Special Topics: Strategic Management of IT Innovation

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Issues to be covered

• IT Innovation : Why it is special?
  – Speed: Moore’s Law
  – Division of innovative labor : GPT (general purpose technology)

• Innovator’s dilemma

• Platform Strategy

• Recent internet business (IoT/Big Data/AI)
Characteristics of IT Innovation

“If GM had kept up with the technology like the computer industry has, we would all be driving $25.00 cars that got 1,000 miles to the gallon”

(by Bill Gates, Founder of Microsoft)
# Is it true? (Case of Sony PC)

<table>
<thead>
<tr>
<th></th>
<th>Sony VAIO 2000</th>
<th>Sony VAIO 2011</th>
<th>Ratio 2011/2000</th>
<th>% growth per year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Pentium Ⅲ</td>
<td>Core i7-2860QM</td>
<td>3.31</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td>755MHz</td>
<td>2.5GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Memory</strong></td>
<td>128MB</td>
<td>8G</td>
<td>62.50</td>
<td>45.6%</td>
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<tr>
<td><strong>Graphics Memory</strong></td>
<td>16MB</td>
<td>350MB</td>
<td>21.88</td>
<td>32.4%</td>
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<tr>
<td><strong>HD</strong></td>
<td>30GB</td>
<td>2T</td>
<td>66.67</td>
<td>46.5%</td>
</tr>
<tr>
<td><strong>CD/DVD</strong></td>
<td>CD-RW</td>
<td>Blue Ray</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>300,000</td>
<td>150,000</td>
<td>0.5</td>
<td>-6.1%</td>
</tr>
</tbody>
</table>
Moore’s Law
Gordon Moore, Electronics, 39(9), 1965

![Graph showing the logarithm of the number of components per integrated circuit vs. year from 1959 to 1975.]
Moore’s Law until 2015

2015: 50 years of an exponential

(Data: https://en.wikipedia.org/wiki/Transistor_count)

(From ARM material)
Destructive Innovation

*Innovator’s Dilemma* by Clayton Christensen

Technological progress >> Customer’s requirement
Prof. Christensen found that

Dominant players in hard-disc industry

- 14 inches: Memorex (spinout of IBM)
- 8 inches: Shugart Associates (again, spinout of IBM), Micropolis
- 5 inches: Seagate, Miniscribe
- 3.5 inches: Conner Peripherals (spinout of Seagate)

*Innovator’s Dilemma* by Clayton Christensen
Competition phase of hard-disc industry

First Phase
Competition by Storage Size

Second Phase
Competition by Disc Size

Third Phase
Competition by Reliability

Fourth Phase
Competition by Price

*Innovator’s Dilemma* by Clayton Christensen
Technological Structure of PC

Cusumano and Gawer, Platform Leadership
Google vs Apple as a platform leader

Customer

Android

iphone

iOS

Smart Phone

App developers
Two kinds of Platform

- **Business Innovator**
  - Market (Customer)
  - Product/Service
  - Parts/Material
  - Examples: Apple iPhone and APP developer

- **Technology Platformer**
  - Market (Customer)
  - Examples: Intel and PC firms (à la Platform Leadership)
Technology Management Strategy in Science Economy Era (in Day 1)

Dynamic and Uncertain market (customer needs)

- **Business Innovator** (B2C Key Stone)
  - Customer Value Proposition (Product Function -> Customer Value by product usage)
  - New Biz Model (solution)

- **Technology Platformer** (B2B Key Stone)
  - Tech Driven → Biz Driven (Lead customer’s strategy driven)
  - In-house tech → Technology Platform by integrating external tech
Concept of Business Eco-system

- Complementary Relationship between “Key Stone” and “Niche”
- Dynamics and diversity of whole system
  - Key Stone: Activities to support whole system (Platform function)
  - Niche Player: Activities to maintain dynamics and diversity of whole system (by providing core managerial resources)

Examples:
Microsoft and service developers
Walmart and its suppliers
TSMC and NVIDIA

『Key Stone Strategy』（Iansiti and Levien）、HBS2004
Platform Biz and Eco-system

Customers

Key Stone

Niche Players

Interactions with players (mainly B2B)

Customer

Platform Users

Platform leader

Huge scalability (mainly B2C)
What is IoT (Internet of Things)?
(Internet use for B2B business)

http://www.skyworksinc.com/products_IoT.aspx
## Rise of Superstars: Who?

