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Technology Management & Operations Strategy

Session 3 : Controlling Operations Systems & Outsourcing

Organizing for innovation: When is virtual virtuous?

Henry W. Chesbrough & David J. Teece
Harvard Business Review
Aug. **2002**

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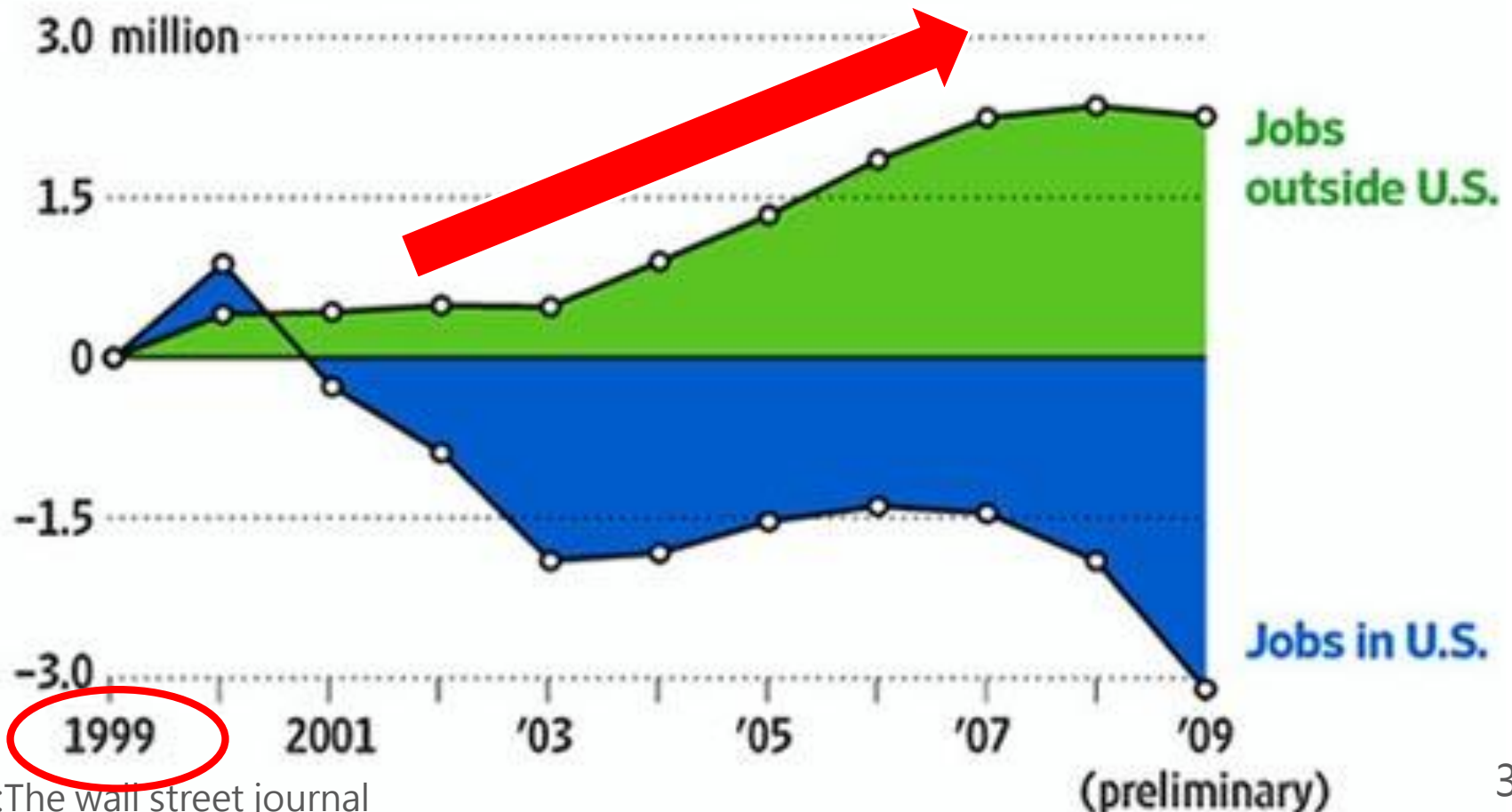
Outline

- Background Supplementary Information
- 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

