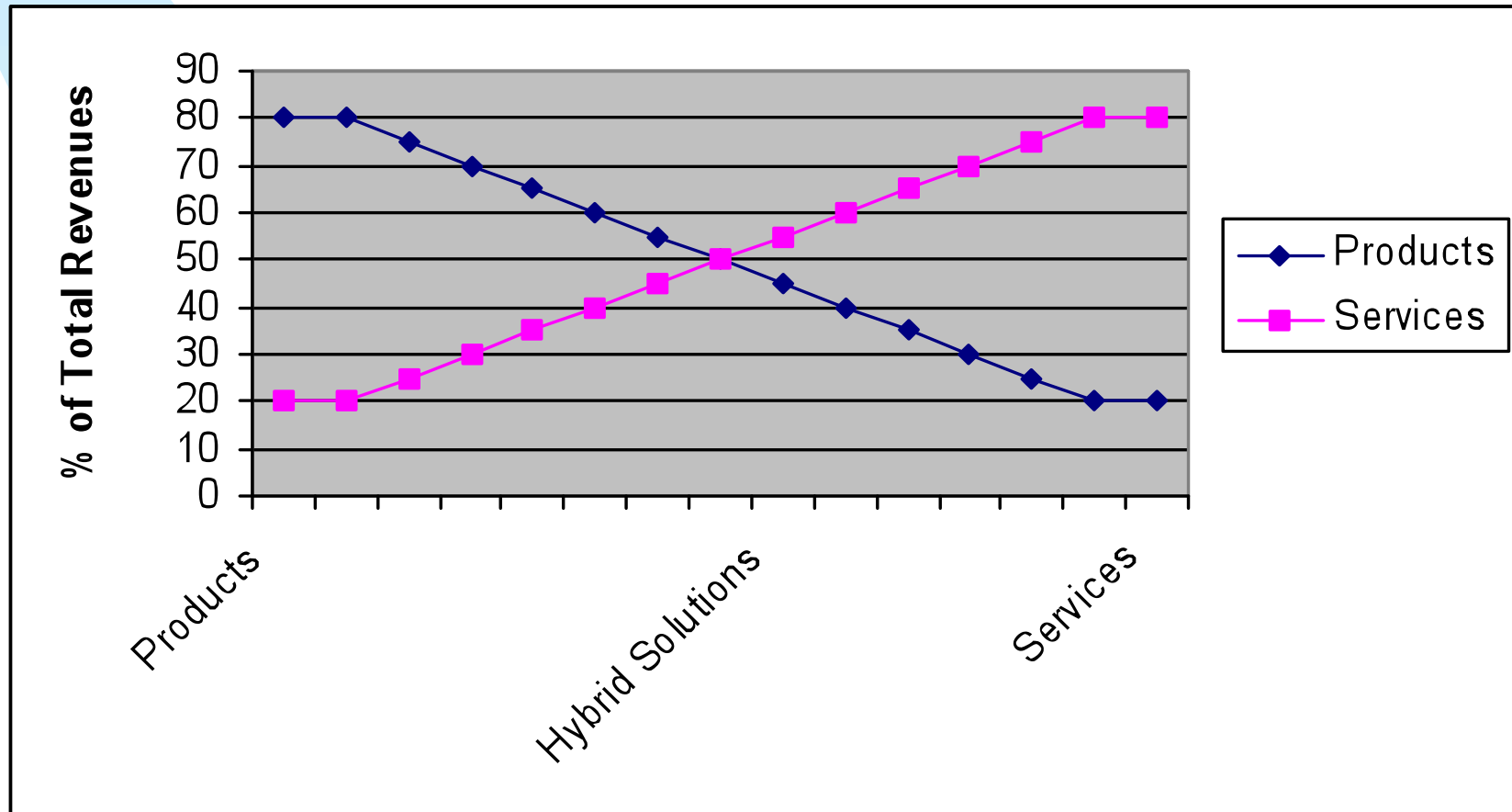
Some Key Questions

- **When should product firms treat services as essential to their *business models*** (ways of making money, or smoothing out revenues & profits) **and *competitive strategies*** (ways of competing more effectively)**?**

- **How does managing the services side of the business differ from the product business? Or complement it?**

- **Why have we seen the rise of services (professional and automated) so prominently in computing & information technology?**
  - Simultaneous trend of "innovation & commoditization"? 26

Oracle

Oracle

Siebel

$ million

- NewProd
- ServMain

1200
1000
800
600
400
200
0

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004

Siebel

% of Total Revenues

- NewProd
- ServMain

100
90
80
70
60
50
40
30
20
10
0

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004

Business or Life Cycle Models?

Source: M. Cusumano, The Business of Software (2004)

Typical View of Services in High-Tech Companies?

"Services will be the graveyard for old tech companies that can't compete."

