

Discontinuous Technological Innovations: A Review of its Categorization

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Agenda

- **Introduction**
- **Characteristics of Discontinuous Innovations**
- **Differences between Radical & Disruptive Innovations**
- **New Categories of Discontinuous Innovations**

Introduction

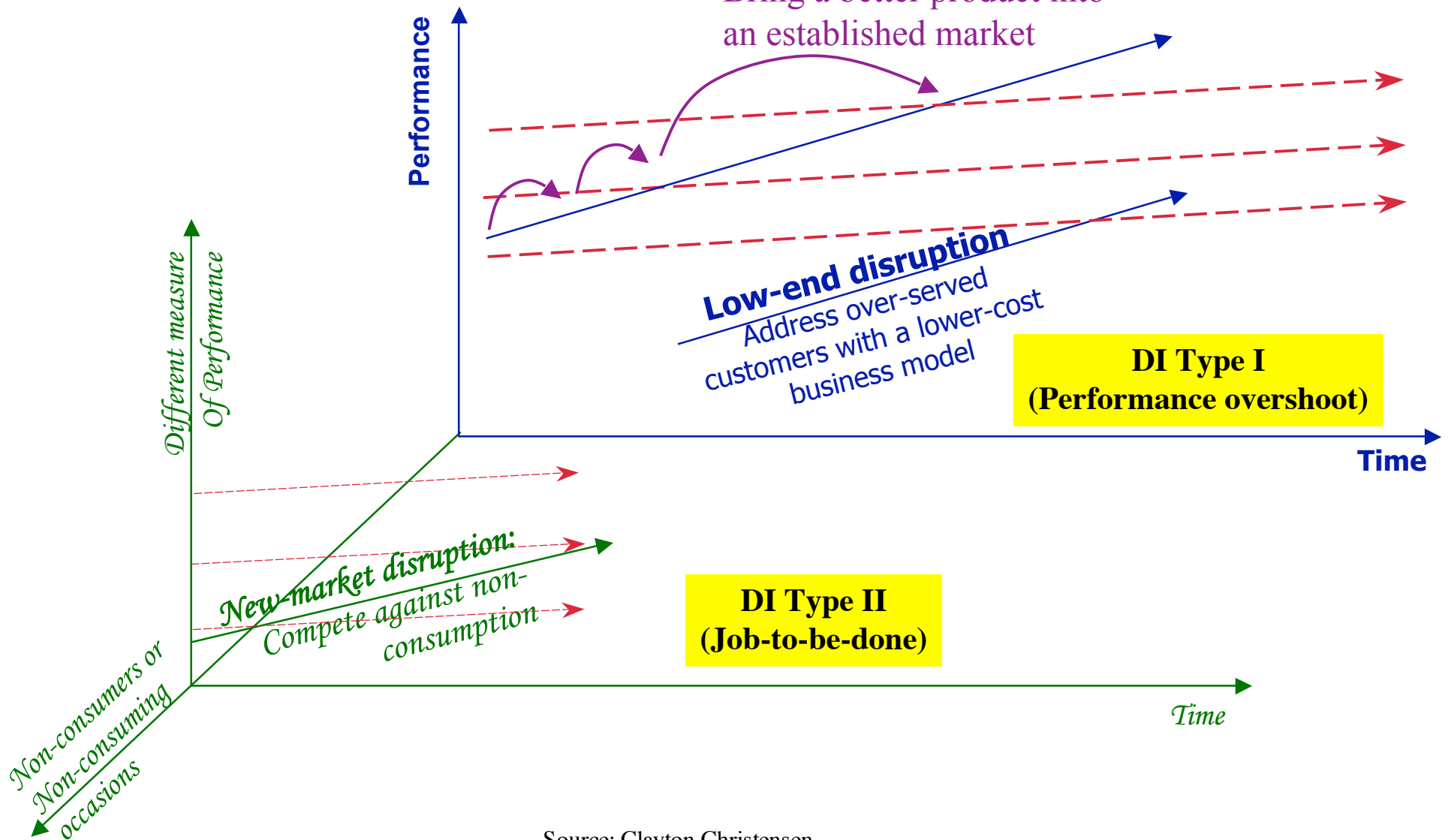
- **Discontinuous innovation is major force behind market domination and new market creation**
- **Top management need to understand the nature (or type) of discontinuous innovations to devise the right strategies**
- **Too many definitions/terminologies**
~ **resulted in confusion amongst academia and practitioners**

