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Technology Management & Operations Strategy

# Customer Power, Strategic Investment, and the Failure of Leading Firms.

Clayton M. Christensen & Joseph L. Bower  
*Strategic Management Journal* 17,  
No. 3 (March 1996)

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# Outline

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- The Background
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- The Literature review

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  - Airbnb
  - Netflix
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Part 1

Part 2

# The Author - Clayton M. Christensen

## Introduction

1977

- Technologies Attraction: The Dangers of too Much Technology

1992

- Exploring the Limits of the Technology S-curve, Part 1: Component Technologies. / Part 2: Architectural  
→ There are multiple S-Curves, must be focused on switch point.

1993

- The Rigid Disk Drive Industry, 1956-90: A History of Commercial and Technological Turbulence.  
→ Observing the trend of the development of disk industry.

1994

- Technological Discontinuities, Organizational Capabilities, and Strategic Commitments.  
→ The advantage of entrants is the new value networks from economics and organization theory.

1995

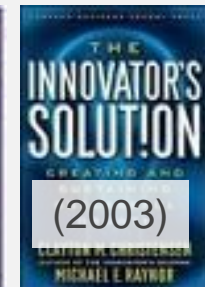
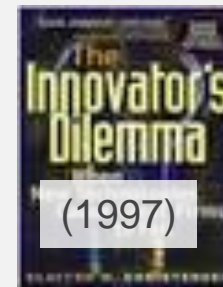
- Explaining the Attacker's Advantage: Technological Paradigms, Organizational Dynamics, and the Value Network.  
→ Value network is key to disruptive innovation.

1996

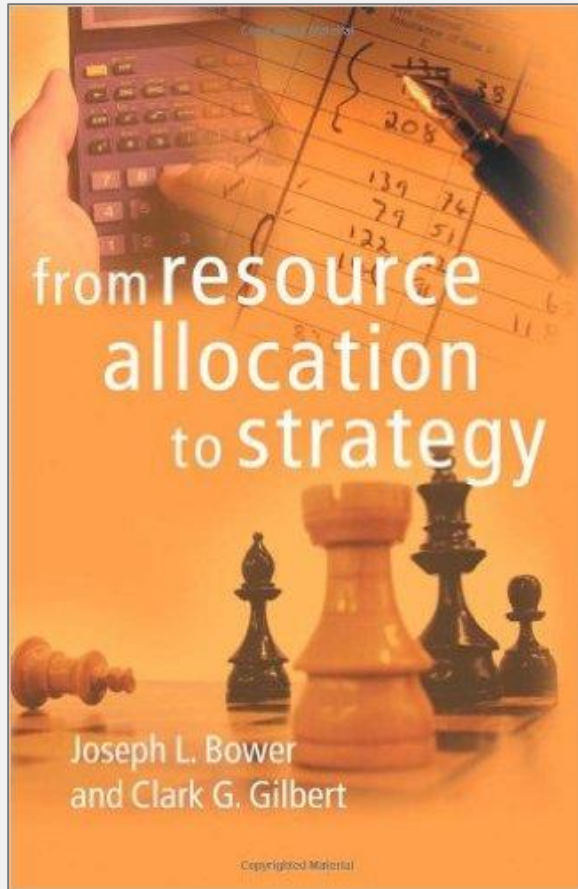
- Customer Power, Strategic Investment, and the Failure of Leading Firms  
→ This paper.



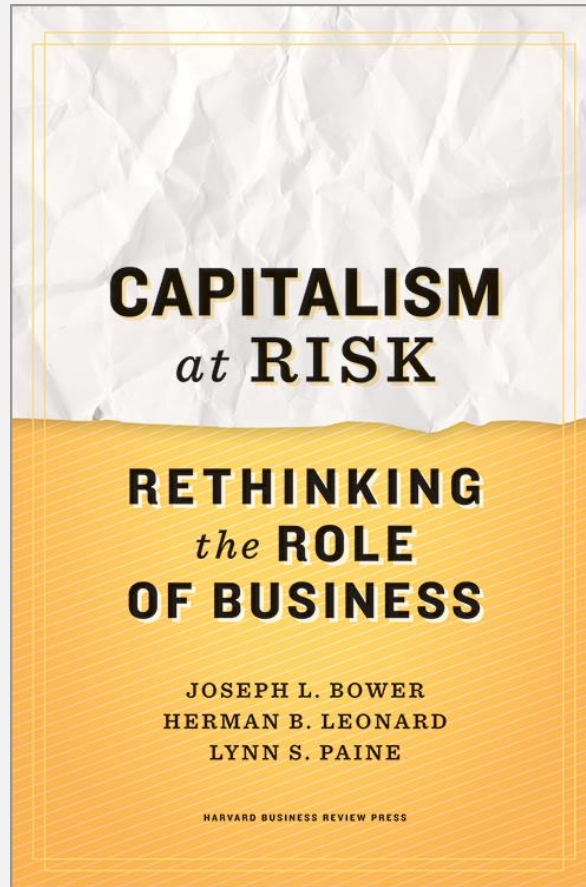
- Born on 1952 (age 63)
- Professor of HBS
- Oxford University (M.Phil.) in 1977
- Harvard University (MBA in 1979 , DBA in 1992)



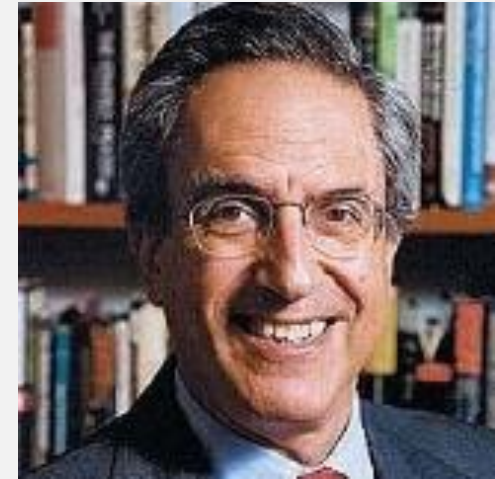
# The Author - Joseph L. Bower



Examining how strategy is made by company managers across several levels of an organization. ( 2006 )



In Capitalism at Risk, how can capitalism be sustained? The authors critic turn to government. ( 2011 )

