Organizing for innovation: When is virtual virtuous?

Henry W. Chesbrough & David J. Teece
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Graduate Institute of Business Administration
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2016/5/11
Outline

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• Introduction
  • The Authors
  • Types of organization
• Method
  • Case study - IBM PC
• Results
  • The Virtuous virtual
  • The Right design
  • Examples
  • The Scale and Scope
• Conclusions
• Discussion
Background Supplementary Information

Where the Jobs Are Going

U.S.-based multinational companies added jobs overseas during the 2000s and cut them at home. Cumulative change since 1999

Source: The Wall Street Journal

1999

Jobs outside U.S.

Jobs in U.S.
During the past year, in response to the economic downturn, the company has....

- Terminated one or more outsourcing arrangements: 9
- Significantly restructured one or more outsourcing agreements: 34
- Increased the use of outsourcing: 57%

Source: 2009 Strategic Outsourcing Conference
Outsourcing is a lot **CHEAPER**
But is it Perfect?
What is the hidden issues?

Industry: IT

<table>
<thead>
<tr>
<th>Jobs in U.S.</th>
<th>Outside the U.S.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle 2008</td>
<td>Oracle 2019</td>
<td></td>
</tr>
<tr>
<td>22,008</td>
<td>39,000</td>
<td>+77.2%</td>
</tr>
<tr>
<td>+20,919</td>
<td>+66,000</td>
<td>+215.5%</td>
</tr>
</tbody>
</table>

Industry: Conglomerate

158,000 152,000 133,000 154,000

Industry: Heavy equipment

<table>
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<tr>
<th>Jobs in U.S.</th>
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<tbody>
<tr>
<td>Caterpillar 2008</td>
<td>Caterpillar 2019</td>
<td></td>
</tr>
<tr>
<td>38,664</td>
<td>47,319</td>
<td>+22.4%</td>
</tr>
<tr>
<td>33,340</td>
<td>57,171</td>
<td>+71.5%</td>
</tr>
</tbody>
</table>
Henry W. Chesbrough

- Born on 1956 (age 60)
- Professor of Berkeley Haas
- BA, Economics, Yale University
- MBA, Stanford University
- PhD, Haas School of Business, UC Berkeley
- Open Innovation, Business Model Innovation, Service Innovation

David J. Teece

- Born on 1948 (age 67)
- Professor of Berkeley Haas
- BA, MComm, University of Canterbury
- MA, University of Pennsylvania
- PhD, Economics, University of Pennsylvania
- Core competence, Dynamic capabilities, Strategic Management, Technology Transfer
## Types of organization

<table>
<thead>
<tr>
<th>Authority</th>
<th>Vertical Integration</th>
<th>Virtual Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>Enterprise authority domain</td>
<td>Diffused authority domain</td>
</tr>
<tr>
<td>Process</td>
<td>Do it all</td>
<td>Outsource part of Process</td>
</tr>
<tr>
<td>Advantages</td>
<td>• Complete &amp; total Control</td>
<td>• Flexibility / Incentives</td>
</tr>
<tr>
<td></td>
<td>• Have own know-how</td>
<td>• Responsiveness</td>
</tr>
<tr>
<td></td>
<td>• Internal Job Creation</td>
<td>• Cost savings</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>• Higher investment</td>
<td>• Less of control</td>
</tr>
<tr>
<td></td>
<td>• Bureaucracy</td>
<td>• Less of own know-how</td>
</tr>
<tr>
<td></td>
<td>• Inflexibility</td>
<td></td>
</tr>
<tr>
<td>Example</td>
<td>GM fallen from drum brakes to disc brakes</td>
<td>IBM PC</td>
</tr>
</tbody>
</table>

**Is Virtual PERFECT?**

Source: CHAINLINK Research

**Introduction**
Case Study - IBM PC

- In 1981, IBM PC: Intel microprocessor + Windows OS
- Virtual: Outsource + Open architecture + Retail distribution → Rapid growth (Market share: 26% in 1984; 41% in 1985)
- In 1995, IBM(7.3%) < Compaq(10.5%) WHY?
  - Outsource → NO core competency.
  - Open architecture → NO barrier for competitors.
- Either success or failure boils down to the Virtual Enterprise.

Source: http://www.asymco.com/2014/07/15/catharsis/
Q: How to find the degree of centralization? To be virtual or not?

A: It depends on the types of innovation.

As incentives to take risks decrease...

