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15.912 Technology Strategy
Fall 2008

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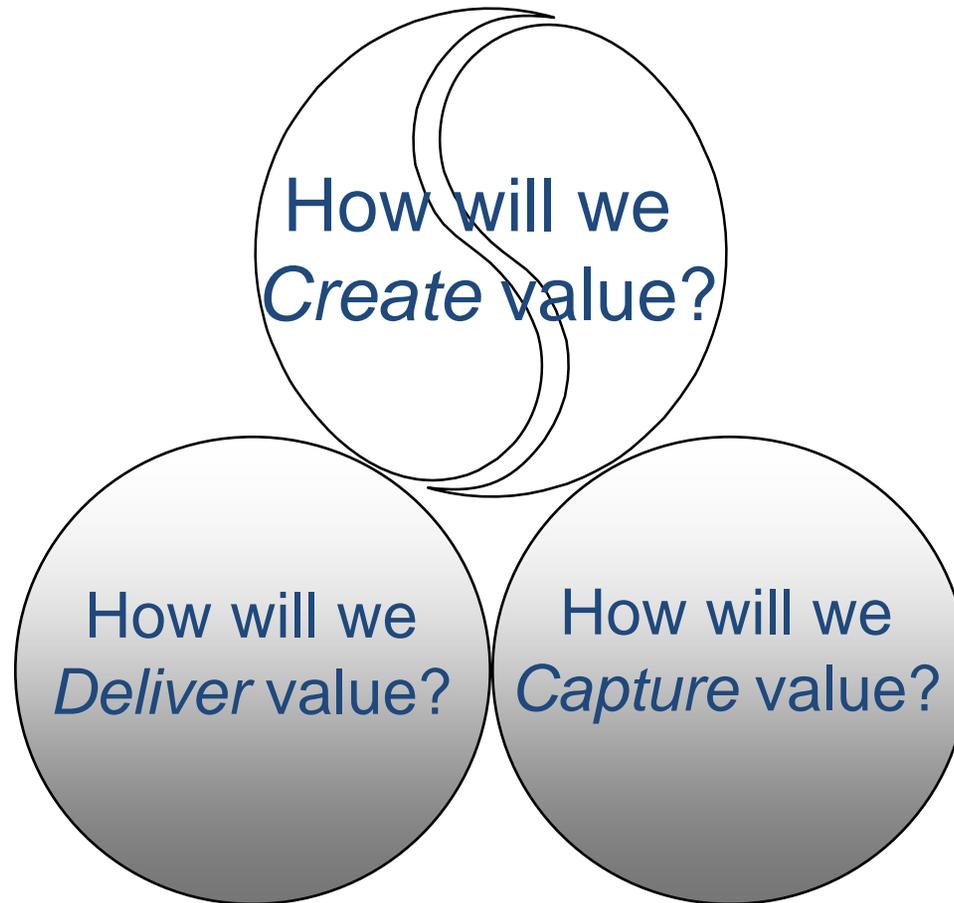
Market Evolution

Professor Jason Davis

MIT Sloan School of Management



The first of 3 key questions

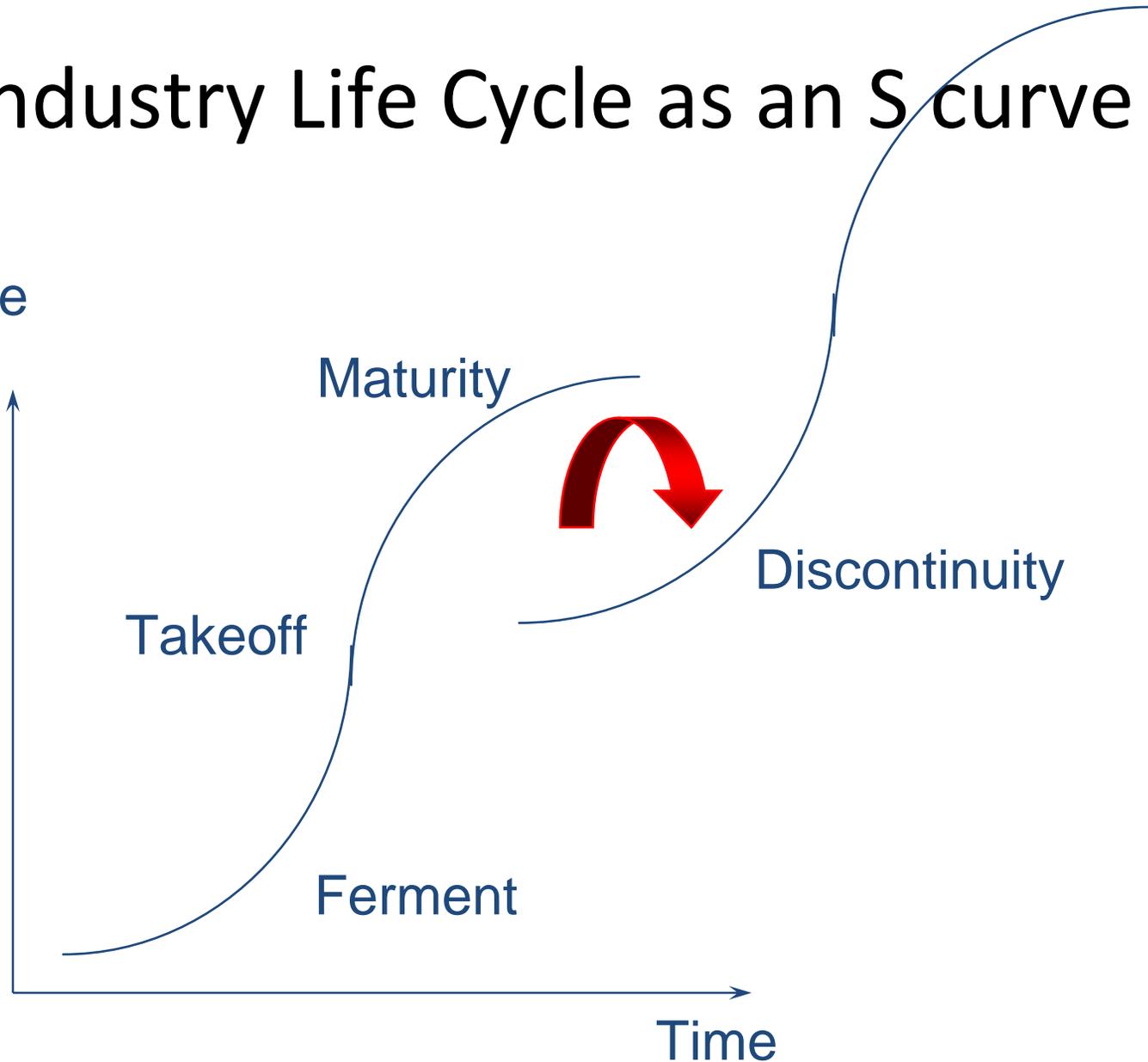


Market Evolution over the Life Cycle

- Drivers of diffusion
 - When does the S curve imply a diffusion curve?
- Managing the market
 - Market segmentation
 - Crossing the chasm
 - New markets, new needs:
 - Invasive Technologies
 - Disruptive Technologies (The Innovator's Dilemma)