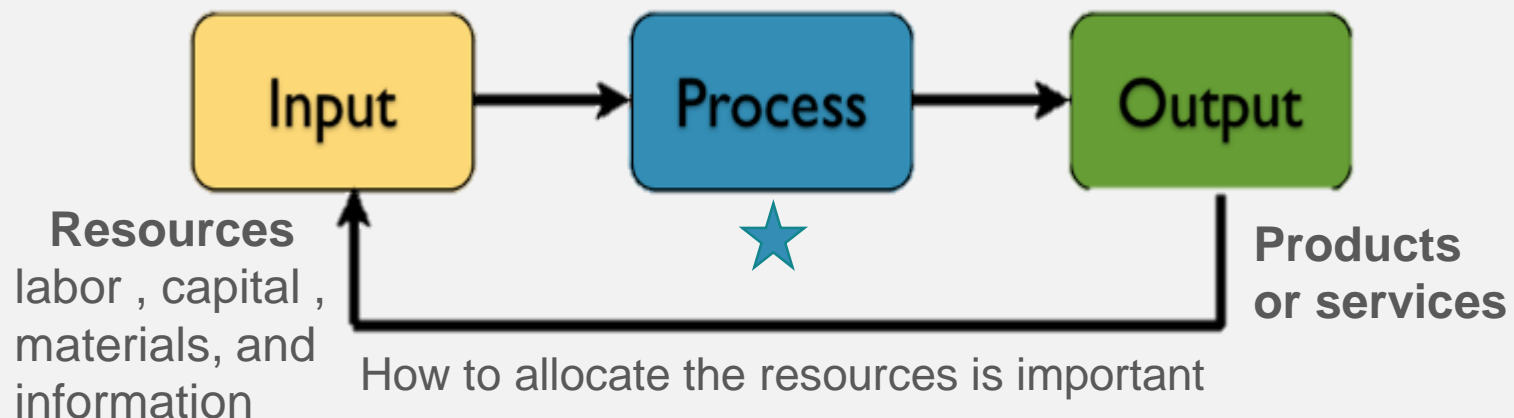


- Born on 1938 (age 77)
- Professor of HBS
- BA / MBA / DBA  
Harvard University
- An expert on corporate strategy, organization, and leadership.

- **Innovation** : a change in technology
- **Technology** : the processes by which an organization transforms resources (labor , capital , materials, and information...) into products or services.

i.e., Extend beyond the engineering and manufacturing functions of the firm, encompassing a range of business processes .

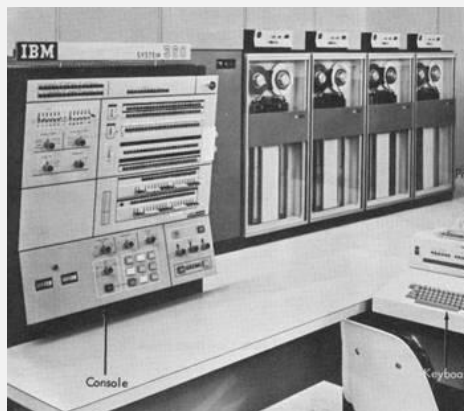
**All firms have technologies.**



# The Background

- Mainframe : IBM
- ↓
- Minicomputer : Digital Equipment , Data
- ↓
- Desktop Computer : Apple, Commodore ,Tandy, IBM(later)
- ↓
- Portable computer : Compaq, Zenith, Toshiba, Sharp

Why many leading firms failed to develop simpler technologies that initially were only useful in emerging market ?



1964 Mainframe  
IBM System/360



1965 Minicomputer  
DEC PDP-8



1984 Desktop computer  
Apple Macintosh

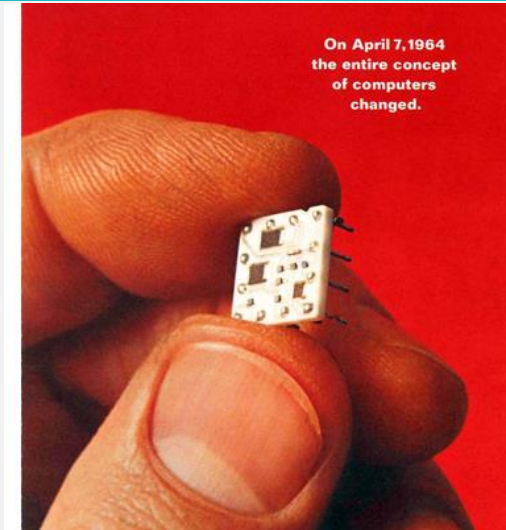


1983 Portable computer  
Compaq Portable

Because they lacked the skills ?  
No. Actually they were excellent  
in skills.

e.g.,  
IBM : multi-chip IC package/CISC  
Sun Microsystems : RISC microprocessor technology

But why they were later shaken by shifting technologies  
and markets ?



**Q:** While facing the technology revolution, why many leading firms failed?

**A:** **Wrong** + **Wrong** = Customer Power, Strategic Investment, and the Failure of Leading Firms.

Listen too carefully to the current customers. ( not the potential)

The value networks support sustaining innovations. (not the disruptive)

The leaders Failed & The entrants succeeded.

The reasons : (1)managerial myopia. (2)organizational lethargy. (3)insufficient resources or expertise.



How the resource allocation impact the innovation?

Linking two historically independent stream of research:

## 1. Resource Dependence

Improving the **conventional technologies** used by their **current customers** which provided the resources the firms needed to survive over the **short term**.  
(Cooper & Schendel,1976 ; Resource Dependence ; Foster,1986)

## 2. Resource Allocation

The middle level managers tended to support the product was assured for reducing the risks. (Bower,1970 ; Burgelman, 1983&1984)

Whether the disruptive innovation will happen, is not depend on the manager's power, but the current customers' demand .

## 1. Content Analysis

- **The disk database of product and performance**

*From* : *Disk / Trend Report* *Year*: 1975 – 1990 *Amount* : Over 1,400 products

- **The Company strategy and success or failure**

*From* : *Disk / Trend Report* and *Electronic Business* magazine *Year* : 1976 – 1990



## 2. In-depth interview

- Over 70 personal, unstructured interviews. The firms account for over 80% of the disk drives.

**Q: Why Hard disk industry?**

**A:** Rapid change in technology and market structure.

# The Results ( Part 1 )

## Sustaining vs. Disruptive innovation



### 1. Sustaining innovation

- Including the **component** and **architectural innovation**.
- Established trajectory of performance improvement.

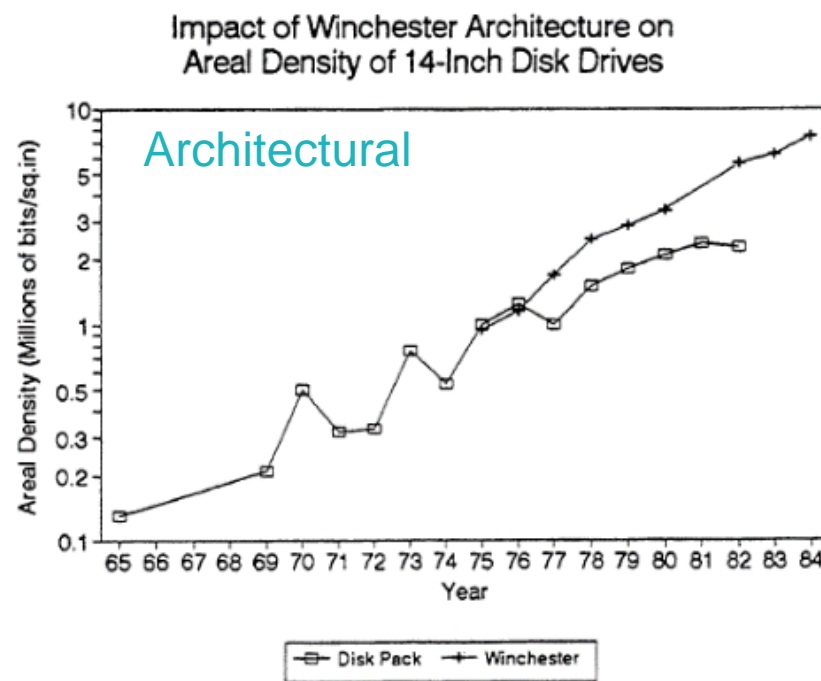
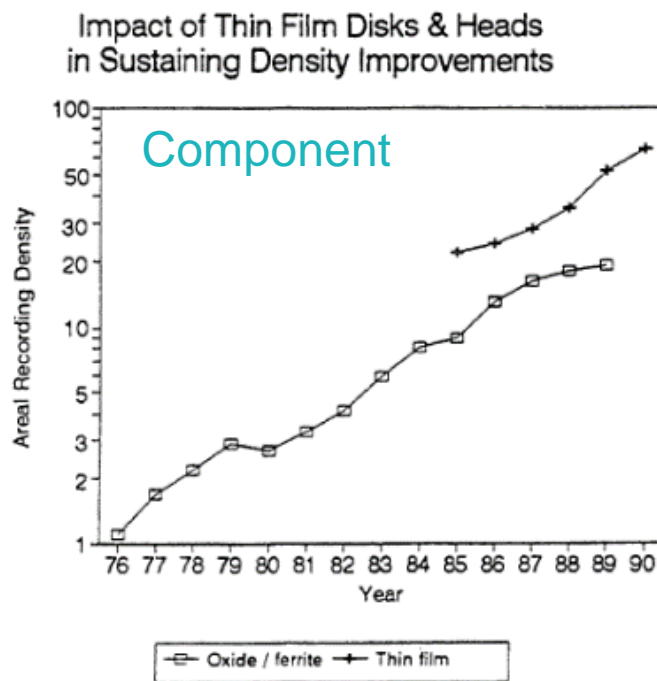