Introduction

- **Disruptive innovation (DI) and Radical Innovation (RI) are the most commonly used terminologies.**
- **We will use DI and RI as reference.**
 - ~ **DI: defined by Clayton Christensen, HBS**
 - ~ **RI: defined by Leifer et al., RPI**
- **We will explore new discontinuous innovation types, an intermediate category, to address anomalies not covered by RI & DI**

Disruptive Innovation (DI)

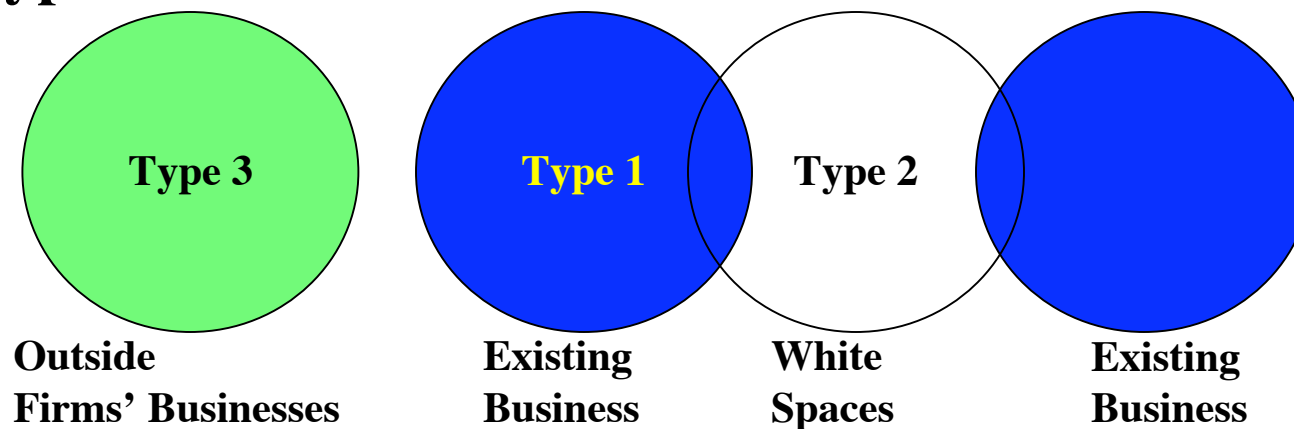
Bring a better product into
an established market



Radical Innovation (RI)

- Leifer et al (RPI)
- **RI has the potential of one or more of:**
 - ~ entirely new set of performance features
 - ~ improvement in known performance features (**5X or more**)
 - ~ significant reduction in cost (**> 30%**)

- **3 Types of RI**



Markets		Concept of Discontinuous Innovations	
		Disruptive Innovation Literature	Radical Innovation Literature
New	Hi-End		<i>Type II/III</i> Radical Innovations
	Existing	Hi-End	<i>Type I</i>
Existing	Main	Sustaining Innovations	Incremental Innovations
	Lo-End		<i>Type I</i>
New	Lo-End	Disruptive Innovations <i>Type II</i>	