The Industry Life Cycle as an S curve

Performance



Maturity

Discontinuity

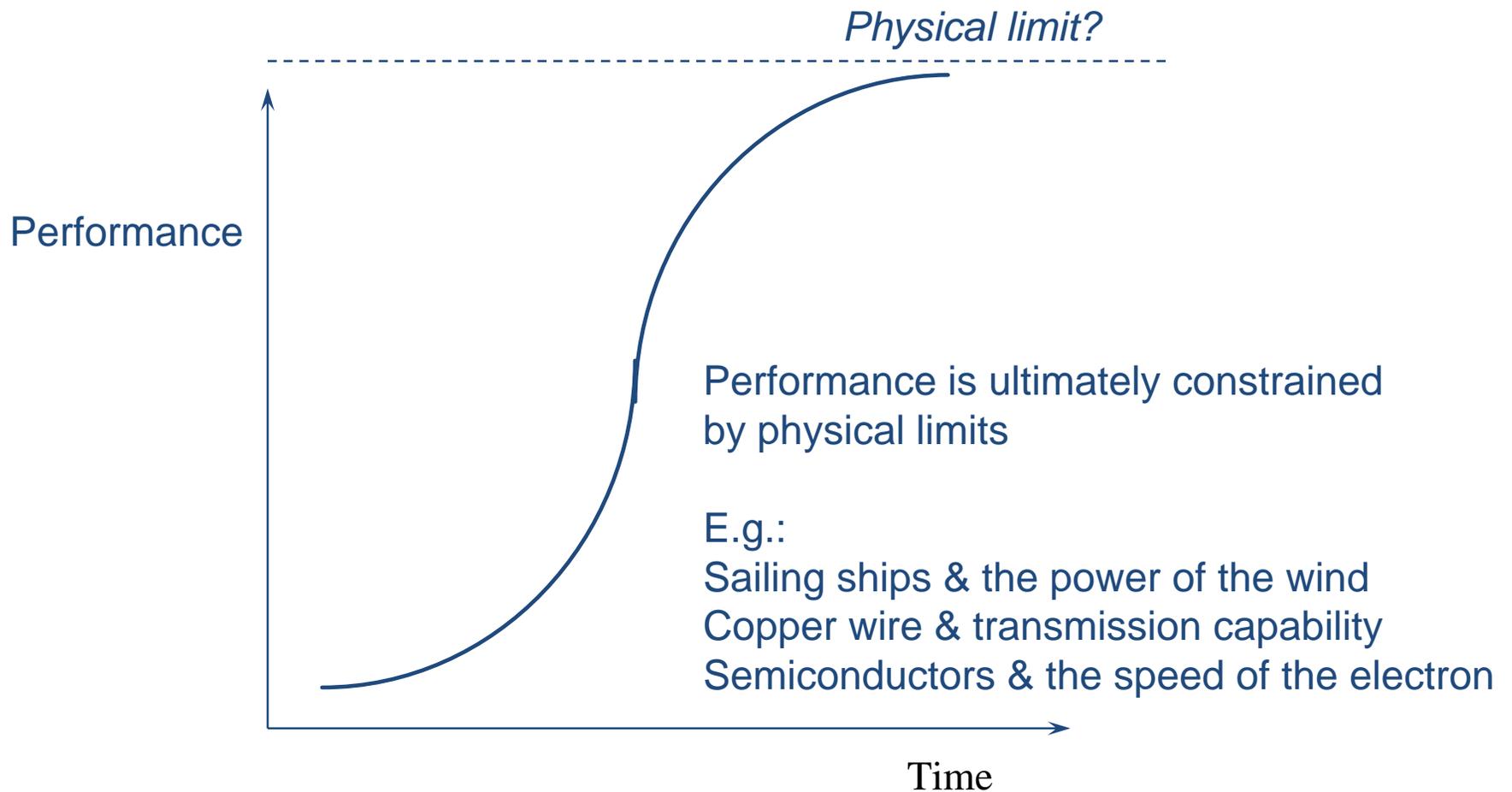
Takeoff

Ferment

Time

Do all good things come to an end?

Technological exhaustion

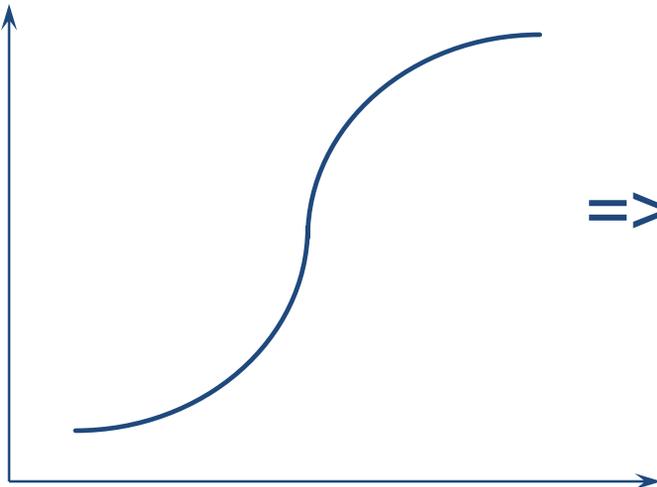


Predicting S curves

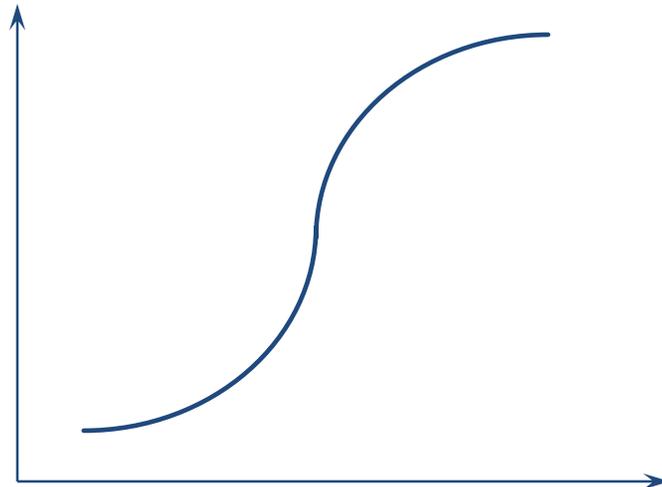
- Limited by physics?
 - “up against the limits”
- Limited by the dominant design?
 - “squeezing the lemon”
- Limited by the production technology?
 - “the productivity dilemma”
- Limited by the problem solving approach?
 - “problem solving trajectory”
- Limited by “technological bottlenecks”?
 - “Inducement mechanisms and focusing devices”

What is the relationship between the S curve and the diffusion curve?

Performance



Cumulative sales



=> ?

If technology never changed, would there be diffusion?

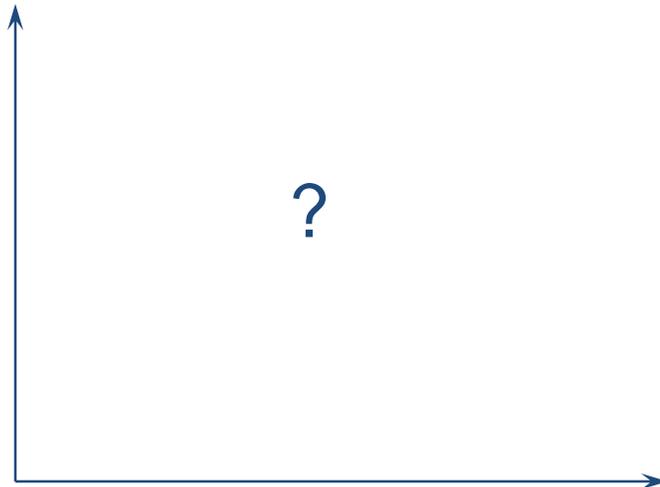
Performance



Time

=>

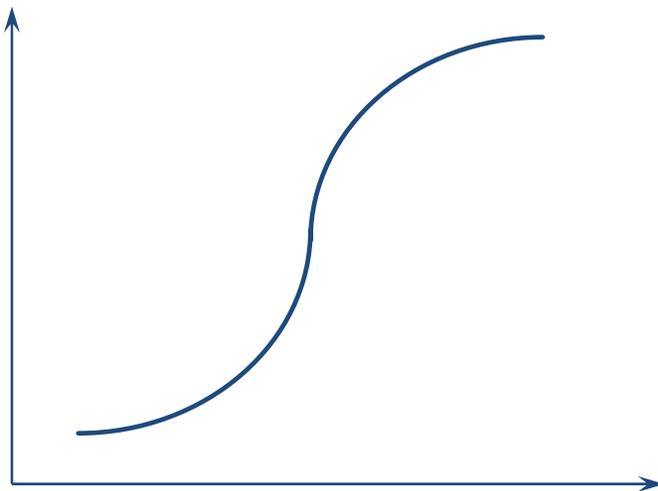
Cumulative sales



Time

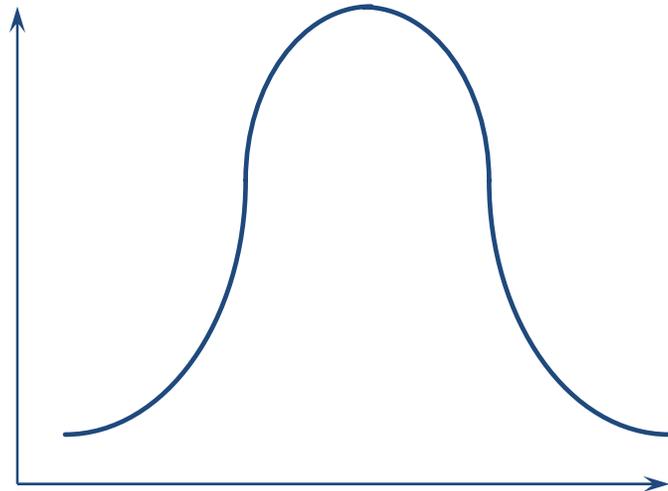
The diffusion of many products and services follow a similar pattern:

Penetration
Or
Cumulative Sales



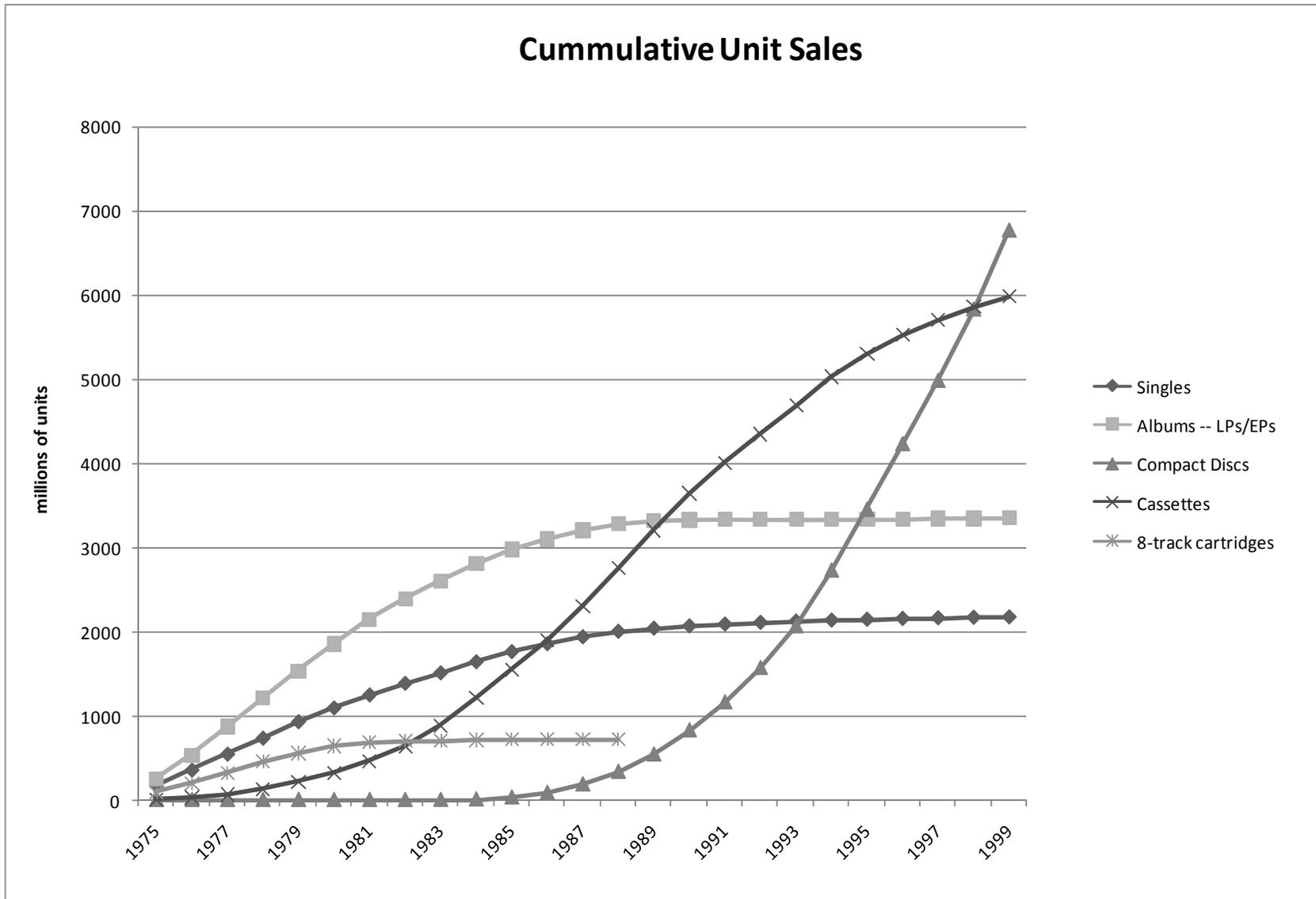
Time

Sales/year



Time

What drove the diffusion of the CD?



Thinking through diffusion

Technology is:

Static

Evolving

Customers are

Homogeneous

Information
Externalities
Supply constraint
Price

Heterogeneous

Thinking through diffusion

Technology is:

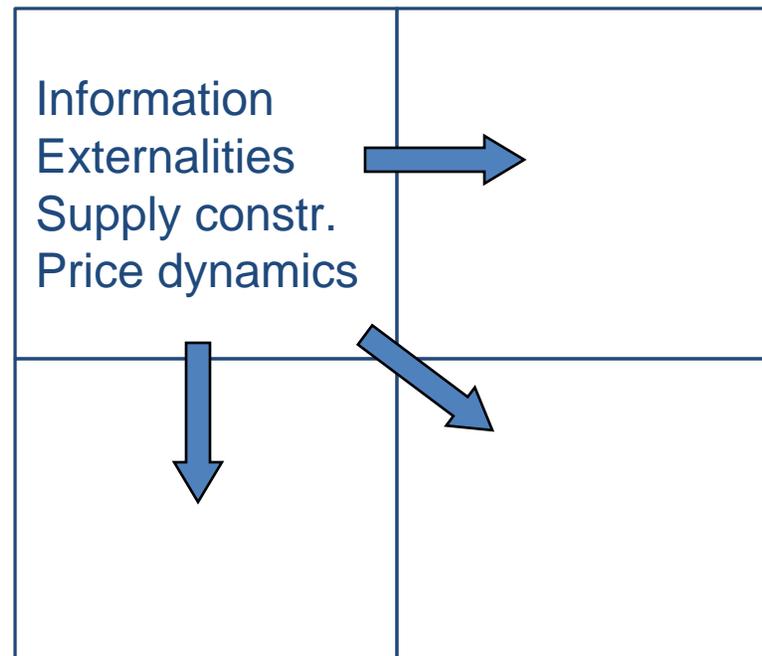
Static

Evolving

Customers are

Homogeneous

Heterogeneous



Thinking through diffusion

Technology is:

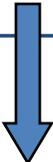
Static

Evolving

Customers are

Homogeneous

Heterogeneous

		“Technology push” new capabilities gate demand
		

Thinking through diffusion

Technology is:

Static

Evolving

Customers are

Homogeneous

Heterogeneous

Market pull: Diffusion evolves Across segments	

Thinking through diffusion

Technology is:

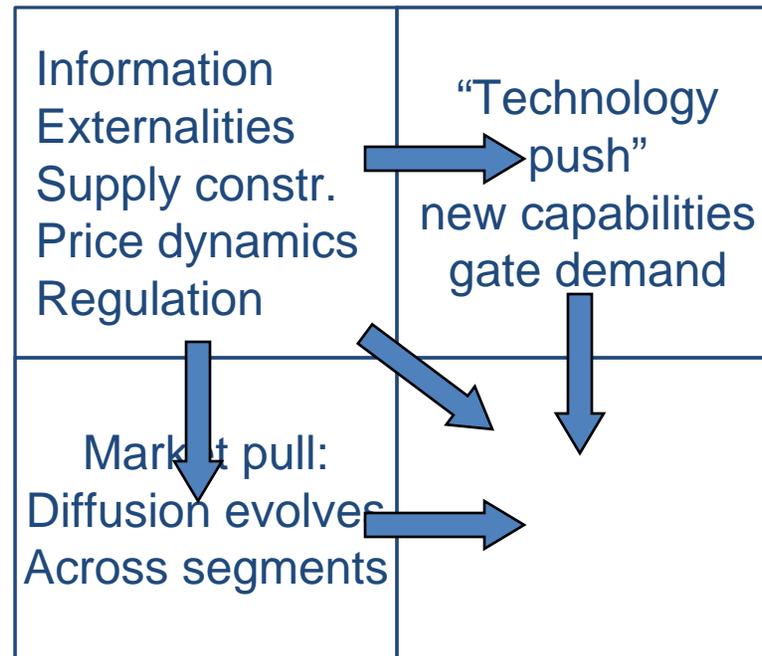
Static

Evolving

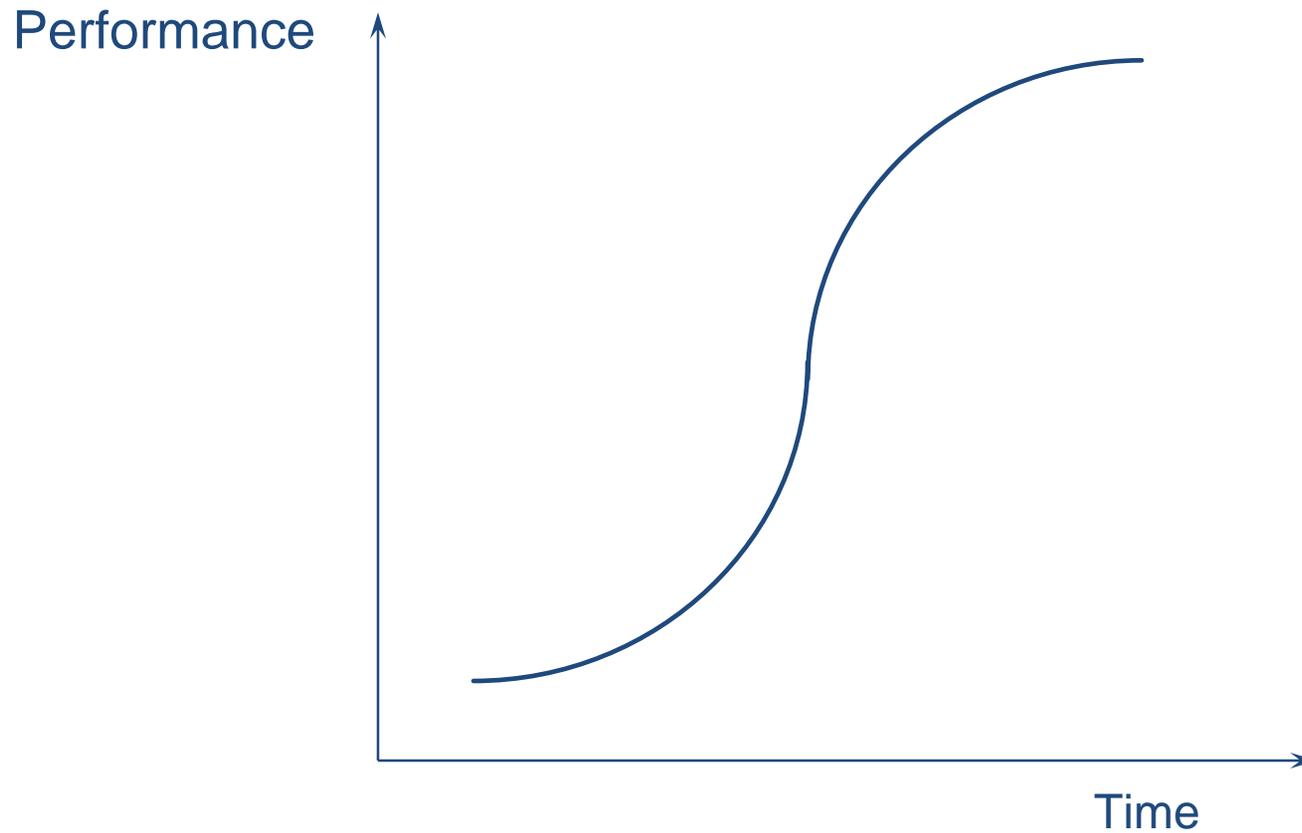
Customers are

Homogeneous

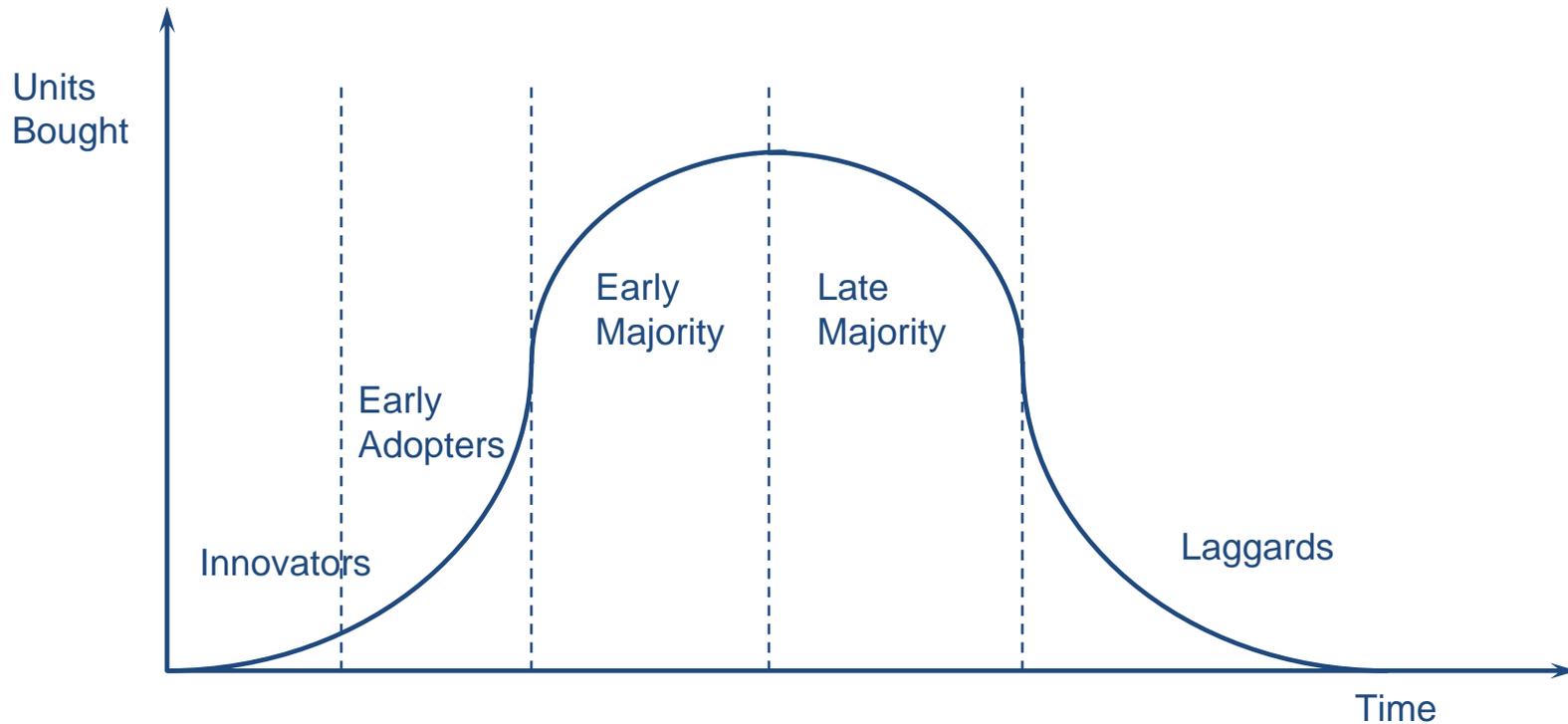
Heterogeneous



Managing the Market: Who buys a technology as it evolves?

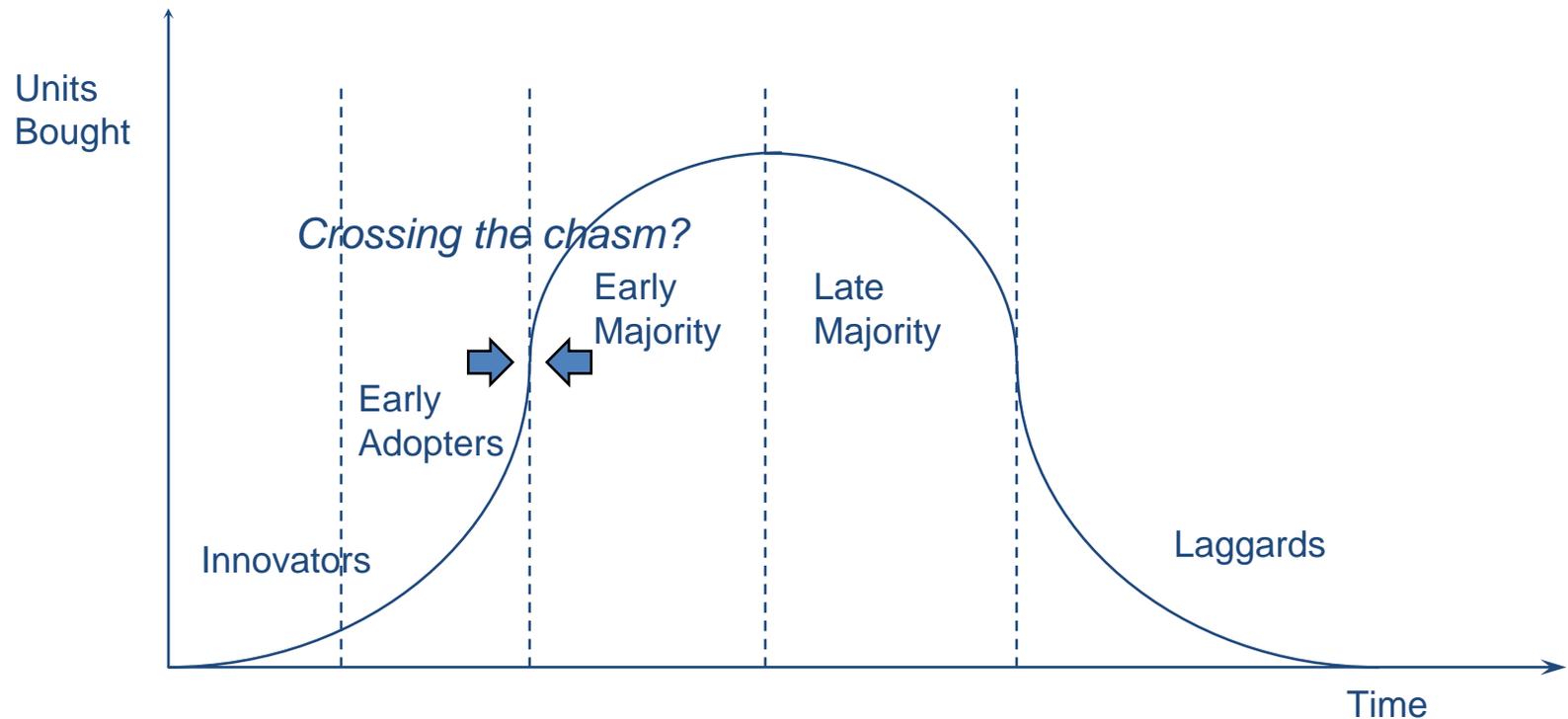


Understanding market dynamics: Basic segmentation (Rogers)