Figure 1. Examples of sustaining technological change in componentry (left) and product architecture (right). Reprinted with permission from *Business History Review*, 1993, 67, p. 557.

## 2. Disruptive innovation

Table 1. The disruptive impact on performance improvement of the 5.25-inch, vs. the 8-inch architecture

	Minicomputer	PC
Attribute	8-inch drives	5.25-inch drives
<b>Capacity (megabytes)</b>	<b>60</b> ✓	10
<i>Volume (cubic inches)</i>	566	150 ✓
<i>Weight (pounds)</i>	21	6 ✓
<b>Access time (ms)</b>	<b>30</b> ✓	160
<b>Cost per megabyte</b>	<b>\$50</b> ✓	\$200
<i>Total unit cost</i>	\$3000	\$2000 ✓

Key: Attributes valued highly in the minicomputer market in 1981 are presented in **boldface**.

Attributes valued in the emerging desktop computing market in 1981 are shown in *italics*.

Source: Analysis of Disk/Trend Report data; from Christensen (1992a: 90).

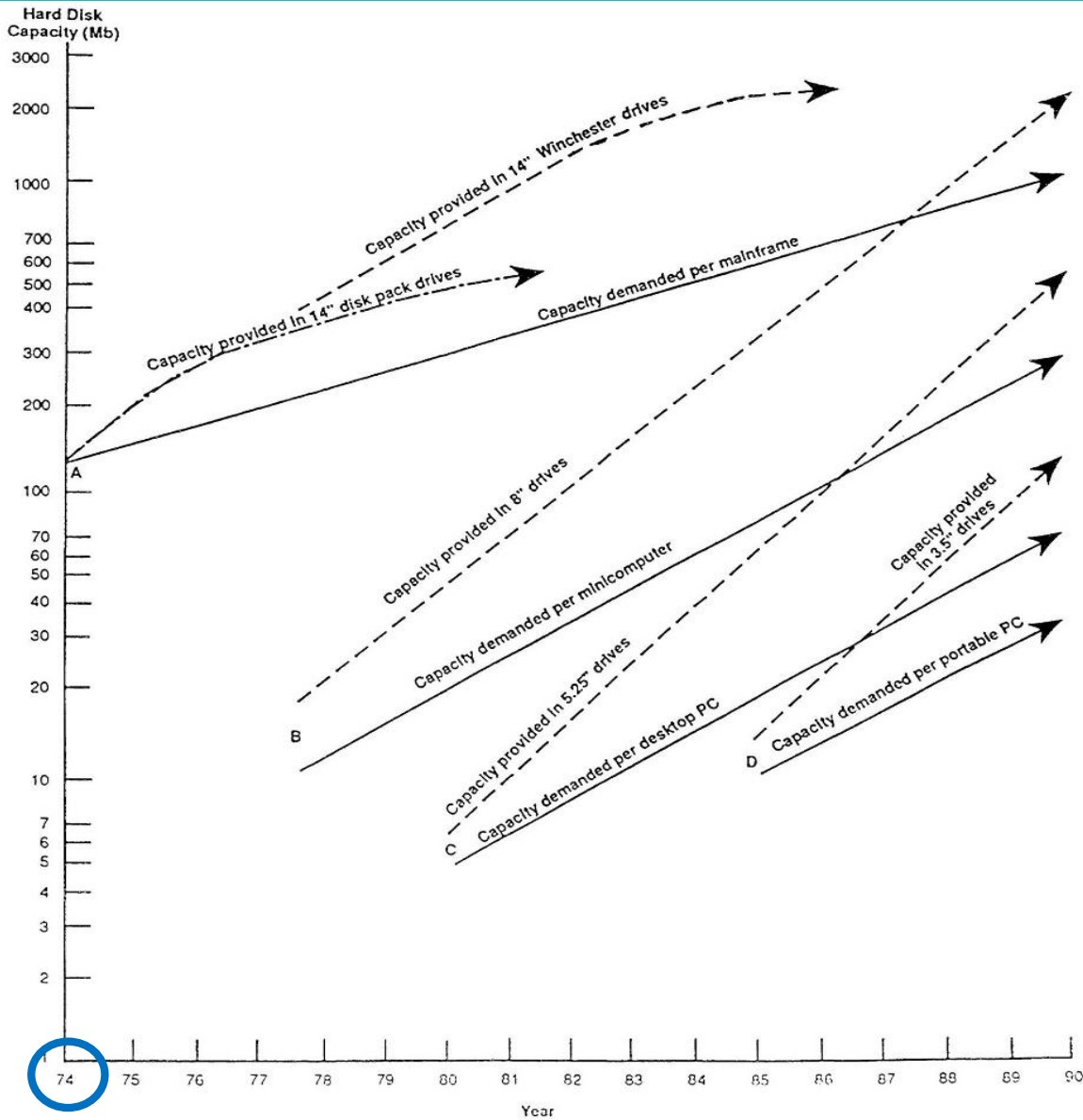
- Be valued in remote or emerging markets.
- 5.25-inch drives is smaller , lighter weight and cheaper , suiting PC market segment.
- Not just in drives, but across a range of industries.