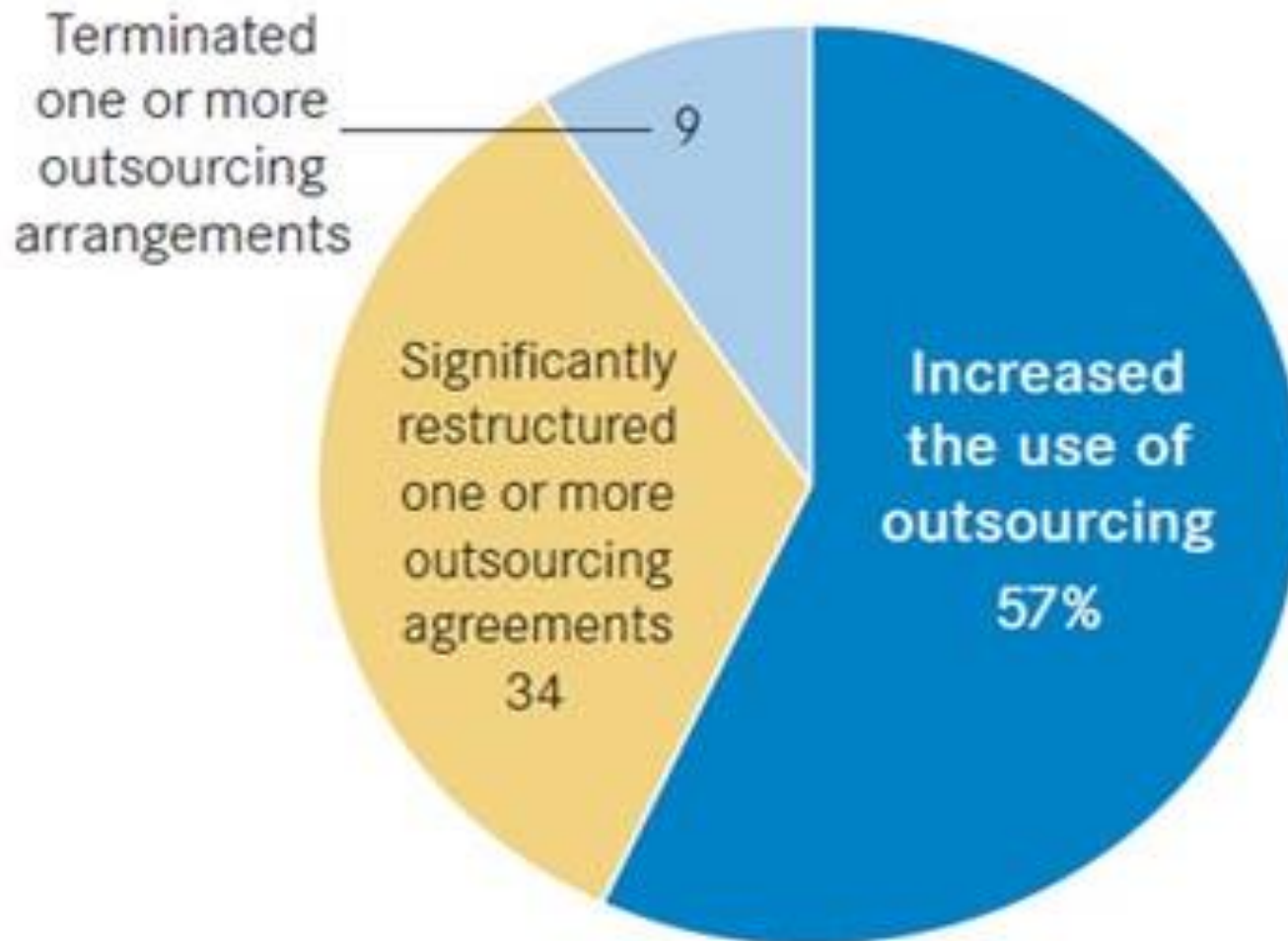
Where the Jobs Are Going

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



Background Supplementary Information

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



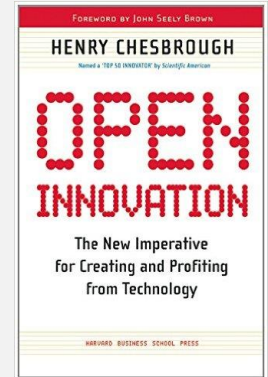


Outsourcing is a lot **CHEAPER**
 But is it Perfect?
 What is the hidden issues?