...the ability to settle conflicts and coordinate activities increases.
### Types of Innovation

<table>
<thead>
<tr>
<th>Definition</th>
<th>Autonomous</th>
<th>Systemic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>independently from other innovations. (Component innovation)</td>
<td>In conjunction with related, complementary innovations. (Architectural Innovation)</td>
</tr>
<tr>
<td><strong>Knowledge Management systems</strong></td>
<td>Codified information (Explicit knowledge) (Know what)</td>
<td>Tacit knowledge (Know why)</td>
</tr>
<tr>
<td><strong>Appropriate Organization</strong></td>
<td>Virtual Enterprise</td>
<td>Vertical Integration</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>• New turbocharger to increase horsepower. • Drum / Disc brakes</td>
<td>Polaroid: new film and new camera technology</td>
</tr>
</tbody>
</table>
The Virtuous virtual

Type of innovation

Autonomous

Go Virtual

Radio Frequency: TriQuint
Audio Chip: Cirrus logic
Gorilla glass: Corning

Systemic

Ally with caution

A7 Chip: TSMC / Samsung
Assembly: Foxconn/Pegatron

Capabilities

Must be created

Exist Outside

Ally or bring in-house

Apps (First-party or Third-party)
Local programmer
Language pack

Bring in-house

Software (iOS & first-part apps)
Design & Development Plan
The Right organizational design

MIX Approaches + Right Balance

Systemic innovation (Core-functions)
Internally (in-house)

Autonomous innovation (non-core functions)
Alliances (Outsource)
Example(1): SUN vs. MIPS

<table>
<thead>
<tr>
<th>Organization</th>
<th>Sun</th>
<th>MIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>1985</td>
<td>1991</td>
</tr>
<tr>
<td>Product</td>
<td>SPARC (Scalable Processor Architecture)</td>
<td>ACE (Advanced Computing Environment)</td>
</tr>
</tbody>
</table>
| Features         | • Strong internal capabilities, but also working with alliance partners.  
                  | • Have design, manufacturing, marketing, sales, service and support, etc.  
                  | • Virtual player. Only had good design.  
                  | • Too relay on partners |

**Winner:** Sun
Question

Outsourcing Conventional battery (Ni-Cd)  
Or  
In-house Fuel cells & Solid-state battery ?

Consideration

1) The **ability** to influence the direction of the technologies.  
2) Bring them to market at a competitively desirable **time**.  
3) **Systemic** technologies or not?
The Scale and Scope

- **Research Background**: The second industrial revolution caused by the great change of the industry. Industrial production in the US. from 1870 accounted for 23% of the world, to become the 36% in 1913, surpassing UK.

- **Research Questions**: How to control and maintain the business expansion of the enterprise? In the face of the huge production facilities, the national marketing and distribution system, increasing the number of managers, how to decentralization of power?

- **Method and Data**: Study on the dynamic development of the 200 largest industrial enterprises in the US., UK, and Germany from 1870 to 1990 through comparative historical method.

- **Result**:  
  - The advantages of competitive managerial capitalism are proposed, which play a central role in the development of their organizational capacity.  
  - "Bureaucracy" system balance of centralization and decentralization, with the product or region as the main decentralization framework, make management a more macro perspective to lead the company.
The Conclusions

• Decentralization with **strategic leverage** and coordination. (MIX Approaches and Right Balance)

• Understanding **Capabilities** and **Type of innovation**.

• Distinguish between **Systemic and Autonomous** innovations.

• Major internal investments (not relied on others)

• Vertical Integration (Tacit knowledge) **can establish standards** (dominant design paradigm).

• Virtual Enterprise (Explicit knowledge) **can not establish standards**.
Discussion (my point of view)

• In addition to Vertical and virtual, what is the other type of organization?

E.g. What is the relationship between Foxconn and other suppliers?

◦ Vertical? NO (because Foxconn did not do it all.)
◦ Virtual? NO (because Foxconn does not have the full authority to other suppliers.)

Federated organization
### Discussion

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<th>Vertical</th>
<th>Virtual</th>
<th>Federated</th>
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<td>Enterprise authority domain</td>
<td>Diffused authority domain</td>
<td>Orchestration/influencer</td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td>Do it all</td>
<td>Outsource</td>
<td>Architects partnership</td>
</tr>
<tr>
<td>Performance</td>
<td>Cost</td>
<td>Time to market</td>
<td>Risk management</td>
</tr>
<tr>
<td>Features</td>
<td>Bureaucracy</td>
<td>Shared execution</td>
<td>Share market place</td>
</tr>
<tr>
<td>Example</td>
<td>GM (in early stage)</td>
<td>Apple</td>
<td>Foxconn</td>
</tr>
</tbody>
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Source: CHAINLINK Research