# The Results — Sustaining vs. Disruptive innovation

Feature \ Innovation type	Sustaining	Disruptive
Definition	Improve the current products	Low-End or New market
Target	current customers	potential customers
Value networks	Current	New
Mode	Evolutionary	Revolutionary
Market size	Big → Small	Small → Big

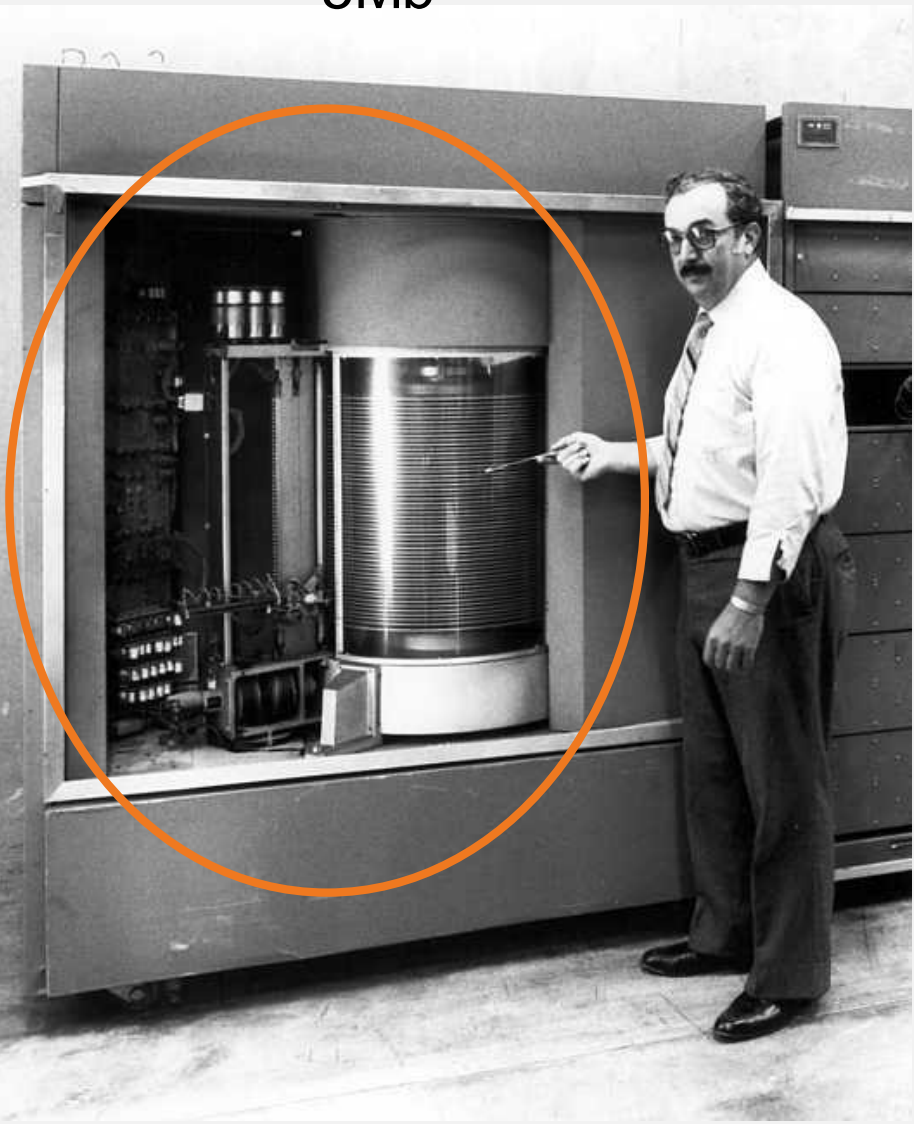
# The Results — The impact on industry structure