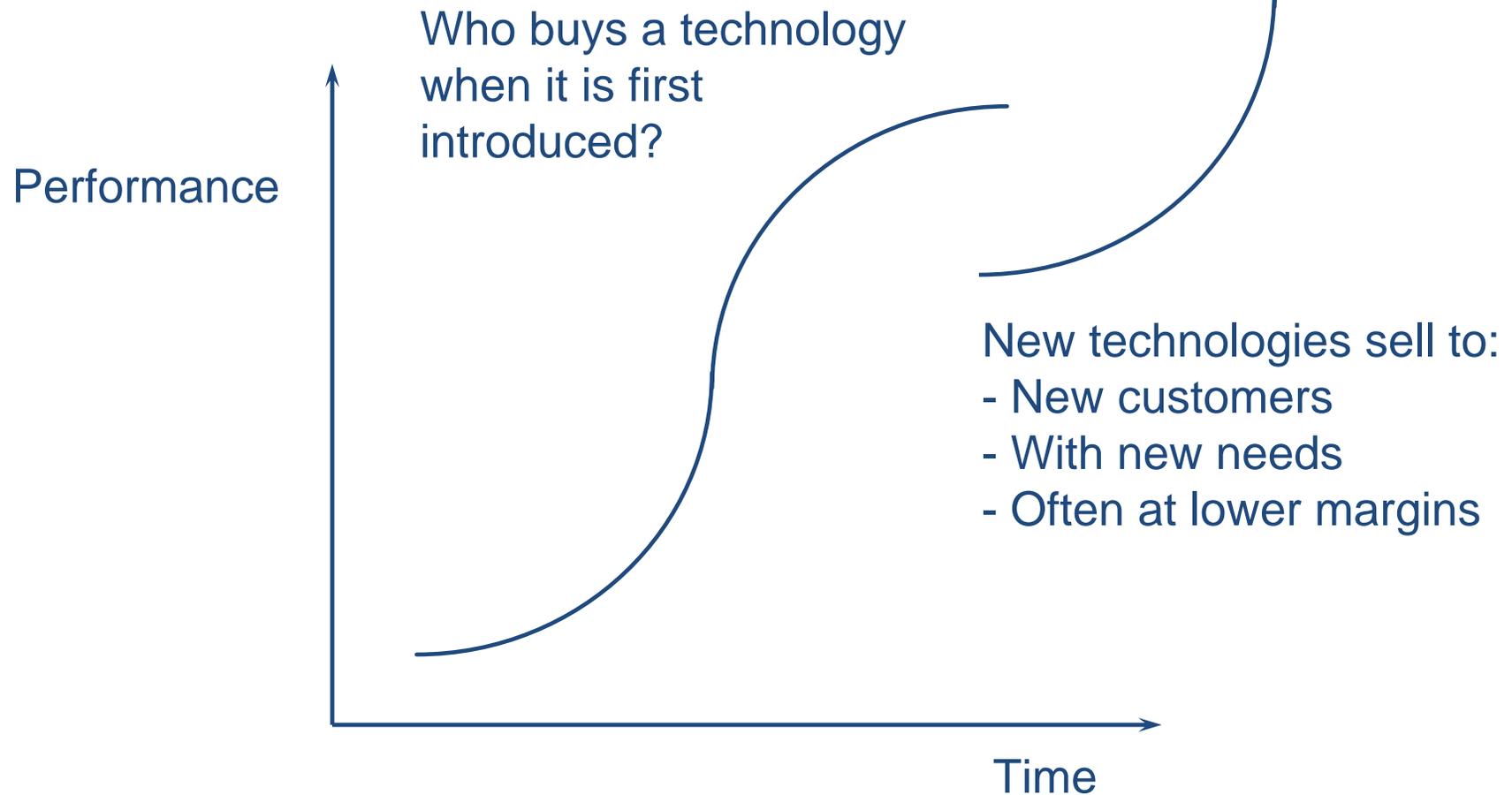
Adopters differ by, for example, social, economic status -- particularly resources, affinity for risk, knowledge, complementary assets, interest in the product

Understanding market dynamics: Crossing the chasm: (Moore)



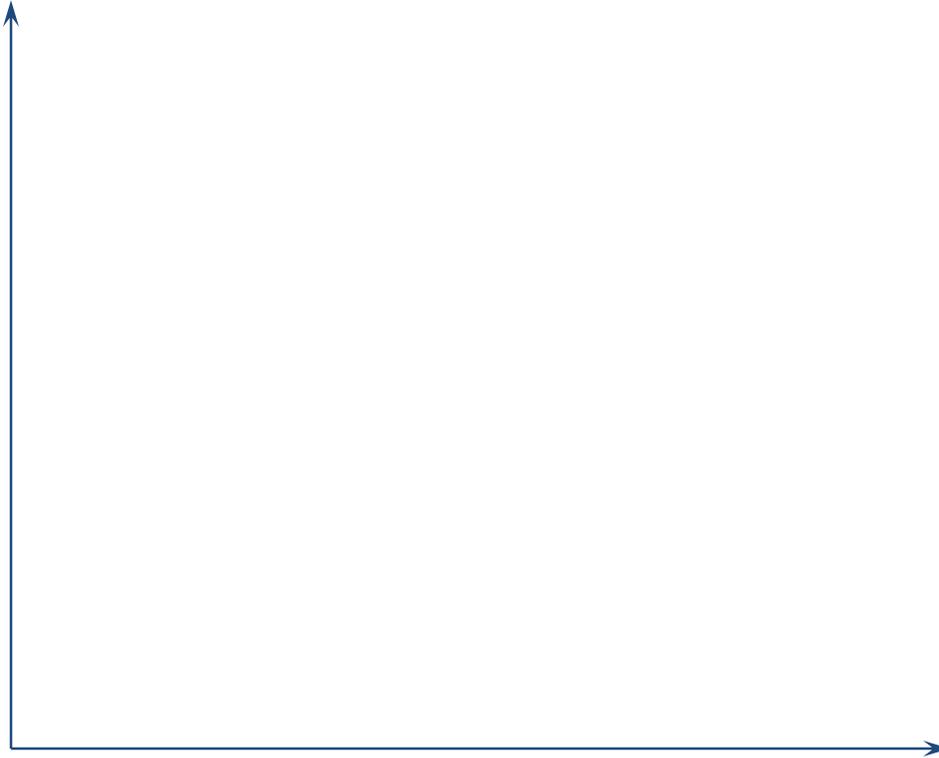
Making the transition from “early adopters” to “early majority” users often requires the development of quite different competencies: e.g. service, support capabilities, much more extensive training.

Managing customers at moments of disruption



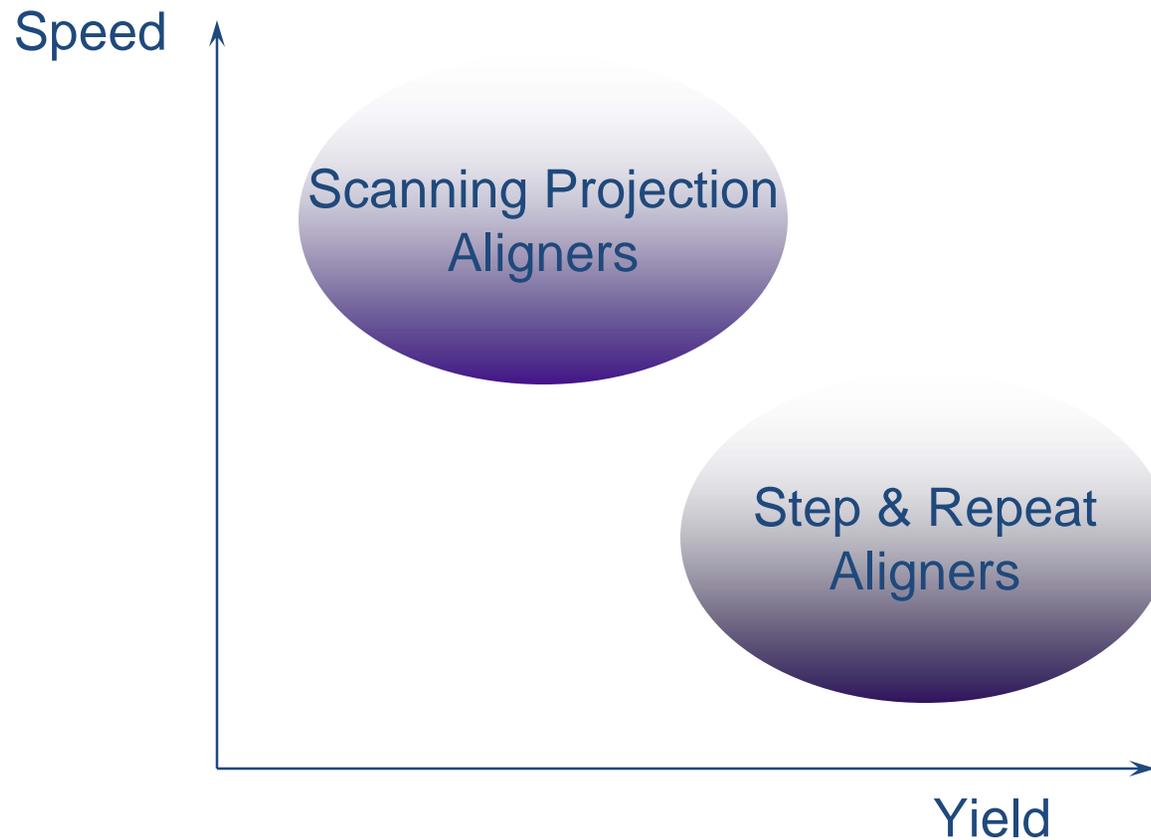
Buzz Groups: Develop a Marketing Strategy for Crossing the Chasm with Kindle