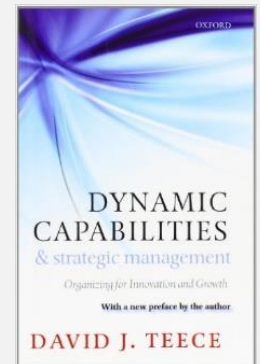
Henry W. Chesbrough

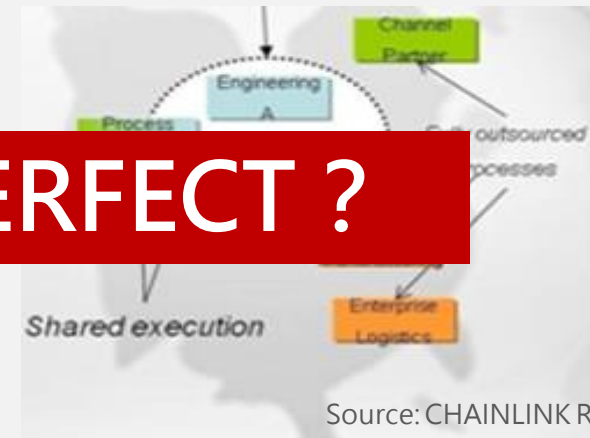
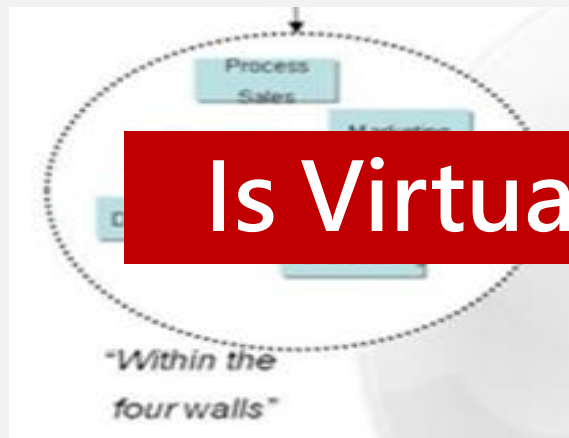
- Born on 1956 (age 60)
- Professor of Berkeley Haas
- BA, Economics, Yale University
MBA, Stanford University
PhD, Haas School of Business, UC Berkeley
- **Open Innovation**, Business Model Innovation, Service Innovation