The Results



Patterns of Entry and Improvement in Disruptive Disk Drive Technologies

1956, IBM 305 RAMAC  
5Mb



1974, IBM 3340 ( Winchester)  
35 or 70Mb , 14-inch



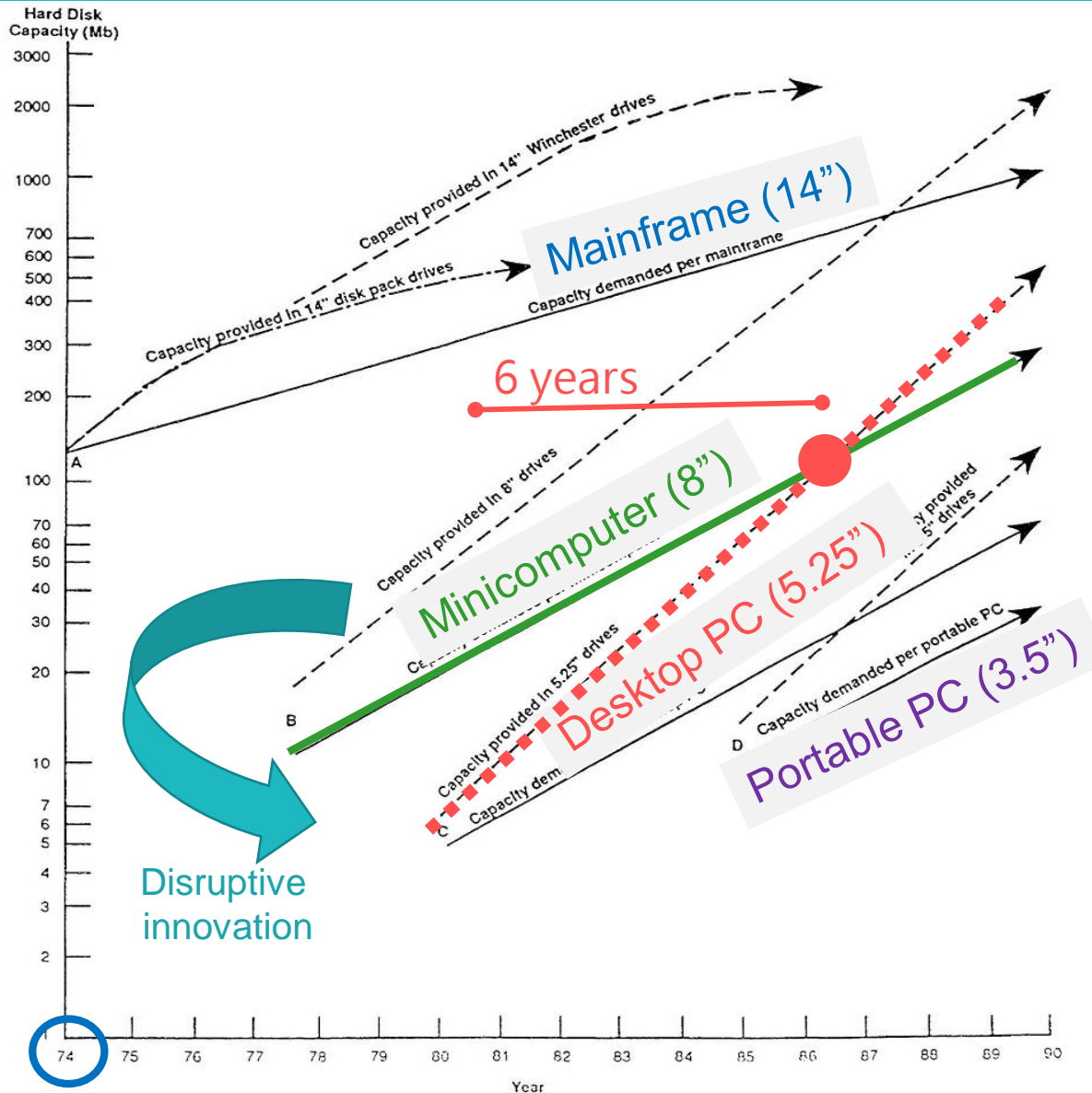


# The Results — The impact on industry structure

The Results

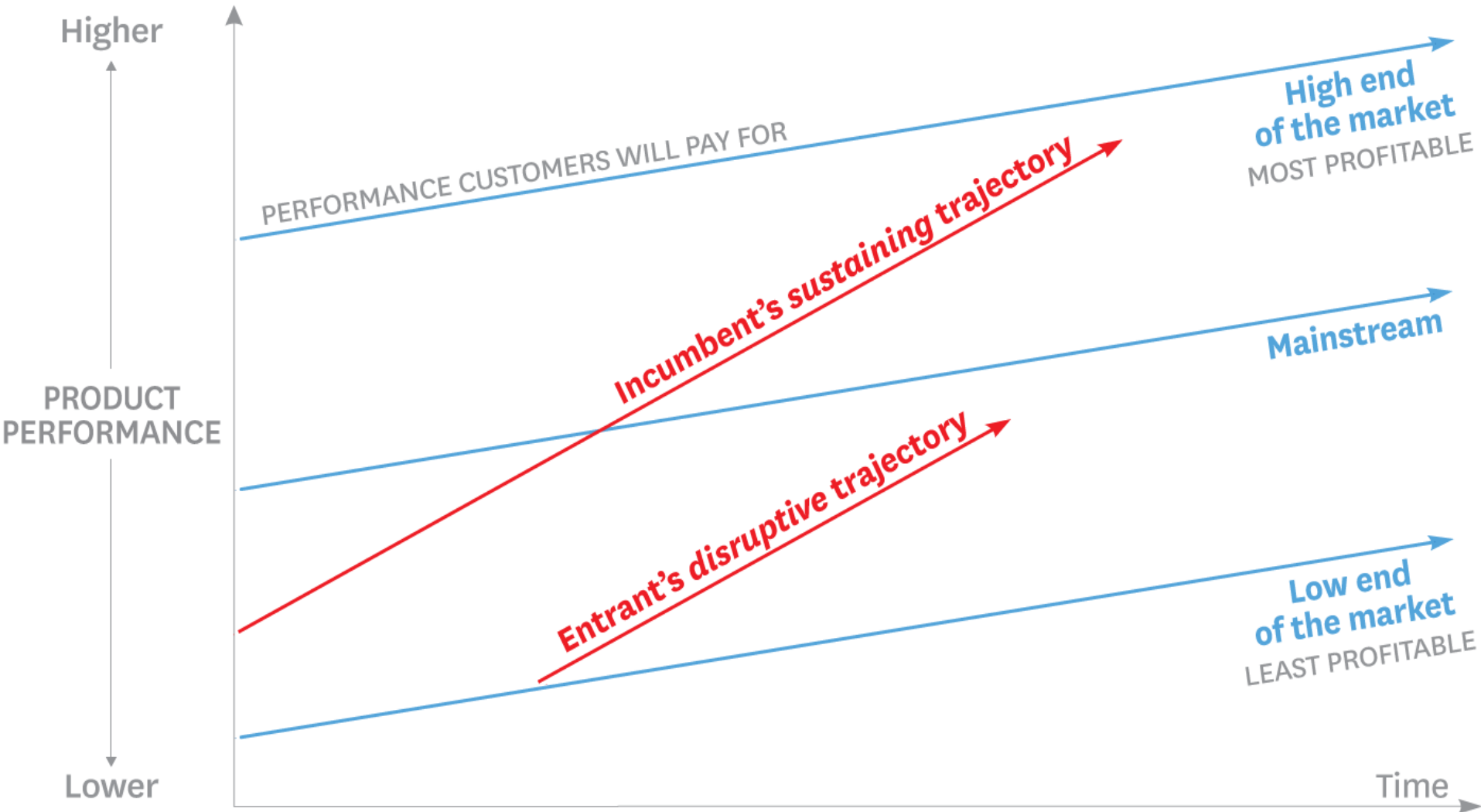
Patterns of Entry and Improvement in Disruptive Disk Drive Technologies

Innovate  
or  
Perish



# The Results — The impact on industry structure

The Results



**SOURCE** CLAYTON M. CHRISTENSEN, MICHAEL RAYNOR, AND RORY MCDONALD  
**FROM** "WHAT IS DISRUPTIVE INNOVATION?" DECEMBER 2015

# The Results ( Part 2 )

The process of allocate  
the resources



# The Results — The leaders in sustaining & disruptive innovations

(a) Numbers of established and entrant firms introducing models employing selected trajectory-sustaining technologies

<b>Sustaining</b>		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Thin-film heads	Entrants							1			1	2	1		1	4
	Established		1			1	1	3	5	6	8	12	15	17	22	
RLL codes	Entrants										1	2	3	6	8	
	Established										4	11	20	25	26	
Winchester architecture	Entrants				1	4	9									
	Established	1	3	3	7	11										

(b) Numbers of established and entrant firms introducing models based upon disruptive architectural technologies

<b>Disruptive</b>		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
8-inch	Entrants					1	4	6	8							
	Established					0	2	5	5							
5.25-inch	Entrants							1	8	8	13					
	Established							1	2	8	11					
3.5-inch	Entrants											1	2	3	4	
	Established											0	1	1	4	4

Those established drive makers average 2 years lag.

# The Results – 6 steps to allocate the resource

Table 3. Support of key elements of model found in each of six in-depth case studies

Companies Studied:	Prototypes of disruptive architecture drive developed internally, well before widespread industry adoption (model step 1)	Marketers show early prototypes to lead customers of prior architecture; they reject product; marketing issues pessimistic forecast (model step 2)	Project to commercialize disruptive product is shelved; company aggressively pursues sustaining innovations (model step 3)	New firms are established to commercialize disruptive architecture; they find new markets, where product's attributes are valued (model step 4)	Entrant firms which initially sold product only in new market improve performance faster than initial market requires, enabling them to attack established markets (model step 5)	In response to entrants' attack, established firms belatedly introduce disruptive product. Sales are largely to existing customers, cannibalizing sales of prior architecture products. (model step 6)
Quantum Corp.	L	L	L, T	L, T	L	L, T
Conner Peripherals	L		L	L	L	
Miniscribe		L		L	L	L
Seagate Technology	L	L	L	L	L	L
Micropolis	T	L	L,T	L,T	L	T
Control Data	L	L	L,T	L,T	L	L,T

- Step 1.** Seagate : Engineers made over 80 prototype models before managers' requirement.  
Control Data: Designing 8-inch drives 2 years before others.
- Step 2.** Seagate's main customer, IBM rejected Seagate's 3.5-inch prototypes for insufficient capacity.
- Step 3.** In 1987, the market of 3.5" disk is US\$50 million, but 5.25" is 0.5 billion. Seagate kept sustaining innovation.
- Step 4.** The frustrated engineers in Seagate and Miniscribe (5.5") found Conner Peripherals Inc. (3.5")
- Step 5.** Conner(3.5) invaded Seagate's(5.5") Market
- Step 6.** Many established firms eventually withdrew for the market.

# The Results — 3 cases of established firms develop disruptive innovation

Table 4. The success and failure of companies addressing disruptive technologies through mainstream vs. independent organizations

Succeeded	Control Data 5.25-inch (L)	Micropolis 5.25-inch (T)
	Control Data 3.5-inch (L)	<b>MICROPOLIS</b>
Failed	Quantum 3.5-inch	Control Data 8-inch (L)
	Maxtor 3.5-inch (L)	Quantum 5.25-inch (L)
		Miniscribe 3.5-inch (L)
		Seagate 3.5-inch (L)
		Micropolis 3.5-inch (L)
		Memorex 8-inch (L)
		Memorex 5.25-inch (L)
		Priam 5.25-inch (L)
		Century Data 8-inch (L)
		Ampex 8-inch (L)
		Ampex 5.25-inch (L)
	Commercialized from within an independent organization.	Commercialized from within the mainstream organization.