**Scott McNealy**
Chairman (then CEO), Sun Microsystems

Referenced in <u>N.Y. Times</u>, Sept. 16, 2004

Change: Software *Products* Business
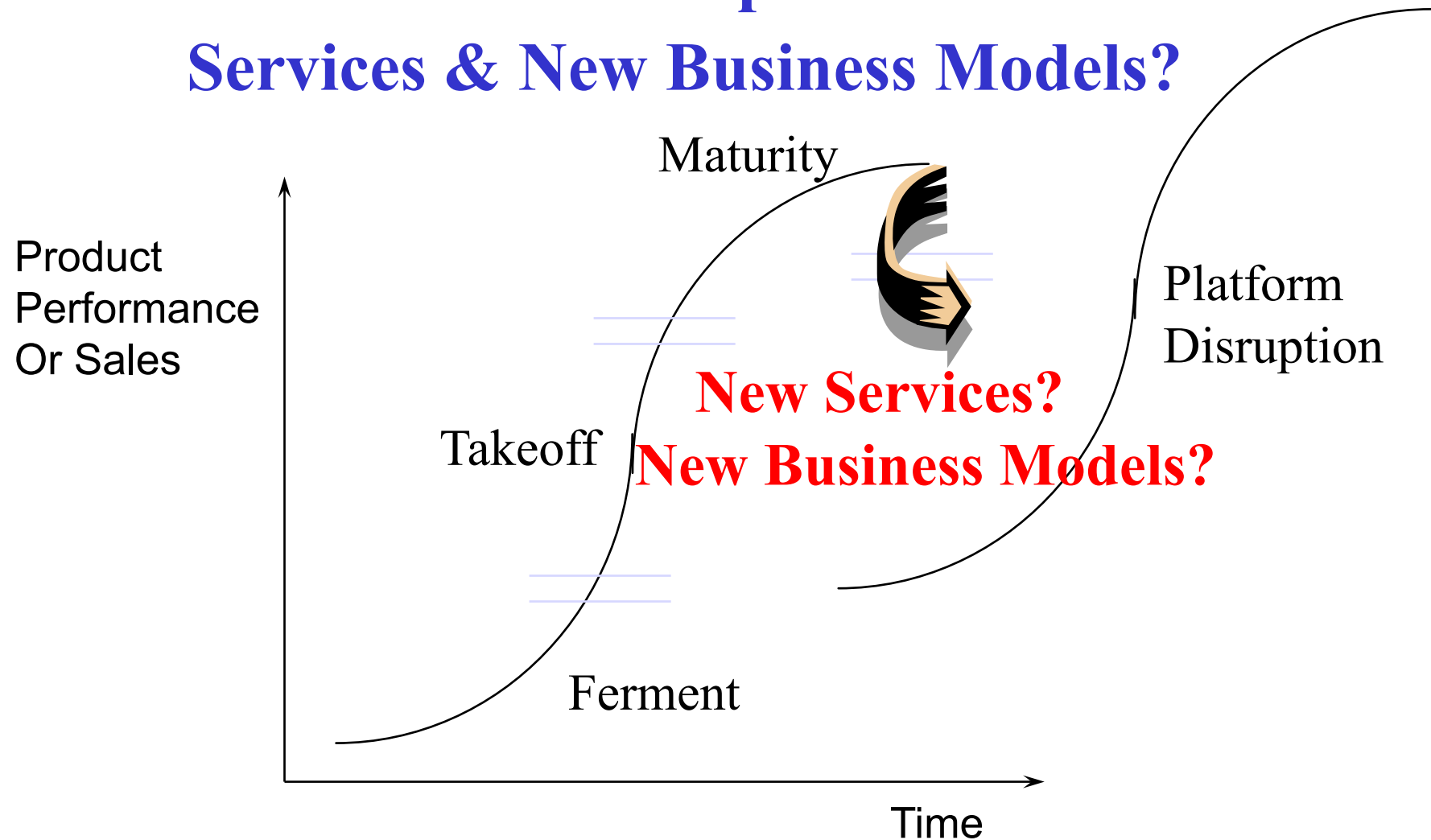## Extreme Example of Innovation & Commoditization?

- **Decline of Enterprise Sales (or Prices?)**
  - Only exceptions are hits & "platform" products?

- **Growth of Services & Maintenance Revenues**
  - Freeware/open source driving prices to zero?
  - Customers rebel against costly products?

- **Massive Industry Consolidation!!**
  - The data are clear

- **Emergence of New Business & Pricing Models**

  ➔ *Software as a Service/Cloud Computing* – *cheaper products, bundled support/maintenance* (Salesforce, Amazon)

  ➔ *Free, But Not Free* – *supported by advertising* (e.g., Google) or *services* (Red Hat), or *multi-sided market* (Microsoft & Adobe, Facebook)