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



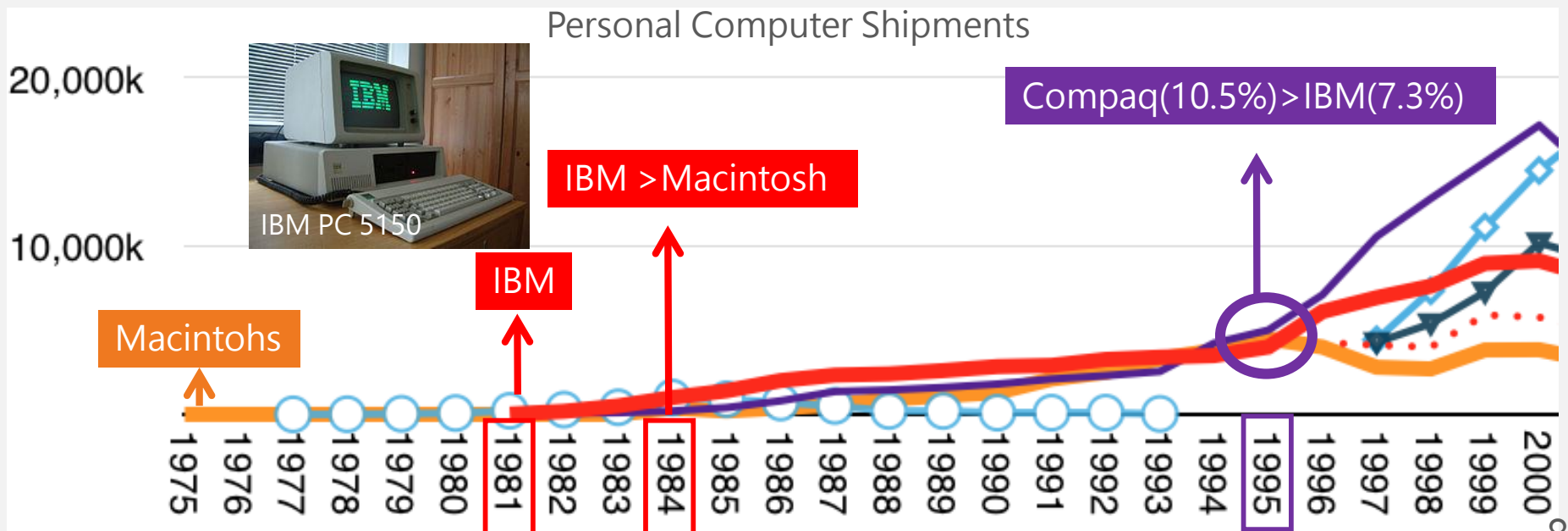


Is Virtual PERFECT ?

	Vertical Integration	Virtual Enterprise
Authority	Enterprise authority domain	Diffused authority domain
Process	Do it all	Outsource part of Process
Advantages	<ul style="list-style-type: none"> • Complete & total Control • Have own know-how • Internal Job Creation 	<ul style="list-style-type: none"> • Flexibility / Incentives • Responsiveness • Cost savings
Disadvantages	<ul style="list-style-type: none"> • Higher investment • Bureaucracy • Inflexibility 	<ul style="list-style-type: none"> • Less of control • Less of own know-how
Example	GM fallen from drum brakes to disc brakes	IBM PC