## 1. An Independent organization

### Control Data Corporation (CDC)

- In 1975 to 1982, the worldwide leader in 14 inch disk drive technology in the OEM marketplace.
- Developing its 5.25-inch disk in Oklahoma City. Developing its 3.5-inch disk in California. (1987)

### Quantum Corporation

- The leading firm of 8- inch disk.
- In 1984, Quantum built up Plus Development Corporation to develop 3.5-inch disk, and retained 80% ownership

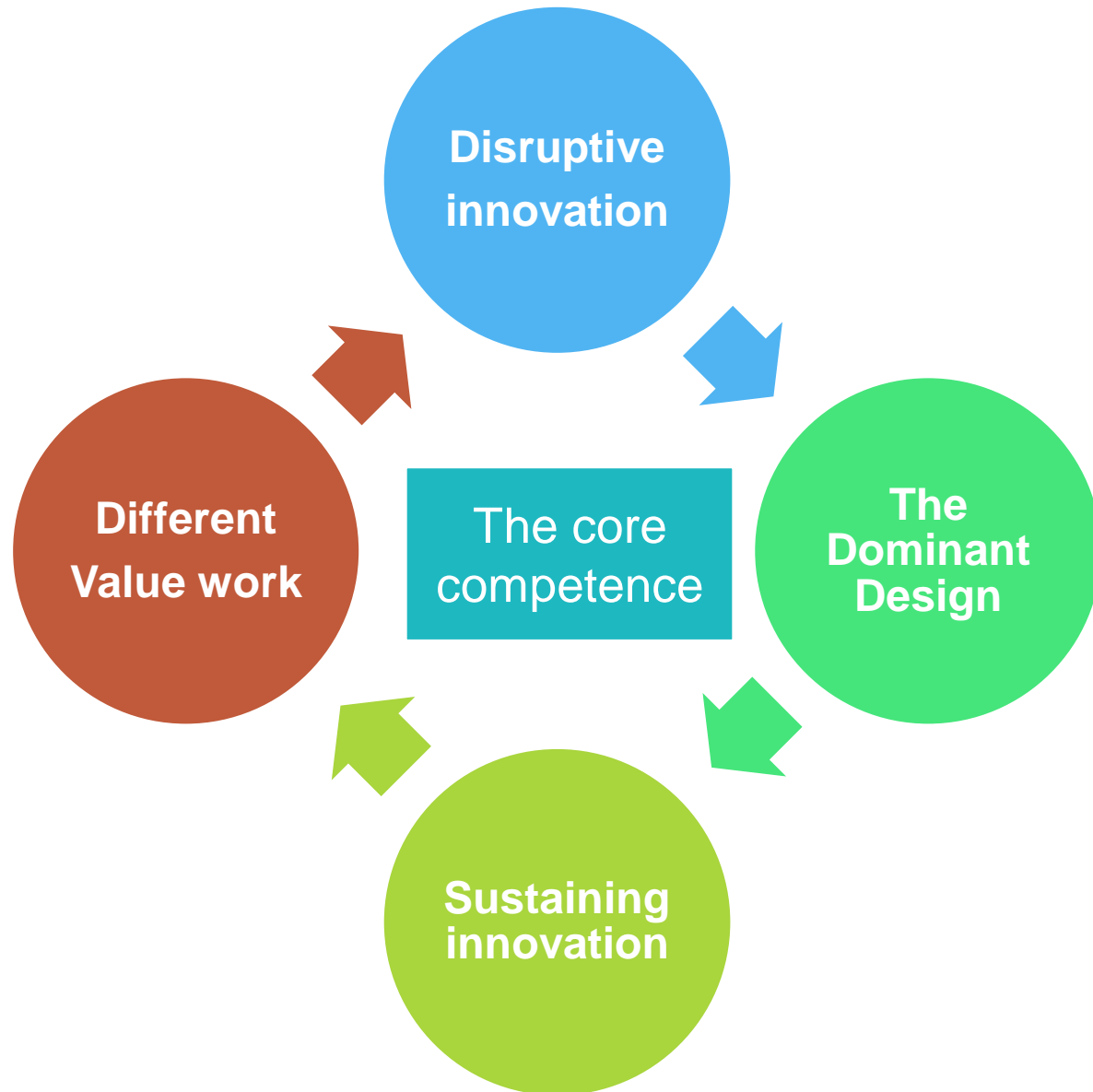
## 2. The Mainstream organization

### Micropolis

- The main products is 8- inch disk.
- In 1982, Micropolis started the disruptive innovation of 5.25-inch disk within the mainstream organization.
- CEO thought it was the most exhausting of his life. ( Asymmetric motivation)

- Describe **the innovator's dilemma**.
- Distinguish between **sustaining and disruptive** innovation.
- The key issue appears to be firms' disabilities **in changing strategy, not technology**.
- To link two theories (resource dependence and resource allocation) , and point the process through which the demands of **the current customers shape the allocation of resources** in innovation.
- Despite the powerful forces of resource dependence, managers can change strategy successfully especially in **organizations independent** from the mainstream groups.
- By understanding the processes that **link customer needs, impetus, and resource allocation, managers can align efforts to commercialize disruptive technology** (which entails a change in strategy) with the forces of resource dependence.

# Learning





# The Discussion

- The Debates
- The improvement of theory
- The Cases
- The Conclusions





**Jill Lepore**

Professor  
Harvard College of  
American History

### From Theories

Disruption is a theory of change founded on panic, anxiety, and shaky evidence. Christensen of poor scholarship ( **handpicking case studies** that conform to his theory); **misreading history** (some companies he casts as doomed continued to perform well); and myopia (missing, the role unions played in the collapse of U.S. Steel).

— *The Disruption Machine: What the gospel of innovation gets wrong*. The New Yorker, June 23, 2014.



**Andrew King**

Professor  
Tuck School of  
Business

### From Practices

We surveyed 77 proposed examples of disruption identified by Christensen. only seven of the cases (**9%**) **exhibited all four elements** of the theory

— *How Useful Is the Theory of Disruptive Innovation?*  
MIT Sloan Management Review , Fall 2015.



# The Debates – From theory\*



- The case studies were **handpicked** to prove the concept . E.g. Seagate Technology developed 3.5” in 1988 (4 years later than others) but still succeeded within 2 years.



- The most important thing of disruption innovation theory **is the process, not the result.**



- Many companies with **disruptive innovation failed** in the final. ( Micropolis, Morrison-Knudsen, Pathfinder, TD Bank...)



- Not all innovation will succeed. We can't criticize the whole theory with the result of a certain event. There is **no permanent successful** company in the world.

\* Christensen and Lepore did not face-to-face debate. I summarize their viewpoints in their article and interview.  
Source: Responds to New Yorker Takedown of 'Disruptive Innovation', *Bloomberg Businessweek*, June 22, 2014



- In 2007, Christensen predicted Apple won't succeed with the iPhone, but actually it was successful.