Different Evolution Curve –
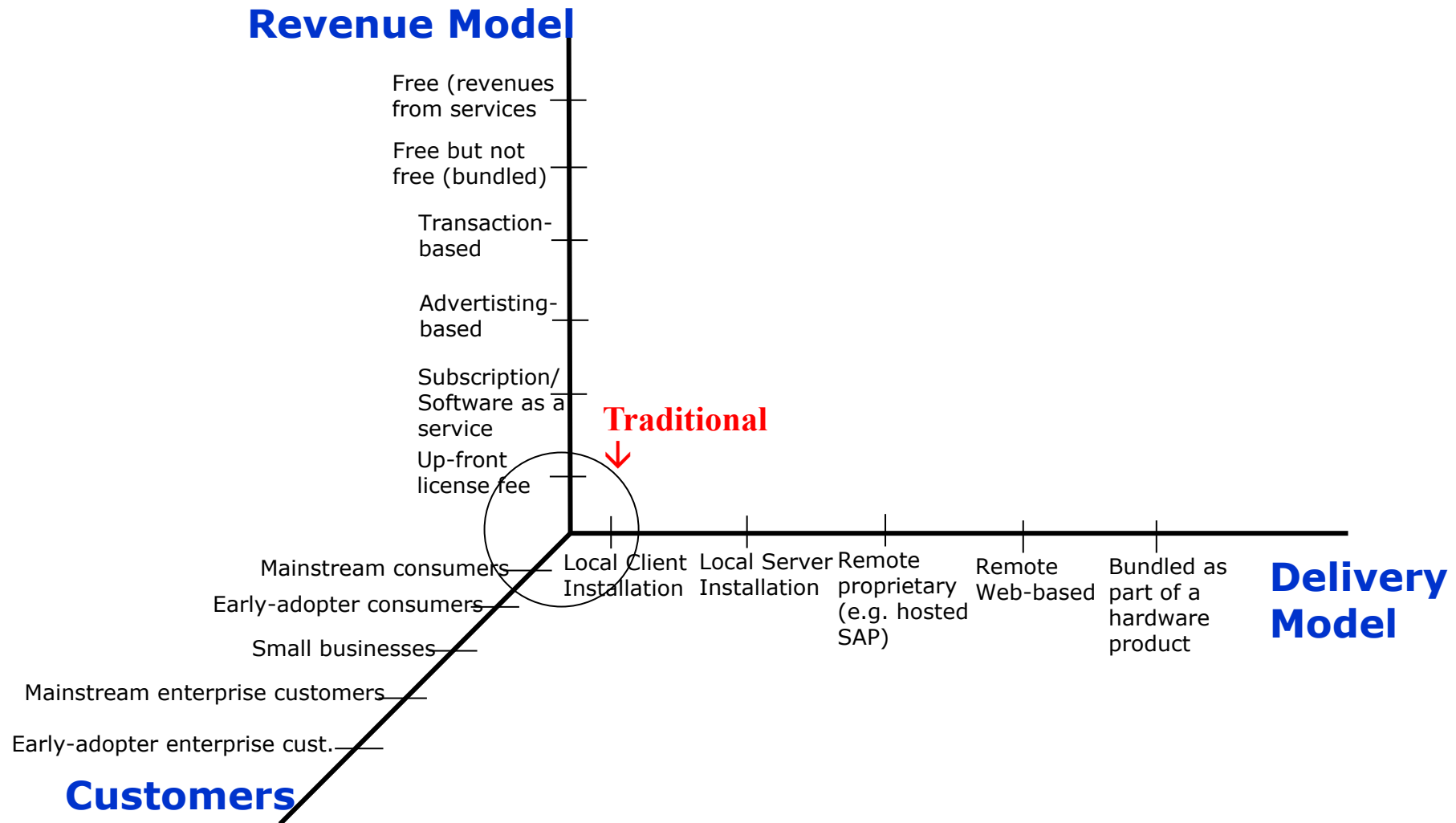# Product, Process, and/then *Services*?
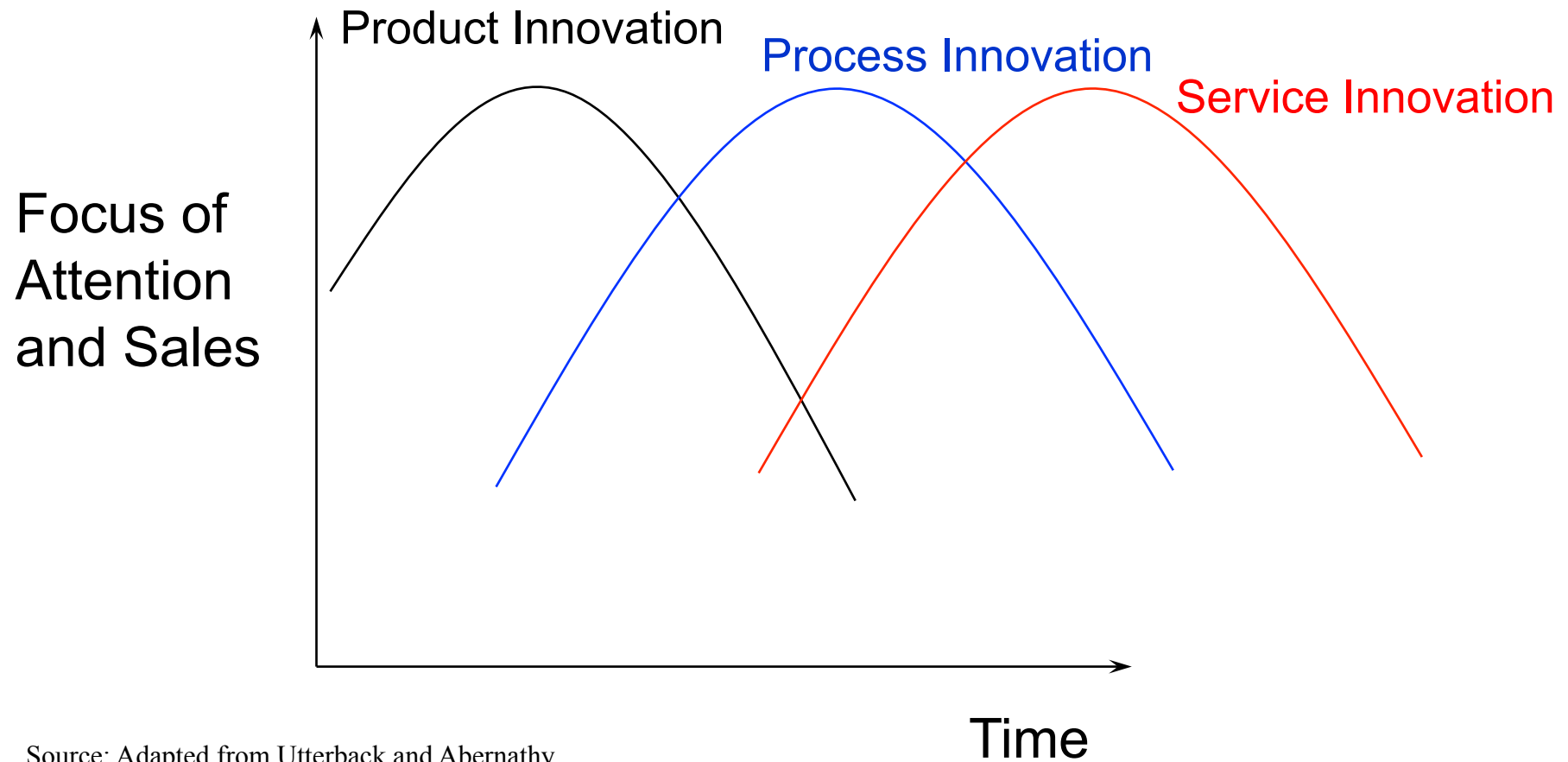
