The Future of Informatics: 
Products, Services & Platforms

Based on Staying Power: Six Enduring Principles for Managing 

Michael A. Cusumano
MIT Sloan School of Management & Engineering Systems Division

University of Zurich, Switzerland
Dept. of Informatics 40th Anniversary Symposium
September 24, 2010

© 2010 cusumano@mit.edu
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)?

<table>
<thead>
<tr>
<th>GOOD: E.g., Mix of Capabilities &amp; Flexibility</th>
<th>LUCKY: E.g., Right place, Right time</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Yes" alt="Yes" /></td>
<td><img src="Yes" alt="Yes" /></td>
</tr>
<tr>
<td>Microsoft, Apple, Intel, Google, Toyota, Cisco, Sony, JVC, et al.</td>
<td><img src="No" alt="No" /></td>
</tr>
<tr>
<td><img src="No" alt="No" /></td>
<td><img src="No" alt="No" /></td>
</tr>
<tr>
<td><img src="Yes" alt="Yes" /></td>
<td><img src="No" alt="No" /></td>
</tr>
</tbody>
</table>

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

- **LUCKY:**
  - E.g., Right place, Right time
My Six “Enduring” Principles

Not original to me, but underlie my work & others, with ca. 30 years of empirical & theoretical research behind them

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
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

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

Forum for Multi-Sided Markets (Industry Platform + Many Types of Complementors; Winner-take-all dynamics)
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

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 “industry-level platform” 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?
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
  - Product-mainly strategy
- Mainly Outside
  - Current iPhone, iPad?
  - Intel microprocessor?
  - iMode?
  - iTunes, AppStore?

**Lever 2: Platform/Interface Technology**
- Mainly Closed
  - Betamax, Macintosh
  - First iPod & iPhone??
- Mainly Open
  - Cisco router + IOS?
  - Red Hat (Linux)?
Apple: 
Before = Product Over Platform
Since 2003 = Product + Platform!

- Apple through 2009 still $\frac{1}{2}$ the sales and $\frac{1}{4}$ 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
<table>
<thead>
<tr>
<th>Year</th>
<th>Microsoft Revenues</th>
<th>Operating Profits (%)</th>
<th>Year-End Market Value</th>
<th>Apple Revenues</th>
<th>Operating Profits (%)</th>
<th>Year-End Market Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$58,437</td>
<td>34.8%</td>
<td>$246,630</td>
<td>$36,537</td>
<td>21.0%</td>
<td>$180,150</td>
</tr>
<tr>
<td>2008</td>
<td>60,420</td>
<td>37.2</td>
<td>149,769</td>
<td>32,479</td>
<td>19.3</td>
<td>118,441</td>
</tr>
<tr>
<td>2007</td>
<td>51,122</td>
<td>36.2</td>
<td>287,617</td>
<td>24,006</td>
<td>18.4</td>
<td>74,499</td>
</tr>
<tr>
<td>2006</td>
<td>44,282</td>
<td>37.2</td>
<td>251,464</td>
<td>19,315</td>
<td>12.7</td>
<td>45,717</td>
</tr>
<tr>
<td>2005</td>
<td>39,788</td>
<td>36.6</td>
<td>233,927</td>
<td>13,931</td>
<td>11.8</td>
<td>29,435</td>
</tr>
<tr>
<td>2004</td>
<td>36,835</td>
<td>24.5</td>
<td>256,094</td>
<td>8,279</td>
<td>3.9</td>
<td>8,336</td>
</tr>
<tr>
<td>2003</td>
<td>32,187</td>
<td>29.7</td>
<td>252,132</td>
<td>6,207</td>
<td>(loss)</td>
<td>4,480</td>
</tr>
<tr>
<td>2002</td>
<td>28,365</td>
<td>29.2</td>
<td>215,553</td>
<td>5,742</td>
<td>0.3</td>
<td>4,926</td>
</tr>
<tr>
<td>2001</td>
<td>25,296</td>
<td>46.3</td>
<td>258,033</td>
<td>5,363</td>
<td>(loss)</td>
<td>7,924</td>
</tr>
<tr>
<td>2000</td>
<td>22,956</td>
<td>47.9</td>
<td>302,326</td>
<td>7,983</td>
<td>6.5</td>
<td>5,384</td>
</tr>
<tr>
<td>1995</td>
<td>5,937</td>
<td>35.3</td>
<td>34,330</td>
<td>11,062</td>
<td>6.2</td>
<td>4,481</td>
</tr>
</tbody>
</table>
“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)

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

1. **Strong network effects?** – 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. **Little differentiation?** – Yes. Initial difference in recording time, but soon eliminated. Same prerecorded tapes available. Quality better with Betamax but not better enough.