“Invasive” technologies often meet new needs: The case of the power bar



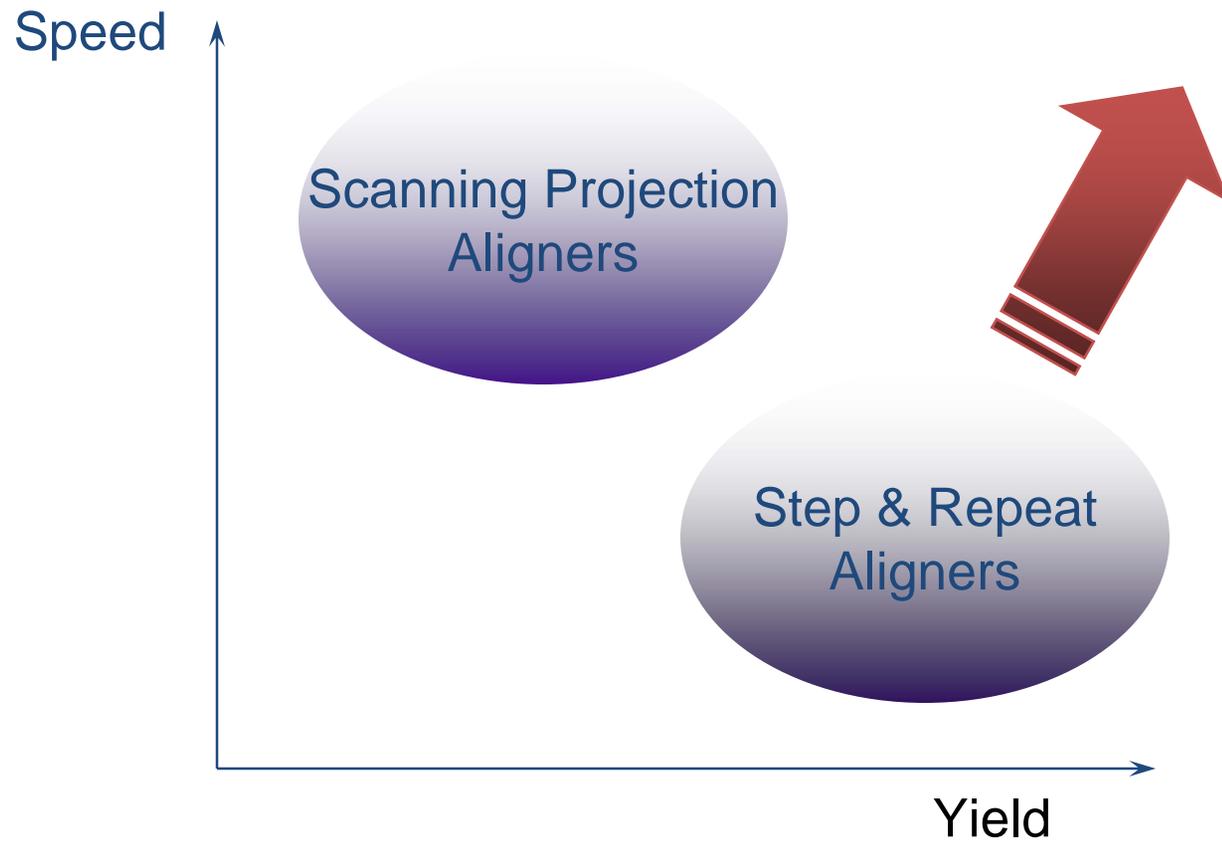
Initially, S&R aligners sold to customers with different needs:

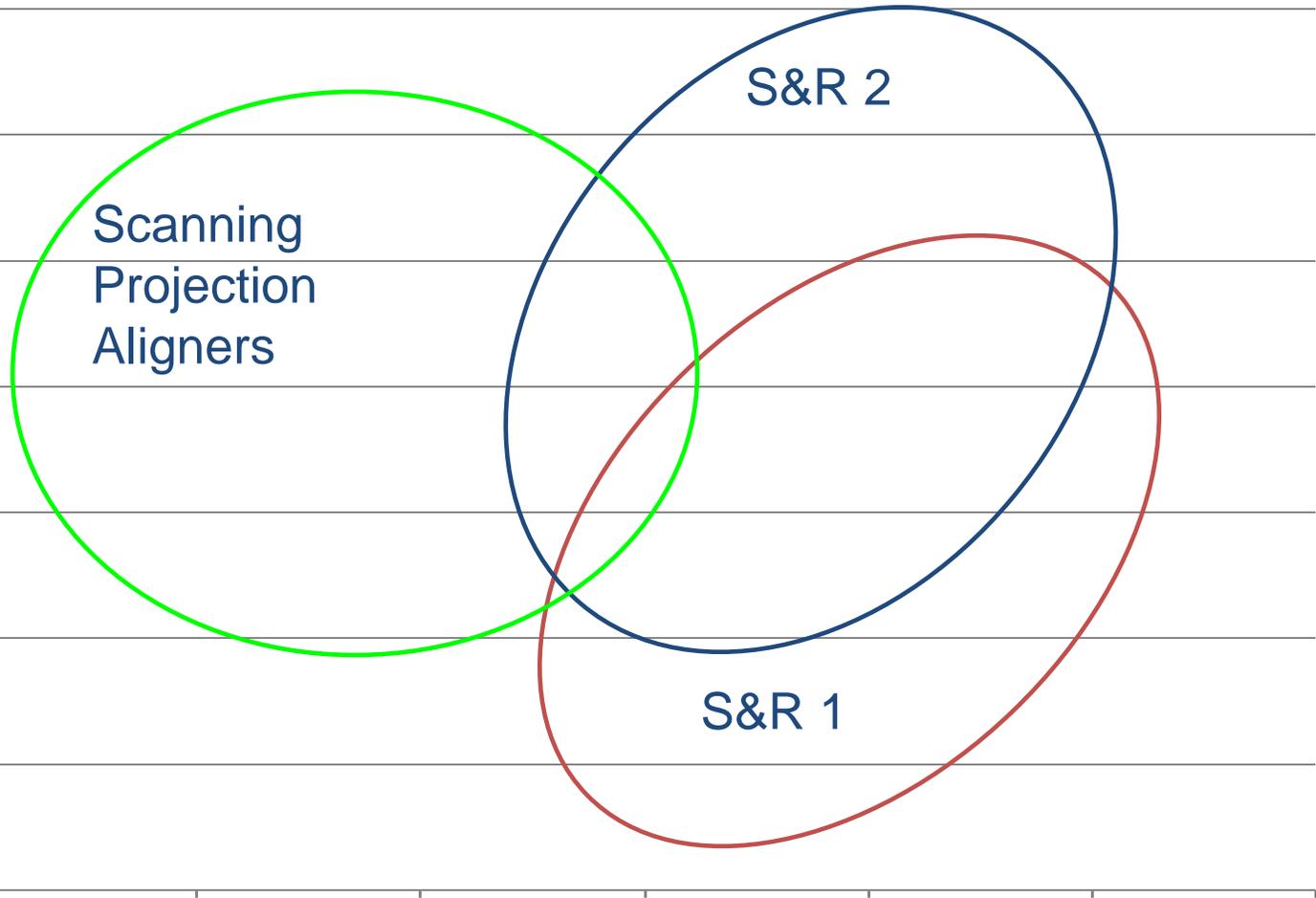
For example: *Semiconductor Photolithography*