Source: Adapted from Utterback and Abernathy
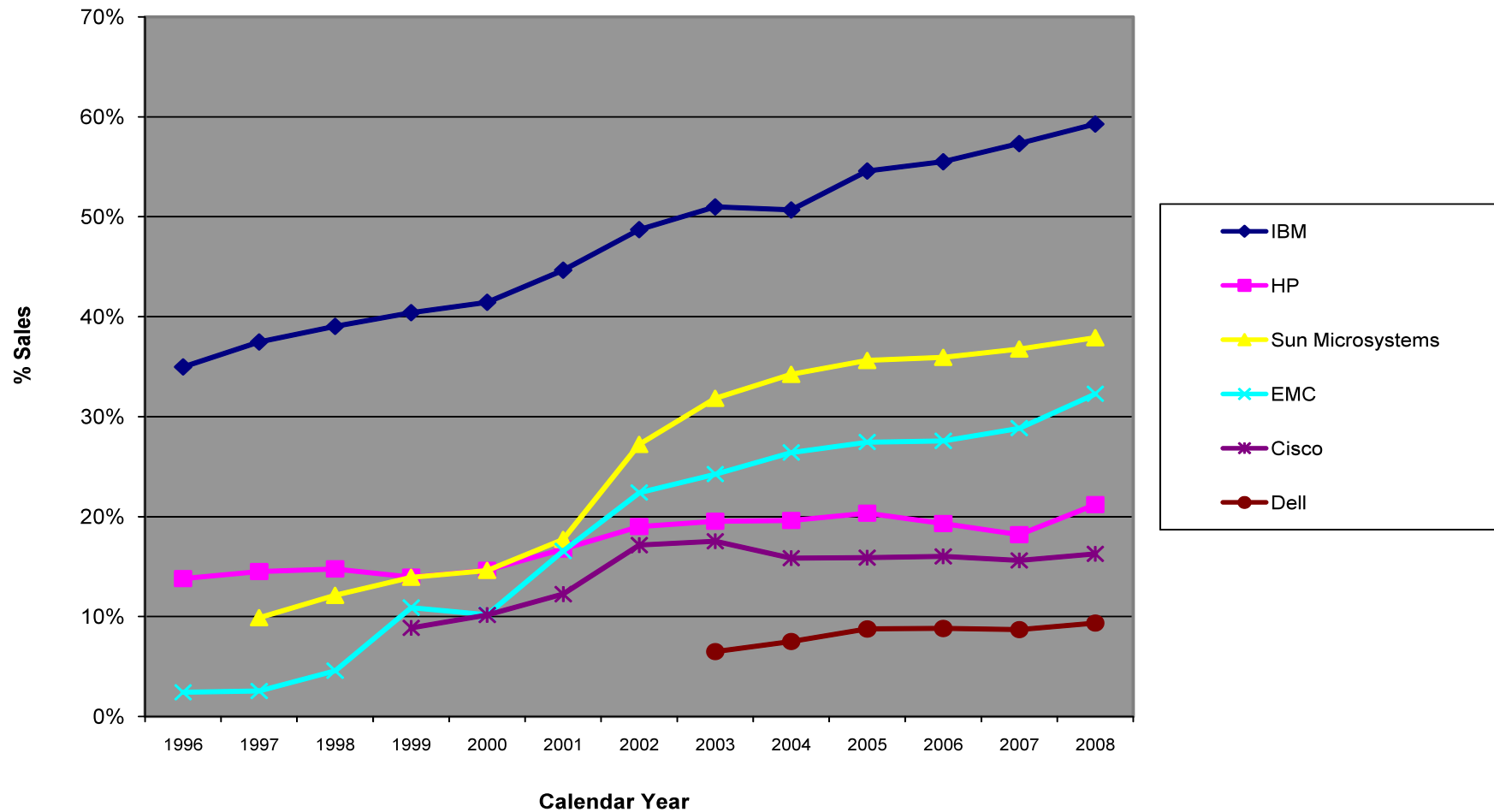
Different S-Curve Dynamics – Product Platform Disruptions Generate New Services & New Business Models?