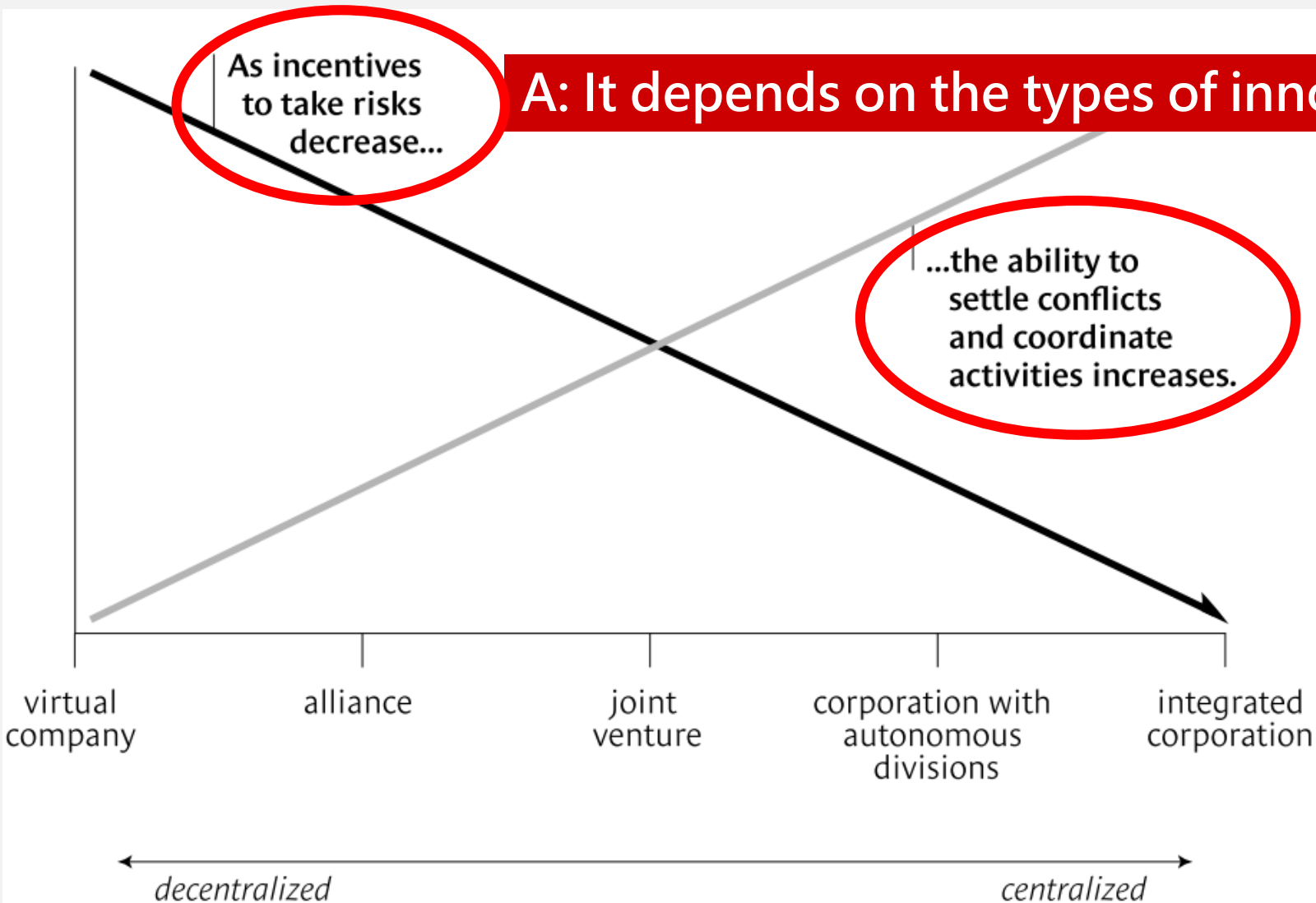
Case Study - IBM PC

- 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.**



The dilemma of organizations

Q: How to find the degree of centralization ? To be virtual or not ?



Types of Innovation



	Autonomous	Systemic
Definition	independently from other innovations. (Component innovation)	In conjunction with related, complementary innovations. (Architectural Innovation)
Knowledge Management systems	Codified information (Explicit knowledge) (Know what)	Tacit knowledge (Know why)
Appropriate Organization	Virtual Enterprise	Vertical Integration
Example	<ul style="list-style-type: none"> New turbocharger to increase horsepower. Drum / Disc brakes 	Polaroid: new film and new camera technology

The Virtuous virtual

Result

Type of innovation

Autonomous

Systemic

Go Virtual



Radio Frequency : TriQuint



Audio Chip : Cirrus logic



Gorilla glass : Corning

Ally with caution



A7 Chip : TSMC / Samsung



Assembly : Foxconn/Pegatron

Ally or bring in-house



Apps (First-party or Third-party)



Local programmer
Language pack

Bring in-house



Software (iOS & first-part apps)