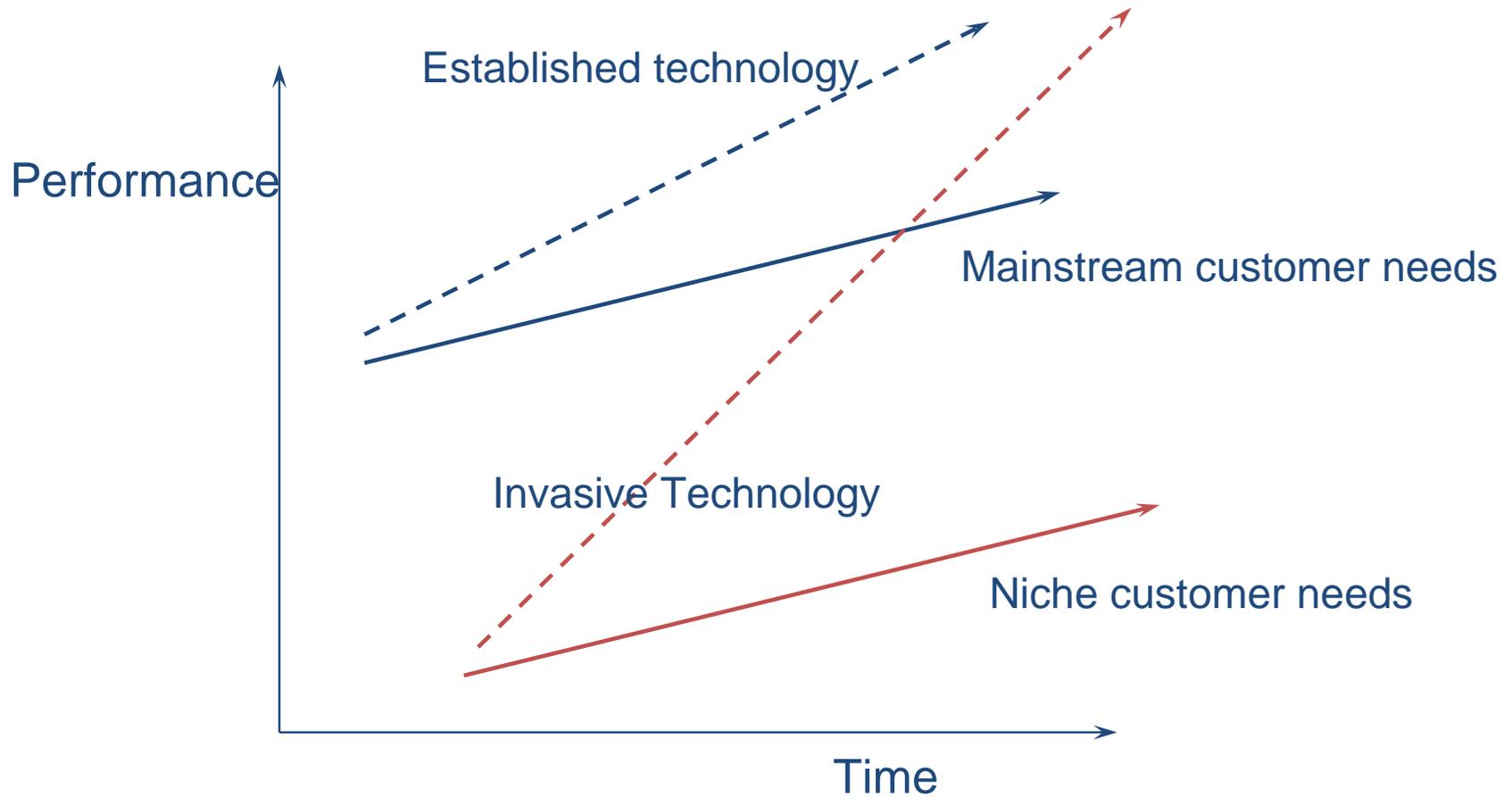
But then they improved sufficiently to take the whole market

For example: *Semiconductor Photolithography*





Some new technologies sell to niche markets with less demanding requirements



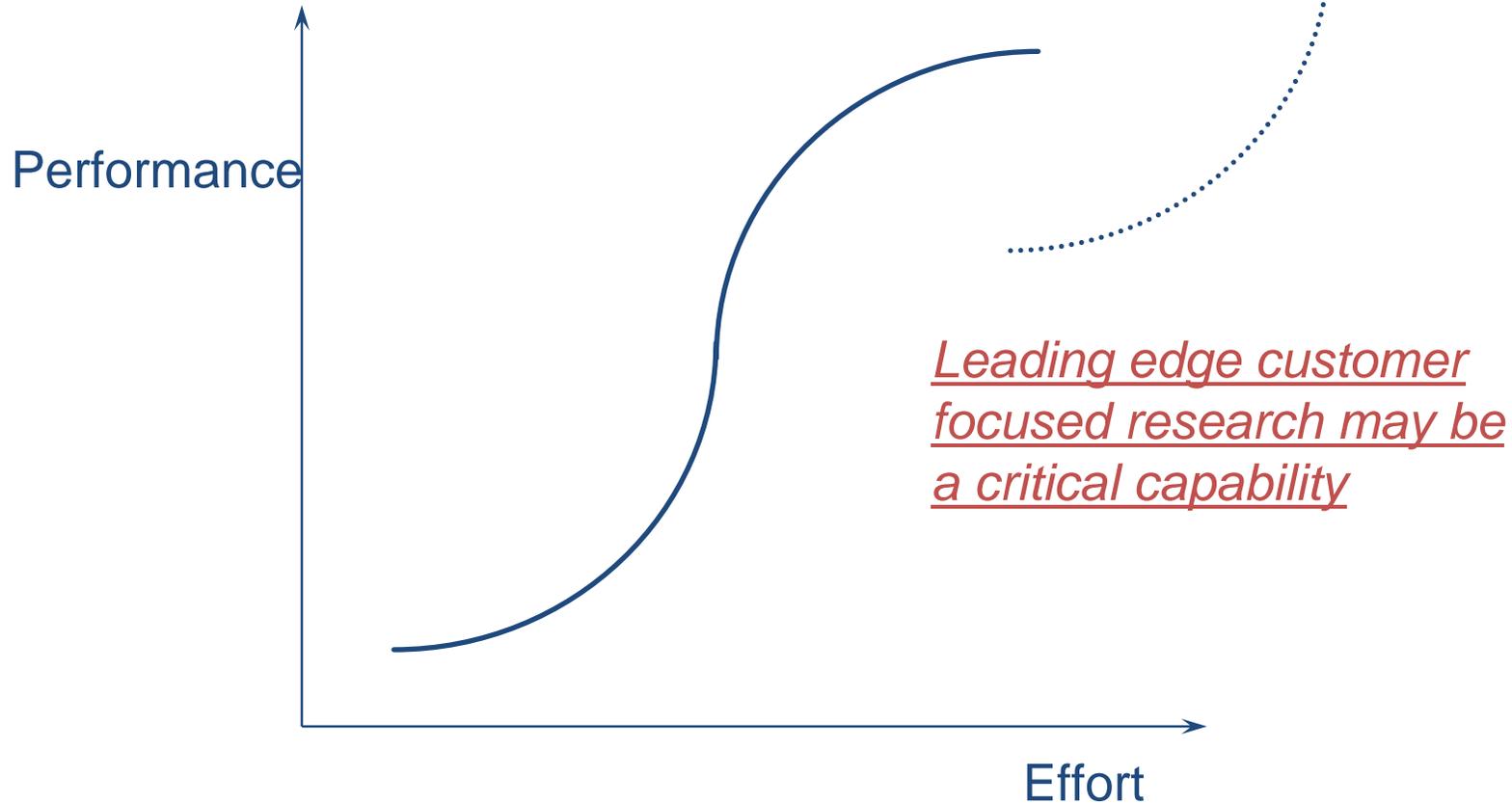
Clay Christensen: *The Innovator's Dilemma*

Buzz Groups: Other Disruptive Technologies?

What should entrants (new firms) do?

What should the established firm do?