- I didn't quite get the iPhone right, because I missed the trajectory that Apple was on. But it made the theory more complete. To define who is the object of destruction. iPhone is disrupting the notebook, but it's a sustaining innovation against Nokia.



- The Disruptive Growth Fund launched by Christensen failed in one year with 64% loss.



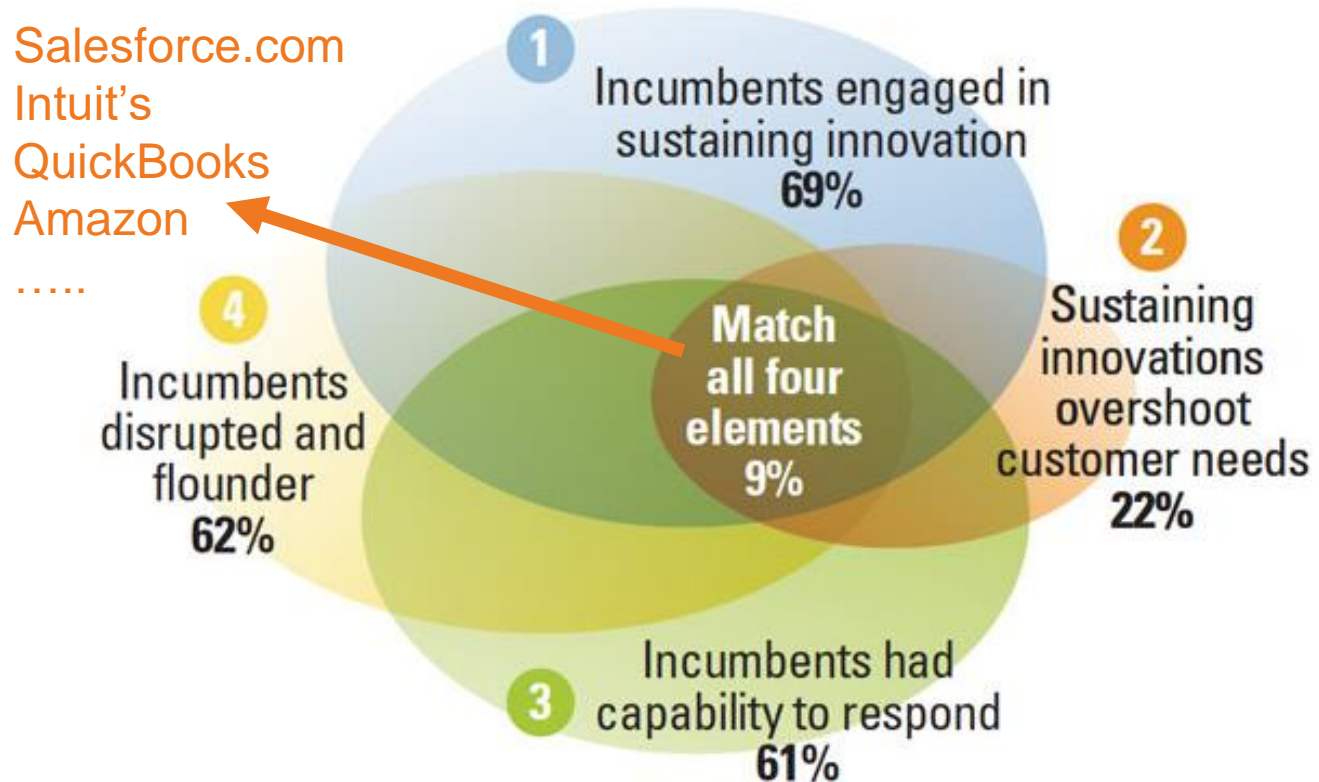
- I had nothing to do with the fund invested.
- Christensen insisted on his view point. He has only to answer a small part of the questions . It seems that he doesn't want to argue with Lepore in the theory.