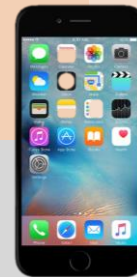


Design & Development Plan

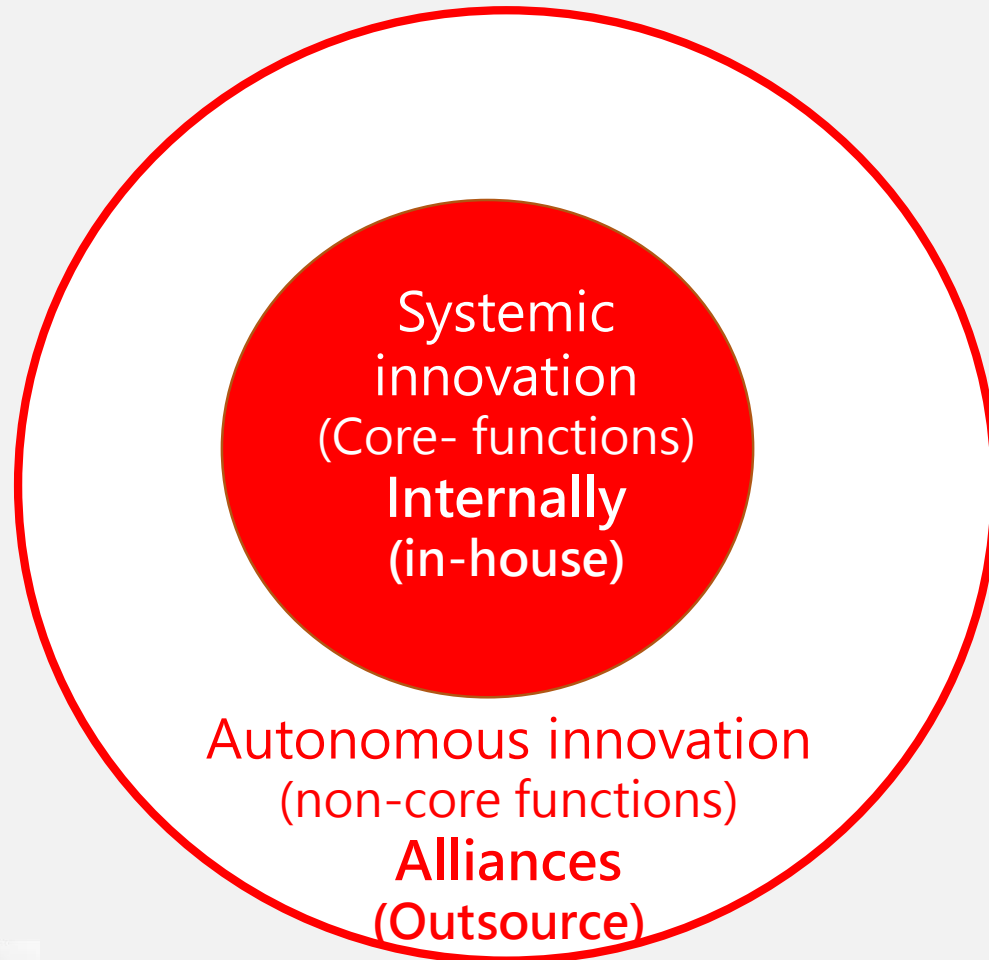
Capabilities

Exist Outside

Must be created

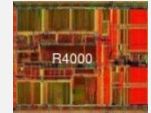


MIX Approaches + Right Balance



Example(1): SUN vs.. MIPS

Result



	Sun	MIPS
Organization	Vertical Integration	Virtual Enterprise
Year	1985	1991
Product	SPARC (Scalable Processor Architecture)	ACE (Advanced Computing Environment)
Features	<ul style="list-style-type: none">• Strong internal capabilities, but also working with alliance partners.• Have design, manufacturing, marketing, sales, service and support ,etc.	<ul style="list-style-type: none">• Virtual player. Only had good design.• Too relay on partners



Example(2): Motorola Battery

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?



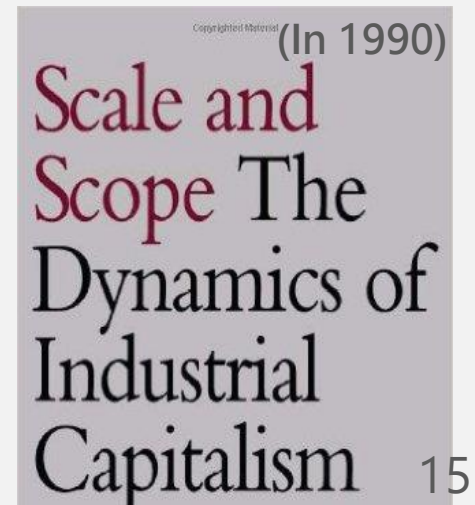
The Scale and Scope

Result

- **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.



Alfred D. Chandler, Jr.
(1918-2007)
professor of HBS



- 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?



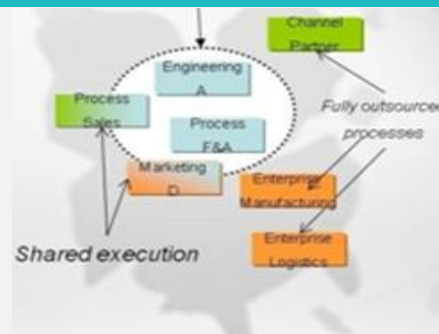
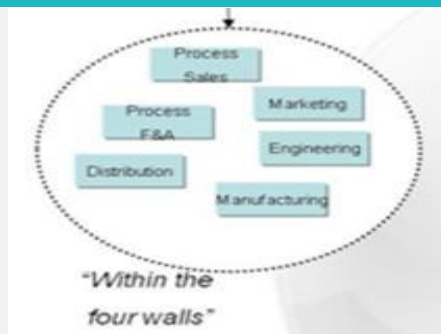
E.g. What is the relationship between Foxconn and other suppliers ?

- 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

Source: CHAINLINK Research



	Vertical	Virtual	Federated
Authority	Enterprise authority domain	Diffused authority domain	Orchestrated/influencer
Policy	Do it all	Outsource	Architects partnership
Performance	Cost	Time to market	Risk management
Features	Bureaucracy	Shared execution	Share market place
Example	GM (in early stage)	Apple	Foxconn