Product Performance Or Sales

Maturity

Platform Disruption

New Services? New Business Models?

Takeoff

Ferment

Time

New Business Model Dimensions

Revenue Model

Free (revenues from services

Free but not free (bundled)

Transaction-based

Advertisting-based

Subscription/ Software as a service

Up-front license fee

Traditional
↓

Local Client Installation

Local Server Installation

Remote proprietary (e.g. hosted SAP)

Remote Web-based

Bundled as part of a hardware product

Delivery Model

Mainstream consumers

Early-adopter consumers

Small businesses

Mainstream enterprise customers

Early-adopter enterprise cust.

Customers

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Service Revenue %, Select Hardware Firms

% Sales

Calendar Year

Legend:
- IBM
- HP
- Sun Microsystems
- EMC
- Cisco
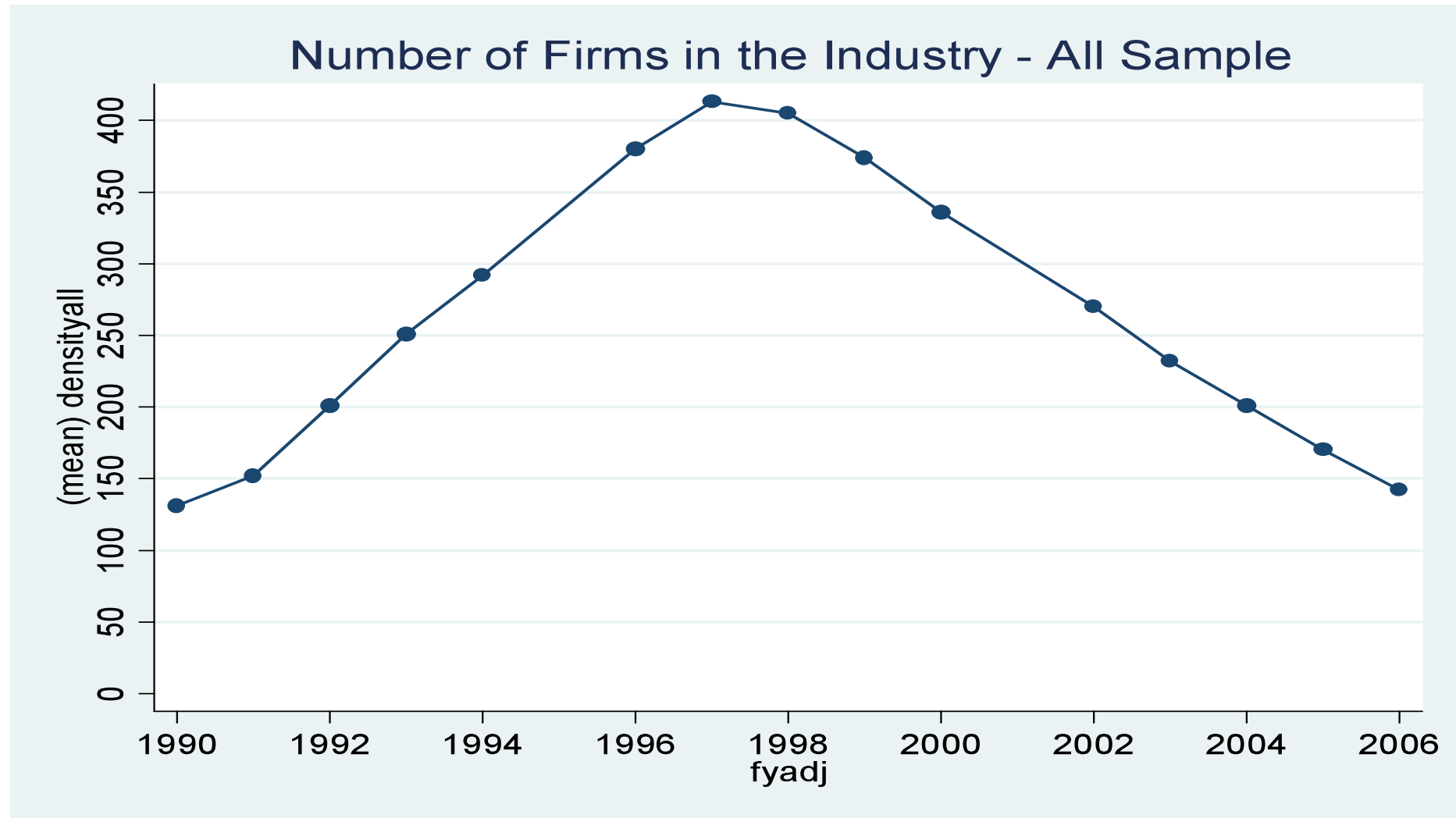- Dell