# The Debates – From practice

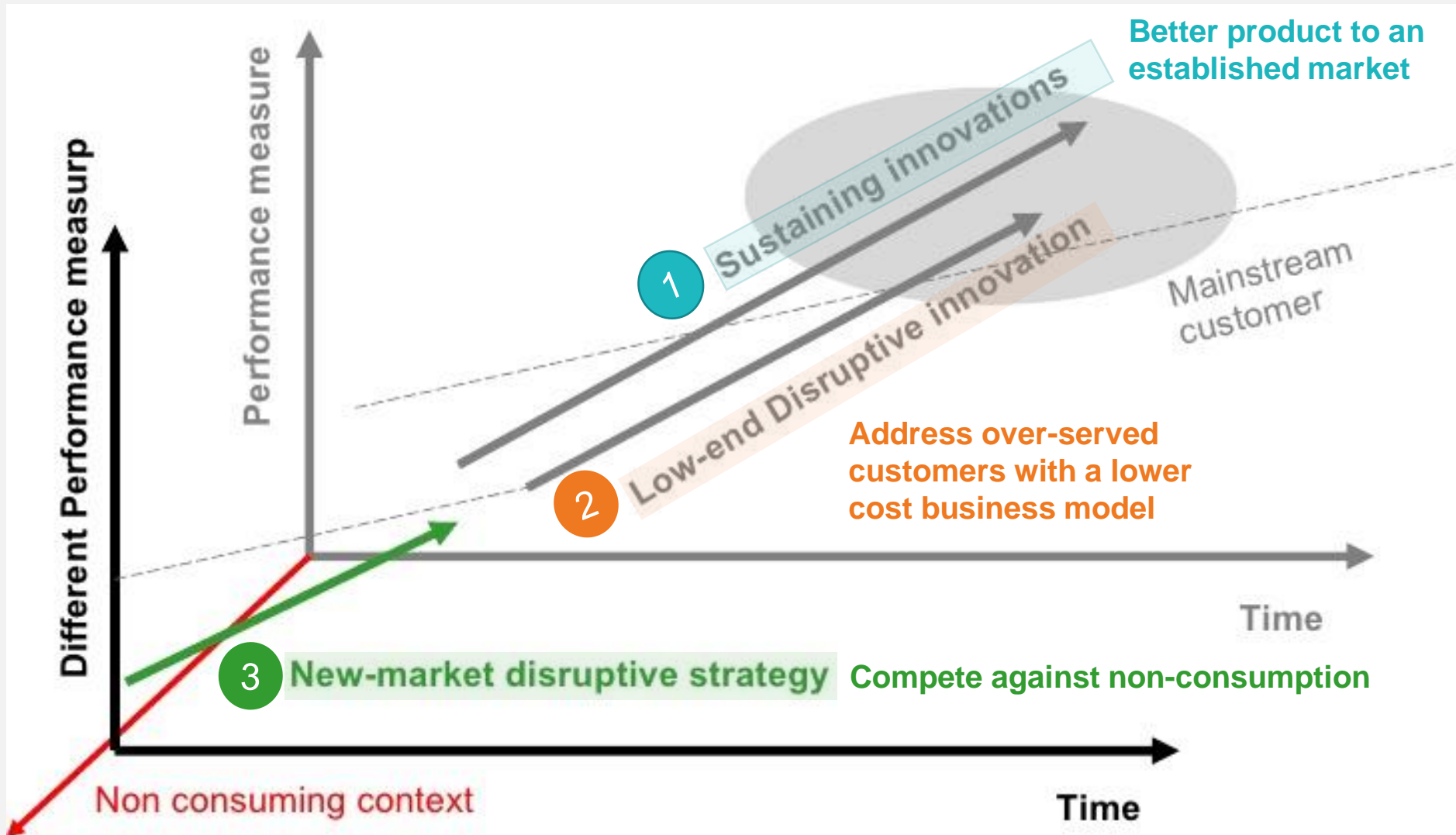


Andrew King

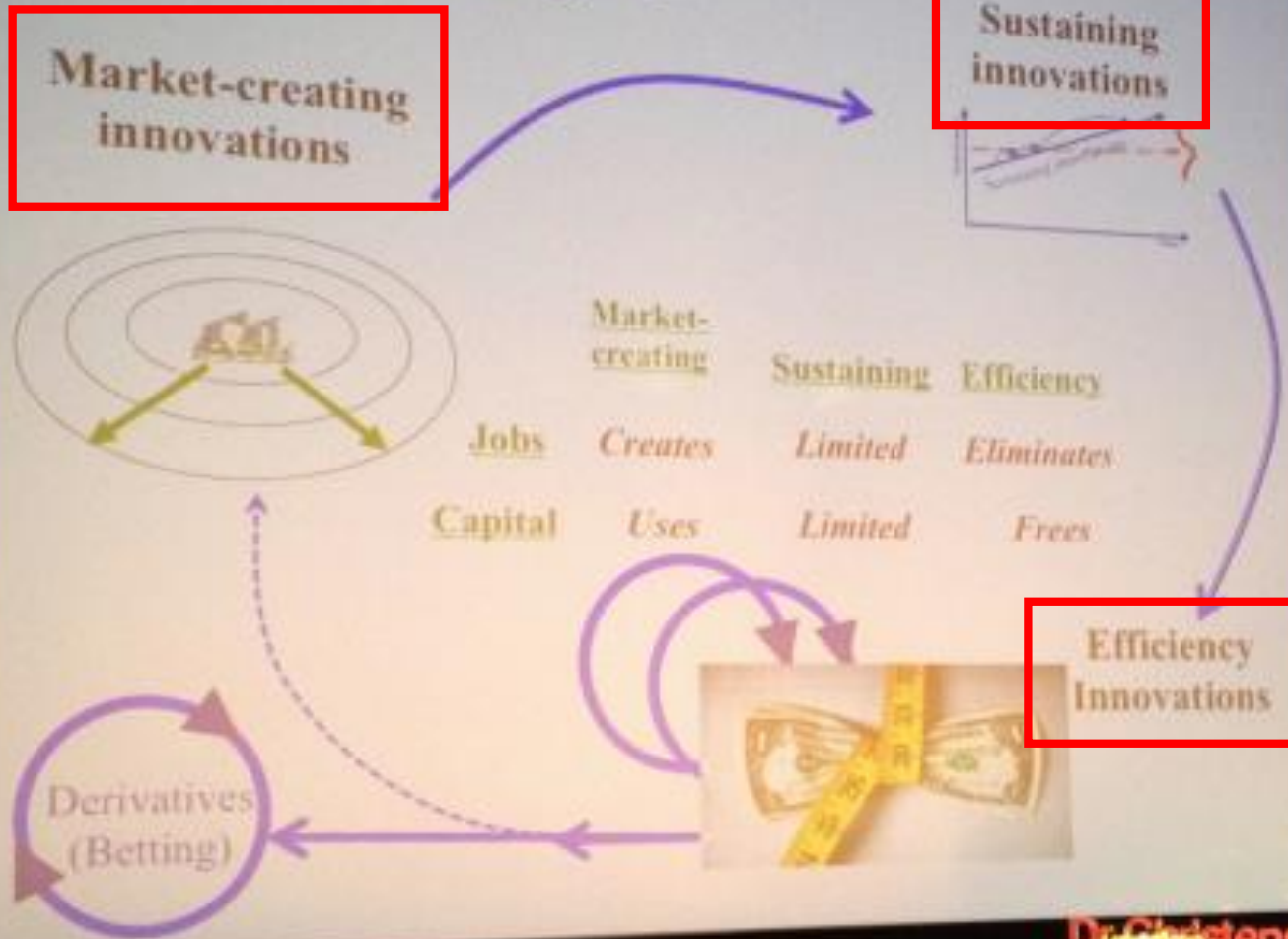
*How Useful Is the Theory of Disruptive Innovation?* (not well)  
The Venn diagram maps the **77 examples** listed in *The Innovator's Dilemma* and *The Innovator's solution* and shows the extent to which, in the opinion of industry experts, they exhibit each of four key elements of the theory. Using the industry experts' assessments, only seven of the cases (**9%**) exhibited **all four elements of the theory**.





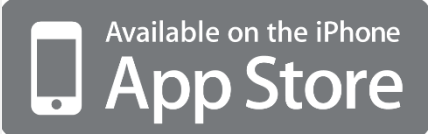
# The improvement of theory



## The economic engine



# The improvement of theory

	Sustaining Innovation	Efficiency Innovation	Market-creating Innovation
Characteristic	Replace old products with new and <u>better models</u>	Sell mature, established products or services to <u>the same customers at lower prices</u>	Transform complicated or costly products so radically that they <u>create a new class of consumers or a new market</u>
Phone business example	<p>The Nokia N95 phone offered <u>superior features</u> compared to the Nokia 6300 phone</p>  <p>N95      6300</p>	<p>The Samsung C3322 handset was a <u>low-cost competitor</u> to the Nokia 6300</p>  <p>\$54      \$146</p>	<p>The iPhone App Store connected developers and users creating a <u>new market</u> for mobile computers</p> 



## Christensen's answer



Disruptive  
innovation

Customer	<input type="checkbox"/> High-end	<input checked="" type="checkbox"/> Low-end
Market	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> New



Sustaining  
innovation

Customer	<input checked="" type="checkbox"/> High-end	<input type="checkbox"/> Low-end
Market	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> New



Disruptive  
innovation

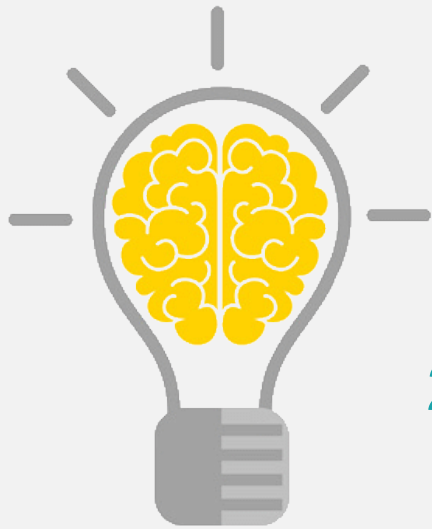
Customer	<input type="checkbox"/> High-end	<input checked="" type="checkbox"/> Low-end
Market	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> New



Sustaining  
innovation

Customer	<input checked="" type="checkbox"/> High-end	<input type="checkbox"/> Low-end
Market	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> New

# The Conclusion



2003

2014

***What's  
The NEXT ?***

1996

- 1.Sustaining
- 2.Disruptive innovation

- 1.Sustaining
- 2.Low-end Disruptive
- 3.New-market Disruptive innovation

- 1.Sustaining
- 2.Efficiency
- 3.Market-Creating innovation