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

Will There Be One Winner in the Global Smart-Phone Market?

1. **Strong network effects?** – 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. **Little differentiation?** – 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. **High cost of multihoming?** – Yes. Phones often subsidized, but service contracts expensive. Most users chose one vendor. But users can and do switch over time.
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

Theories of Service Innovation (in contrast to “Products”)
Barras (1986), Thomke (2003), Mansharamani (2007 – lit. review), others

Services Over the Product Lifecycle (“Servitization” & Value)

Common Case (or Extreme?): Computers & Software Industry
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
Business or Life Cycle Models?

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 N.Y. Times, 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?

Focus of Attention and Sales

Product Innovation

Process Innovation

Service Innovation

Time

Source: Adapted from Utterback and Abernathy
Different S-Curve Dynamics –
Product Platform Disruptions Generate New
Services & New Business Models?

Source: Adapted from Foster, Christensen, Utterback
New Business Model Dimensions

Revenue Model

- Free (revenues from services)
- Free but not free (bundled)
- Transaction-based
- Advertising-based
- Subscription/Software as a service
- Up-front license fee

Delivery Model

- Local Client Installation
- Local Server Installation
- Remote proprietary (e.g., hosted SAP)
- Remote Web-based
- Bundled as part of a hardware product

Customers

- Mainstream consumers
- Early-adopter consumers
- Small businesses
- Mainstream enterprise customers
- Early-adopter enterprise customers

Source: 2006 MIT student team Krishna Boppana, Andreas Göldi, Bettina Hein, Paul Hsu, Tim Jones (Cusumano, The Software Business, 15.358)
Strategy Questions

**Rise in services and new business models temporary or permanent?**

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

- **Permanent Argument:** 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.
Public Software Product Firms Listed on US Stock Exchanges (SIC 7372)
Note: Maintenance about 55% of services revenues for firms breaking this out

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

![Graph showing the impact of services on profits and market value.](image)

- **Products**: 20% of Total Revenues
- **Hybrid Solutions**: 60% of Total Revenues
- **Services**: 90% of Total Revenues

*Scale, Scope, Learning?*

*Stuck in the Middle?*

*Sweet Spot?*
## Taxonomy of Services from the Product Firm

<table>
<thead>
<tr>
<th>Complementary</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance</td>
<td></td>
</tr>
<tr>
<td>• Financing</td>
<td>• Before product release (e.g., Zapmail)</td>
</tr>
<tr>
<td>• Warranty/Insurance</td>
<td>• After product release (e.g., software application hosting, automobile leasing, SaaS)</td>
</tr>
<tr>
<td>• Implementation</td>
<td></td>
</tr>
<tr>
<td>• Maintenance/Repair</td>
<td></td>
</tr>
<tr>
<td>• Technical support</td>
<td></td>
</tr>
<tr>
<td>• Training in basic uses</td>
<td></td>
</tr>
<tr>
<td>• Customization that makes existing product features easier to use</td>
<td></td>
</tr>
<tr>
<td>Extend</td>
<td></td>
</tr>
<tr>
<td>• Customization that creates new features specific to a customer</td>
<td></td>
</tr>
<tr>
<td>• Training or consulting that introduces new uses</td>
<td></td>
</tr>
<tr>
<td>• Integrating the core product with new products</td>
<td></td>
</tr>
</tbody>
</table>
What about Cloud Computing?
(SaaS Infrastructure Services as a Platform)

1. **Strong network effects?** – *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. **Little differentiation?** – *No?* Some infrastructure platforms and ecosystems seem quite different (e.g. Google Maps, or Microsoft Azure Product services). Pricing also different.

3. **High cost of multihoming?** – *Yes, and No?* Application developers may find it cumbersome to port some of their apps across different cloud platforms. Different regulations. 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 (warranty, 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 **Product** Level

- **Strategy**
  - Push
  - Scale
  - Efficiency

- **Examples:**
  - Sony in Betamax era
  - IBM before Open Source
  - Apple before mid-2000s

Broader Way of Thinking About Agility and Competitive Advantage at the **Ecosystem** Level

- **Capabilities, Not Just Strategy**
  - **Pull, Don’t Just Push**
  - **Scope, Not Just Scale**
  - **Flexibility, Not Just Efficiency**

- **Platforms & Services, Not Just Products**

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