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Nationality</th>
<th>Industry</th>
<th>Rank +/-</th>
<th>31 March 2016</th>
<th>Rank</th>
<th>Market Cap ($bn)</th>
<th>31 March 2009</th>
<th>Rank</th>
<th>Market Cap ($bn)</th>
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<tbody>
<tr>
<td>Apple Inc</td>
<td>United States</td>
<td>Technology</td>
<td>32</td>
<td>1</td>
<td>604</td>
<td>33</td>
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<tr>
<td>Alphabet Inc</td>
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<td>2</td>
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<td>22</td>
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<td></td>
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<td>Microsoft Corp</td>
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<td>Berkshire Hathaway Inc</td>
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<td>Financials</td>
<td>8</td>
<td>4</td>
<td>350</td>
<td>12</td>
<td>134</td>
<td></td>
<td></td>
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<td>Exxon Mobil</td>
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<td>Oil &amp; Gas</td>
<td>-4</td>
<td>5</td>
<td>347</td>
<td>1</td>
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<tr>
<td>Facebook Inc</td>
<td>United States</td>
<td>Technology</td>
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<td>6</td>
<td>345</td>
<td>8</td>
<td>145</td>
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<tr>
<td>Johnson &amp; Johnson</td>
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<td>Health Care</td>
<td>1</td>
<td>7</td>
<td>298</td>
<td>8</td>
<td>145</td>
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<tr>
<td>General Electric Co</td>
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<td>Industrials</td>
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<td>8</td>
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<td>Amazon.com</td>
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<td>-</td>
<td>31</td>
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<td>Wells Fargo &amp; Co</td>
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<td>10</td>
<td>245</td>
<td>55</td>
<td>60</td>
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<tr>
<td>AT&amp;T Inc</td>
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<td>Telecommunications</td>
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<td>11</td>
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<td>7</td>
<td>149</td>
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<tr>
<td>Nestle SA</td>
<td>Switzerland</td>
<td>Consumer Goods</td>
<td>3</td>
<td>12</td>
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<td>15</td>
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<tr>
<td>China Mobile Ltd</td>
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<td>-8</td>
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<td>China</td>
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<td>228</td>
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<tr>
<td>Procter &amp; Gamble Co</td>
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<td>Consumer Goods</td>
<td>5</td>
<td>15</td>
<td>233</td>
<td>10</td>
<td>138</td>
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<td></td>
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<tr>
<td>Verizon Communications Inc</td>
<td>United States</td>
<td>Telecommunications</td>
<td>23</td>
<td>16</td>
<td>221</td>
<td>99</td>
<td>86</td>
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<tr>
<td>JPMorgan Chase &amp; Co</td>
<td>United States</td>
<td>Financials</td>
<td>11</td>
<td>17</td>
<td>217</td>
<td>28</td>
<td>100</td>
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<tr>
<td>Wal-Mart Stores Inc</td>
<td>United States</td>
<td>Consumer Services</td>
<td>-15</td>
<td>18</td>
<td>215</td>
<td>3</td>
<td>204</td>
<td></td>
<td></td>
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<tr>
<td>Roche Holding AG</td>
<td>Switzerland</td>
<td>Health Care</td>
<td>-1</td>
<td>19</td>
<td>214</td>
<td>18</td>
<td>119</td>
<td></td>
<td></td>
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<tr>
<td>Petrochina</td>
<td>China</td>
<td>Oil &amp; Gas</td>
<td>-18</td>
<td>20</td>
<td>205</td>
<td>2</td>
<td>287</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Internet Economics

• Network externality
  – Utility for user increases as the number of user increase

• Use of public infrastructure
  – “Internet” and “smart phone” as a huge common infrastructure
  – Crowd computing (IAAS, PAAS, SAAS)
  – Marginal Cost=0, long-tail business

Platform competition, and winner take all!!
## Creating Venture Eco-system
(list of unicorn firm)

<table>
<thead>
<tr>
<th>Company</th>
<th>Valuation ($B)</th>
<th>Country</th>
<th>Industry</th>
<th>Select Investors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uber</td>
<td>$68</td>
<td>United States</td>
<td>On-Demand</td>
<td>Lowercase Capital, Benchmark Capital, Google Ventures</td>
</tr>
<tr>
<td>Didi Chuxing</td>
<td>$56</td>
<td>China</td>
<td>On-Demand</td>
<td>Matrix Partners, Tiger Global Management, Softbank Corp.,</td>
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<tr>
<td>Xiaomi</td>
<td>$46</td>
<td>China</td>
<td>Hardware</td>
<td>Digital Sky Technologies, QiMing Venture Partners, Qualcomm Ventures</td>
</tr>
<tr>
<td>Meituan Dianping</td>
<td>$30</td>
<td>China</td>
<td>eCommerce/Marketplace</td>
<td>DST Global, Trustbridge Partners, Capital Today</td>
</tr>
<tr>
<td>Airbnb</td>
<td>$29.30</td>
<td>United States</td>
<td>eCommerce/Marketplace</td>
<td>General Catalyst Partners, Andreessen Horowitz, ENIAC Ventures</td>
</tr>
<tr>
<td>SpaceX</td>
<td>$21.50</td>
<td>United States</td>
<td>Other Transportation</td>
<td>Founders Fund, Draper Fisher Jurvetson, Rothenberg Ventures</td>
</tr>
<tr>
<td>Palantir Technologies</td>
<td>$20</td>
<td>United States</td>
<td>Big Data</td>
<td>RRE Ventures, Founders Fund, In-Q-Tel</td>
</tr>
<tr>
<td>WeWork</td>
<td>$20</td>
<td>United States</td>
<td>Facilities</td>
<td>T. Rowe Price, Benchmark Capital, SoftBank Group</td>
</tr>
<tr>
<td>Toutiao (Bytedance)</td>
<td>$20</td>
<td>China</td>
<td>Digital Media/ AI</td>
<td>Sequoia Capital China, SIG Asia Investments, Sina Weibo</td>
</tr>
<tr>
<td>Lu.com</td>
<td>$18.50</td>
<td>China</td>
<td>Fintech</td>
<td>Ping An Insurance CDH Investments, Bank of China</td>
</tr>
</tbody>
</table>
Summary

• IT Innovation : Speed (Moore’s Law)
  – Leads to Innovator’s Dilemma (disruptive innovation)

• Division of Innovative Labor
  – Platform Leadership (leadership by facilitating “speed”)
  – Platform by function (based on internet infrastructure)

• IoT and Innovation Ecosystem strategy: “Key Stone” vs “Niche Players”

• Scalability, huge valuation, venture eco-system by unicorn firms.