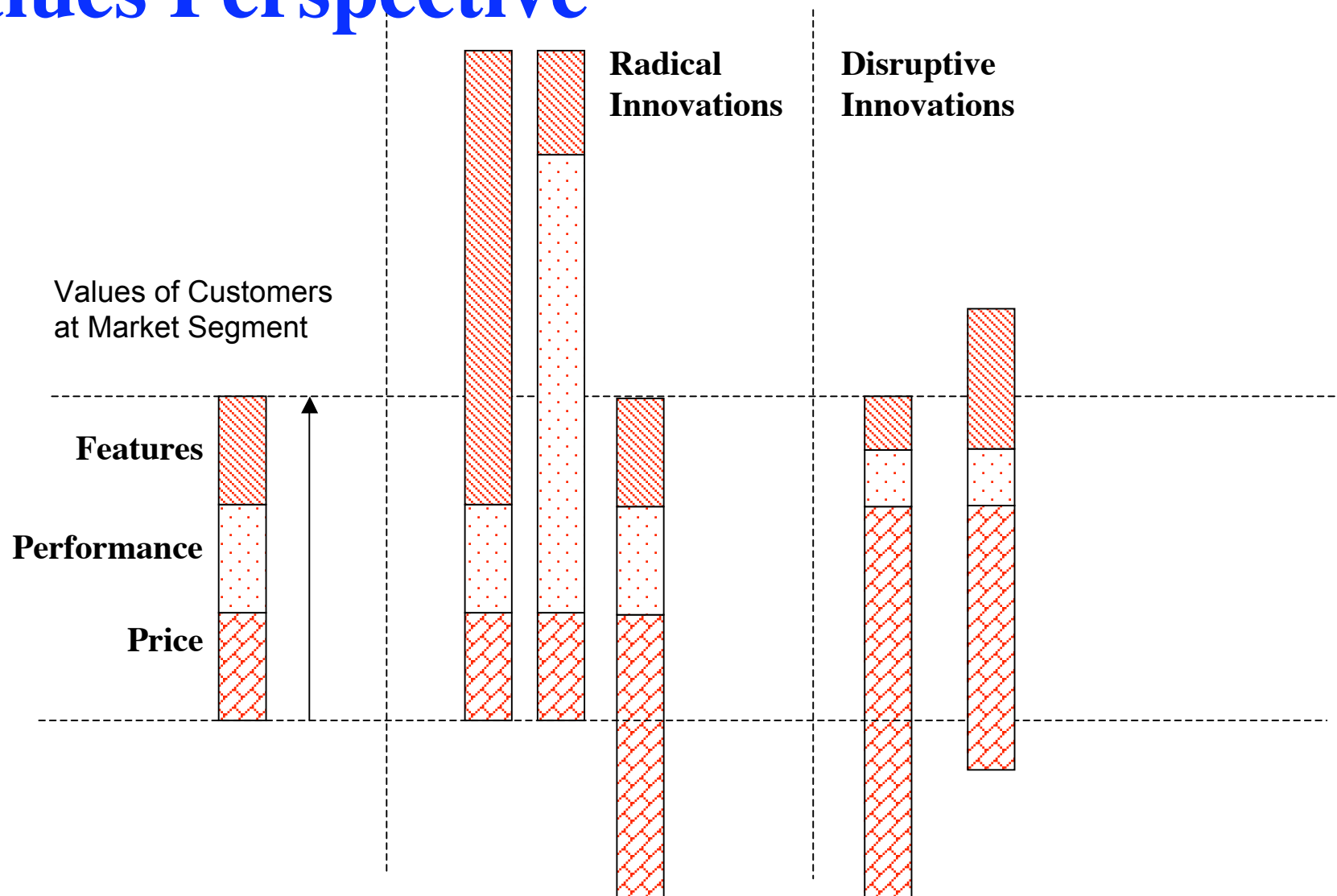
Characteristics of Discontinuous Innovations