Strategy Questions

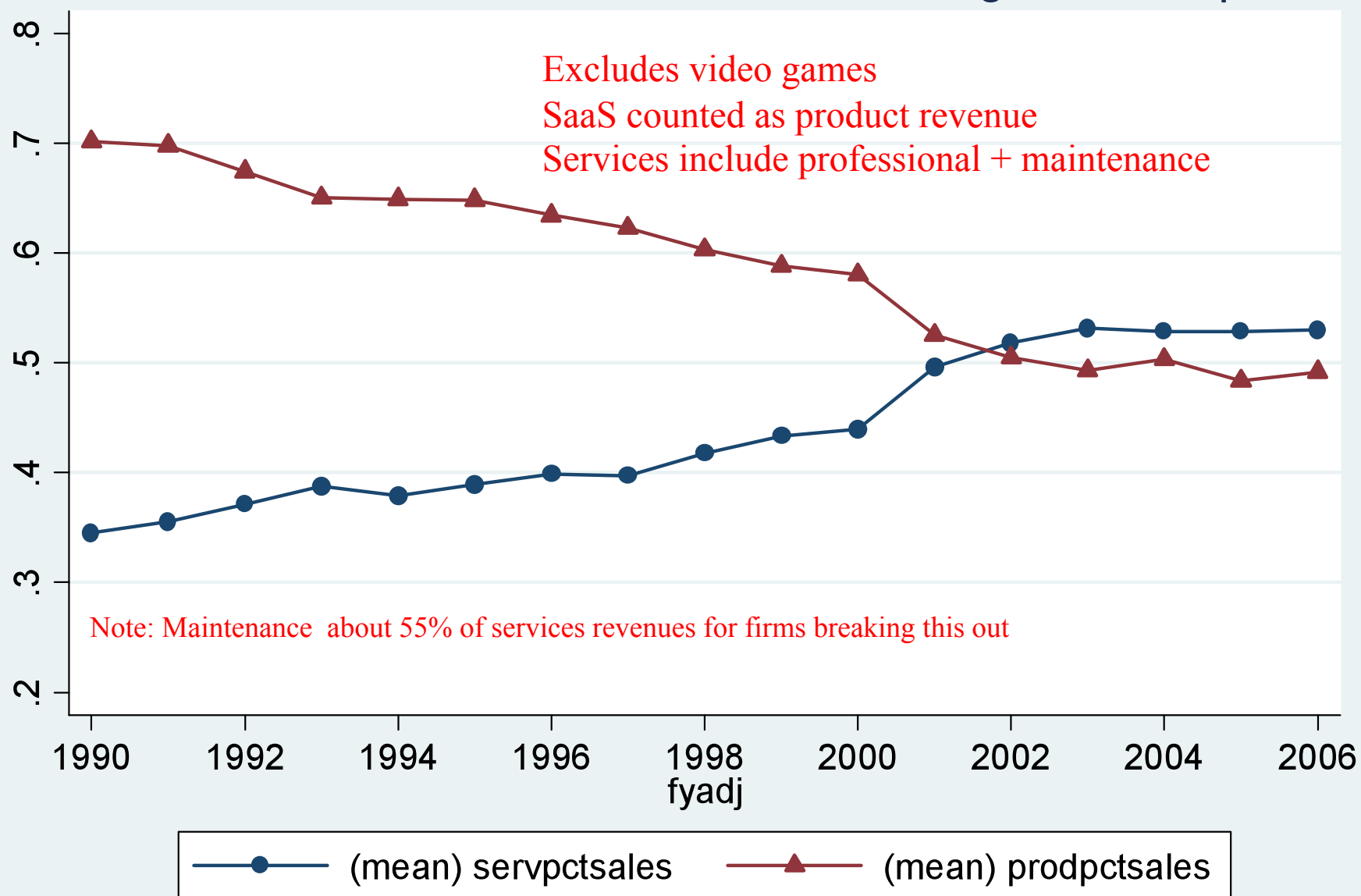*Rise in services and new business models <u>temporary</u> or <u>permanent?</u>*

- <u>*Temporary* Argument:</u> In transition phase between platform and business model innovations *(now client-server to internet to web services & mobile?)*

- <u>*Permanent* Argument:</u> Software and digital goods now commoditized and prices will fall close to zero for any standard or common products. Future is software as a service or "free but not free," supported by advertising or other indirect revenues. *Many other technology-based global industries will follow.*

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Public Software Product Firms
Listed on US Stock Exchanges (SIC 7372)

Number of Firms in the Industry - All Sample

Service vs Product as % Sales - Average All Sample

Excludes video games
SaaS counted as product revenue
Services include professional + maintenance