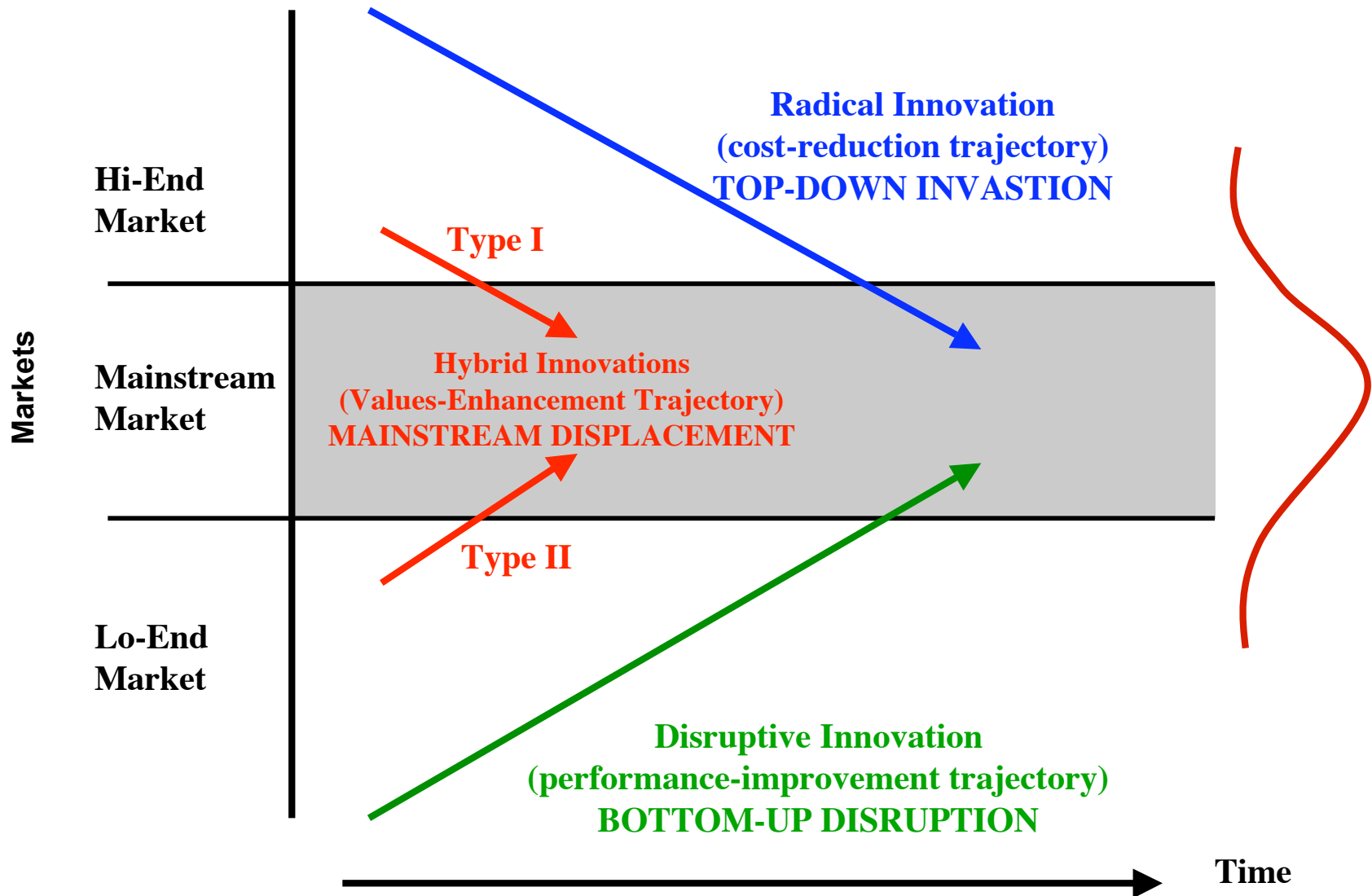
- 1. Likely to be ignored by top management of incumbents**
- 2. Extremely difficult to execute, even with top management support**
- 3. Tremendous market uncertainty**
- 4. Frequent need of accompanying innovation in business model**

Differences between RI & DI

	<u>Radical Innovation</u>	<u>Disruptive Innovation</u>
1. Technology	Breakthrough	Good-enough
2. Market-entry	Hi-end (performance is important)	Low-end (cost more important)
3. Failure of incumbents	Completely paralyzed (due to extensive R&D by entrants)	Favor small firms on conditions ~ performance overshoot ~ asymmetric competition
4. Resources	Extensive (favor large firms)	Minimal (favor small firm or incubating units in large firm)

Values Perspective





New Discontinuous Innovation Framework

Product			Market Entry	Innovation Category	Example
Performance	Price	Features			
Superior	Hi	Hi	Hi-end, Exist	RI-I	Digital X-Ray
Superior	Hi	Hi	Hi-end, New	RI-II/III	MEMS Accelerator
Medium-Hi	-	Hi	Main	Hybrid-I	RFID
Medium-Lo	-	Hi	Main	Hybrid-II	LCD TV
Good-enough	Lo	Lo	Lo-end, Exist	DI-I	Hard Disk Drive
Good-enough	Lo	Lo	Lo-end, New	DI-II	Wireless eMail

New Category of Discontinuous Innovation

Hybrid Innovation

- ~ a direct head-on mainstream market penetration strategy
(as opposed to top-down RI and bottom-up DI)**
- ~ displace current dominant design**
- ~ based on total values of price, performance & features
(consumer do the trade-off)**
- ~ important for firms hi-growth strategy**

New Categories of Discontinuous Innovation

Hybrid Innovation Type I

- **Characteristics**
 - ~ higher technology performance
 - ~ existing mainstream market
- **Example**
 - ~ **RFID**
 - ~ Costly but high performance than Barcode
 - ~ Unique features: read/write ability
 - ~ Introduces flexibility into supply-chain,
enable more value-added functionalities & efficiencies

New Categories of Discontinuous Innovation

Hybrid Innovation Type II

- **Characteristics**
 - ~ **lower technology performance**
 - ~ **existing mainstream market**
- **Example**
 - ~ **LCD**
 - ~ **Costly but lower performance (resolutions, brightness)**
 - ~ **Unique features: light-weight & slimness**
 - ~ **Used in computer industry & crossed-over to consumer TV**

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