Note: Maintenance about 55% of services revenues for firms breaking this out

fyadj

(mean) servpctsales   (mean) prodpctsales

Observations from the Data

- Equilibrium – product & services in **balance**
  - Product revenues NOT falling to zero, but…
  - 70% products still "optimal" for profitability at product firms

- Services can de-commoditize products & drive new sales & profits? ➔**Hybrid Business Model**
  - 60% threshold for profitability & some firms never profit
  - Level of services/maintenance & threshhold varies by segment
  - Products remain the **"engine"** driving service & maintenance

- Intensifying competition in **service capabilities?**
  - Software product firms now comparable to h/w + systems firms
  - Software product firms now competing with IT service firms

Services Impact on Profits & Market Value: Sweet (vs. Sour) Spots
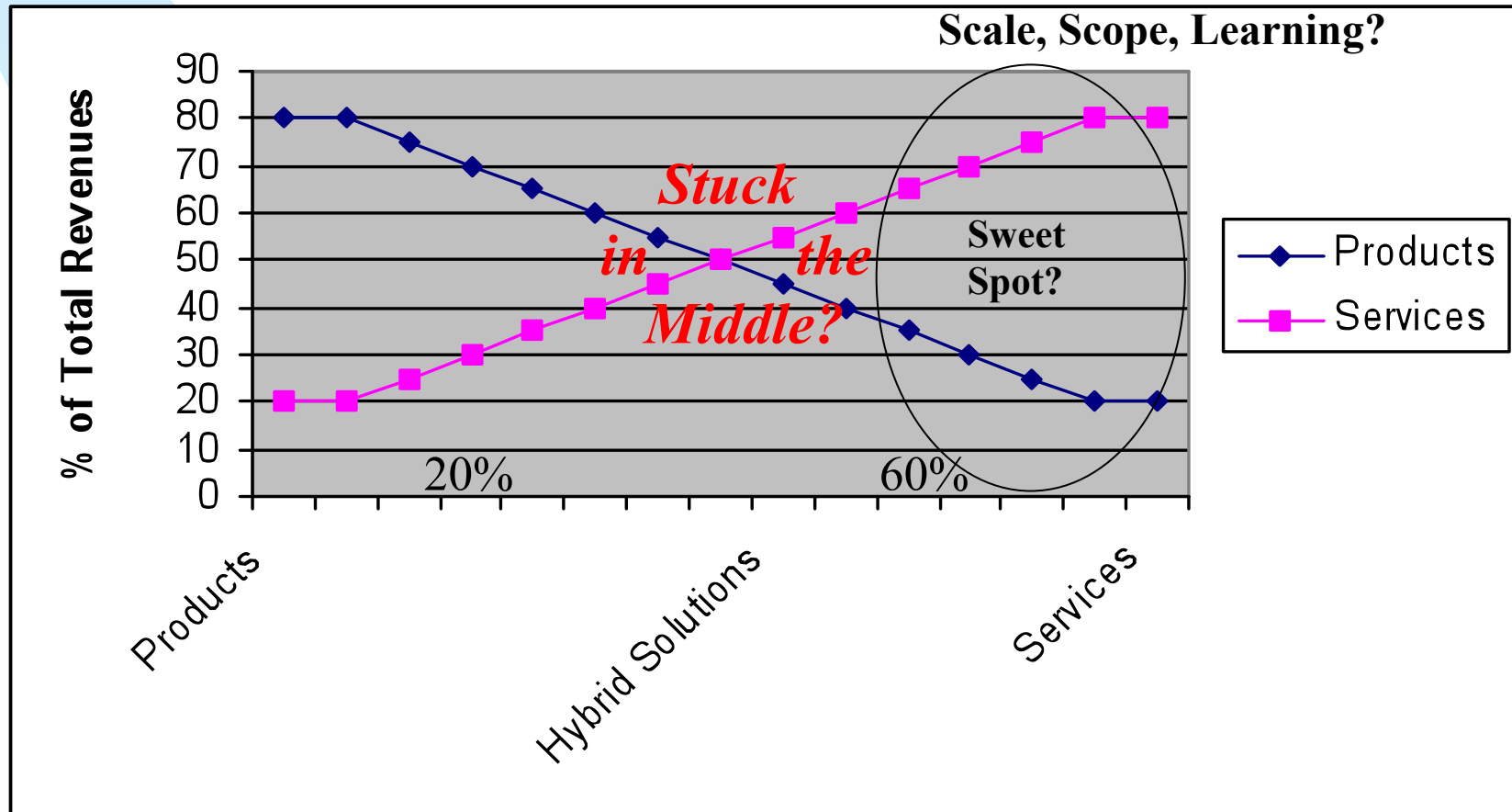
Taxonomy of Services from the Product Firm

Complementary		Substitution
Enhance	**Extend**	**Substitute**
• Financing • Warranty/Insurance • Implementation • Maintenance/Repair • Technical support • Training in basic uses • Customization that makes existing product features easier to use	• Customization that creates new features specific to a customer • Training or consulting that introduces new uses • Integrating the core product with new products	• Before product release (e.g., Zapmail) • After product release (e.g., software application hosting, automobile leasing, SaaS)

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What about Cloud Computing?

(SaaS Infrastructure Services as a Platform)

1. **<u>Strong network effects?</u>** – *Yes, or moderate?* Cross-platform APIs, but apps still depend on some platform-specific APIs or services from Google, Amazon, Windows Azure, Salesforce's AppExchange & Forge.com, etc. Maybe an ecosystem of complementary apps & services will also emerge.

2. **<u>Little differentiation?</u>** – *No?* Some infrastructure platforms and ecosystems seem quite different (e.g. Google Maps, or Microsoft Azure Product services). Pricing also different.

3. **<u>High cost of multihoming?</u>** – *Yes,* and *No?* Application developers may find it cumbersome to port some of their apps across different cloud platforms. Different regulartions. Cloud makes it easier to utilize apps or services on multiple platforms.

Lessons for Managers

- Managers must recognize that most product companies today are **hybrids** – product + services

- Staying power requires **synergies** across the 2 businesses

  1. **Managing the crisscross (**balance revenue streams and capabilities across products, maintenance, and professional services -- consulting, integration, customization, training);

  2. **"Servitizing" products (**innovate around the product to generates value-added customization, support, training, consulting, new pricing/delivery models) and

  3. **"Productizing" services** = software factory-like customization or automated service delivery (SaaS/Cloud digital service = new type of software product)

Product = Platform for Selling Services
(Like a smartphone, e-book, iPad, others?)

Example: "Servitizing" the Automobile

- Financing (loans, leasing; insurance)

- Lifecycle (warrantee, maintenance)

- Repair (remote diagnostics)

- Semi-Customization (configured features)

- Telematics Services/Content Intermediary

  – Internet access

  – Practical Content (navigation, satellite radio)

  – Entertainment Content (music, games, movies, etc.)

Narrow Way of Thinking About Focus and Competitive Advantage at the <u>Product</u> Level

Examples:
- Ford in Model T Era
- GM in the 1920s
- Sony in Betamax era
- IBM before Open Source
- Apple before mid-2000s

Strategy →Push→ Products

Strategy →Scale→ Products

Strategy →Efficiency→ Products
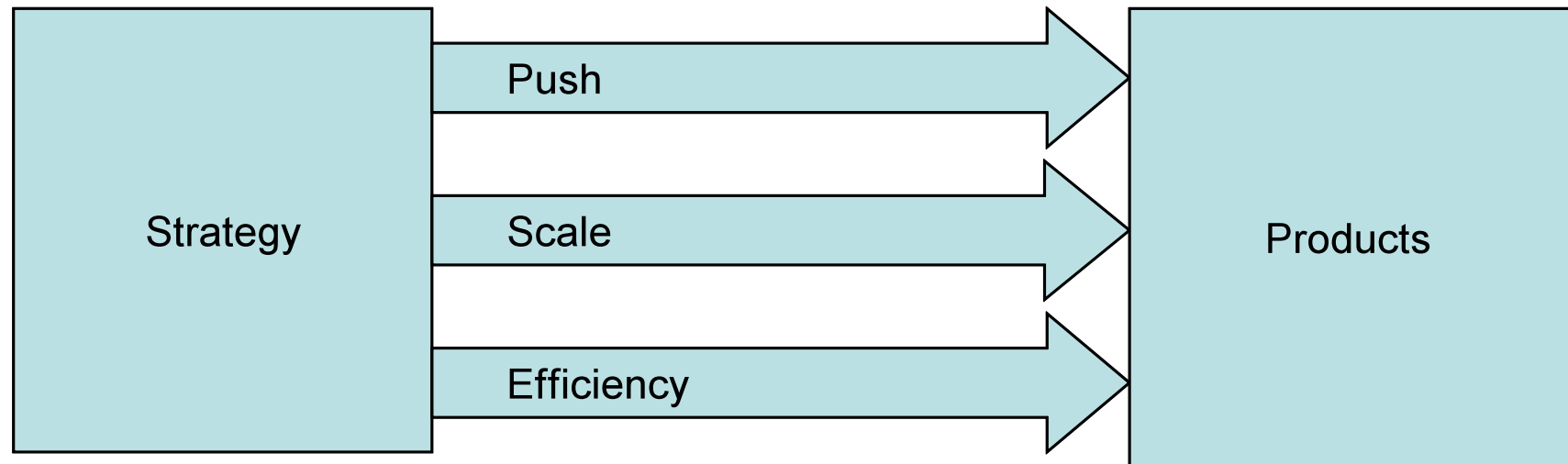
Broader Way of Thinking About Agility and Competitive Advantage at the <u>Ecosystem</u> Level

Examples:
- Toyota
- Microsoft
- Intel
- JVC in VHS Era
- Apple after mid-2000s
- Google, Adobe
- Cisco, Qualcomm, et al.

Capabilities, *Not Just Strategy* ⟷ **Pull**, *Don't Just Push* ⟷ **Platforms & Services,** *Not Just Products*

Capabilities, *Not Just Strategy* ⟷ **Scope**, *Not Just Scale* ⟷ **Platforms & Services,** *Not Just Products*

Capabilities, *Not Just Strategy* ⟷ **Flexibility**, *Not Just Efficiency* ⟷ **Platforms & Services,** *Not Just Products*