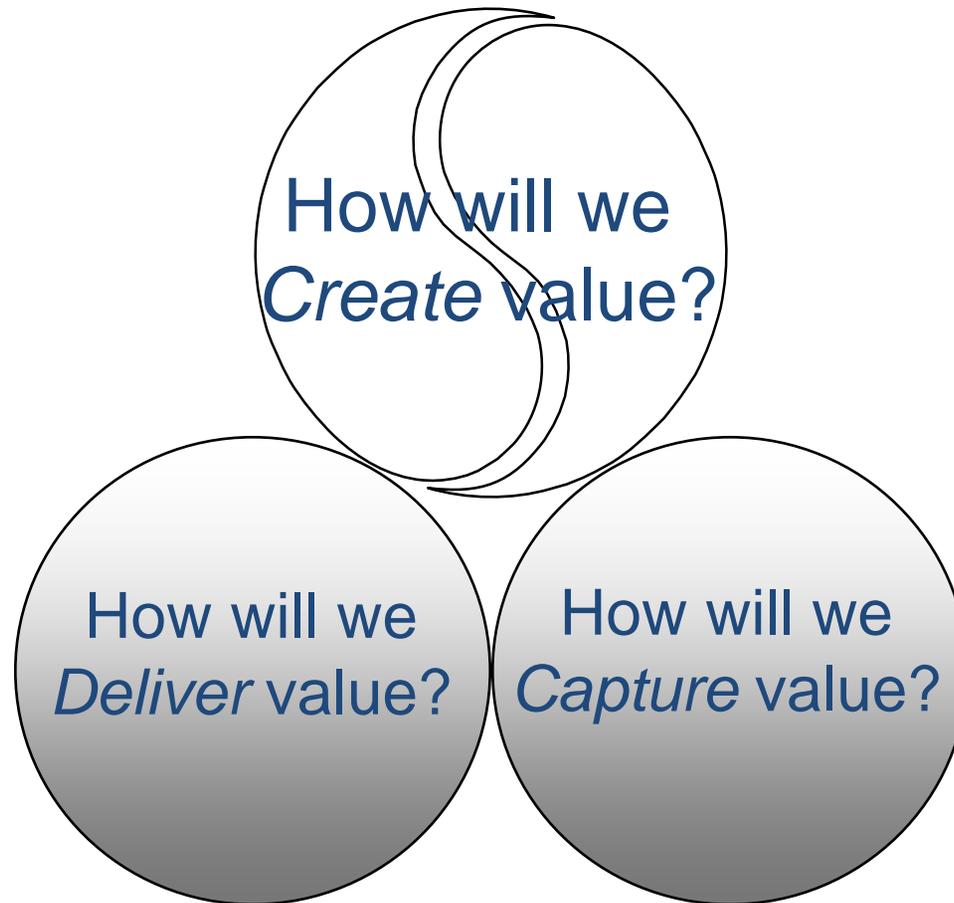
Managing the change in customer groups may be the hardest task!



What can be done?

- Launch and hope?
 - Lead user research
 - Virtual products
 - Small scale experiments
- } Significant resources required!
- Organizations capture relevant experience in structures like rules, roles, hierarchies

Previewing Next Time: Using Effective Organizational Structures to Bring New Technologies to New Markets



Strategic Challenge: Changing Environments are Unpredictable and Ambiguous!

SOURCES

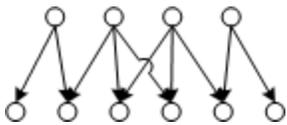
- Future S-curves and market evolution are hard to predict!
- Blurred timing and paths
- Shifting competitive basis, from products to business models
- Lack of control over key technology resources



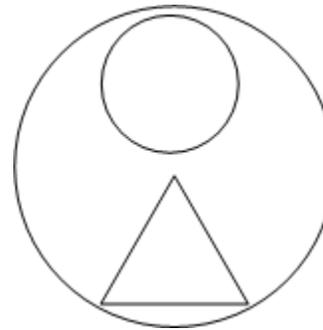
IMPLICATIONS

- Planning is limited
- Reacting is insufficient
- Traditional strategies of “defend a position” and “leverage core competence” are incomplete
- Shift from “closed” internal innovation to “open” innovation with partners

Potential Solution: Organizational Structures that respond to change



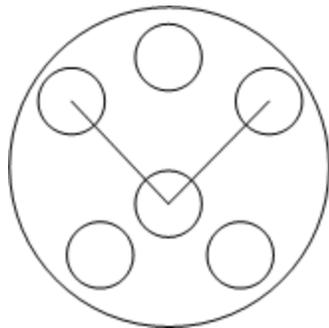
Hierarchy



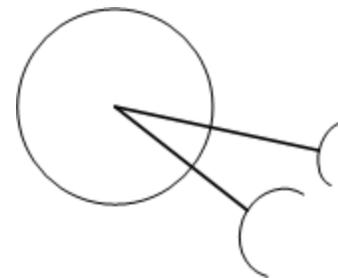
Roles



Rules



Unit Networks



Alliance Networks



Organizational Structures enable coordinated responses to environmental change by shaping action in real-time

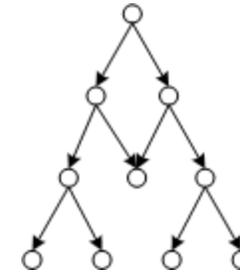
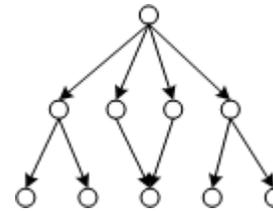
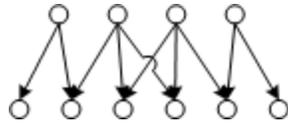
Amount of Organizational Structure can vary greatly!

Low

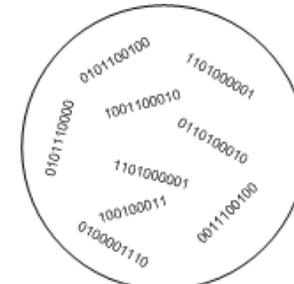
Medium

High

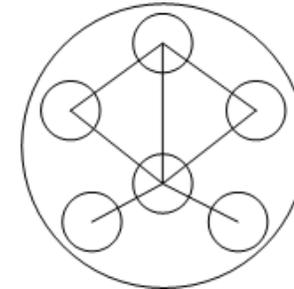
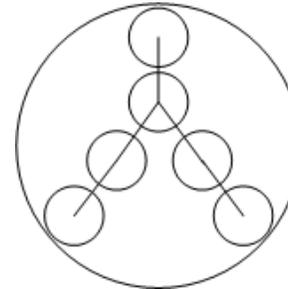
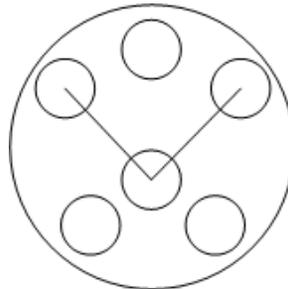
Hierarchy



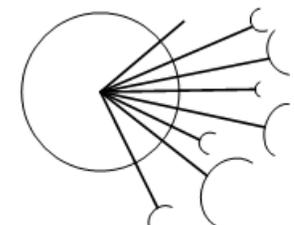
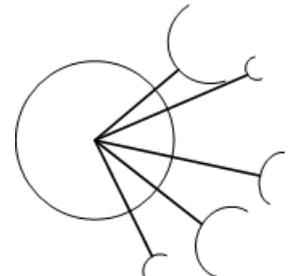
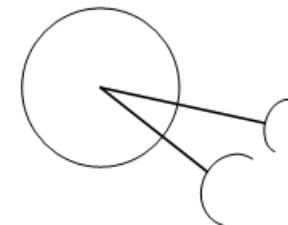
Rules



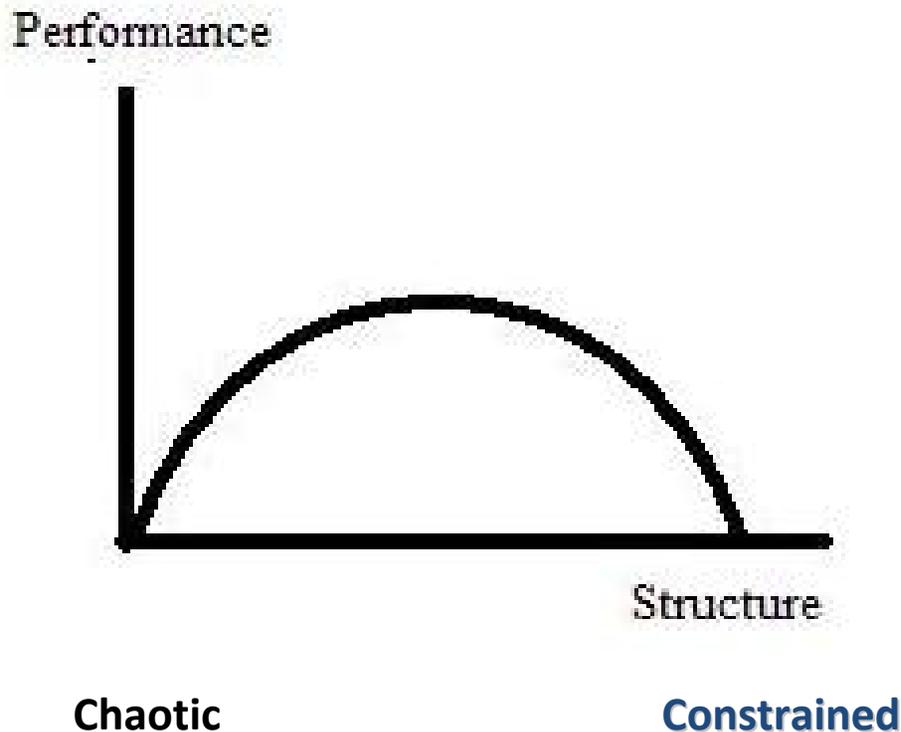
Unit Networks



Alliance Networks

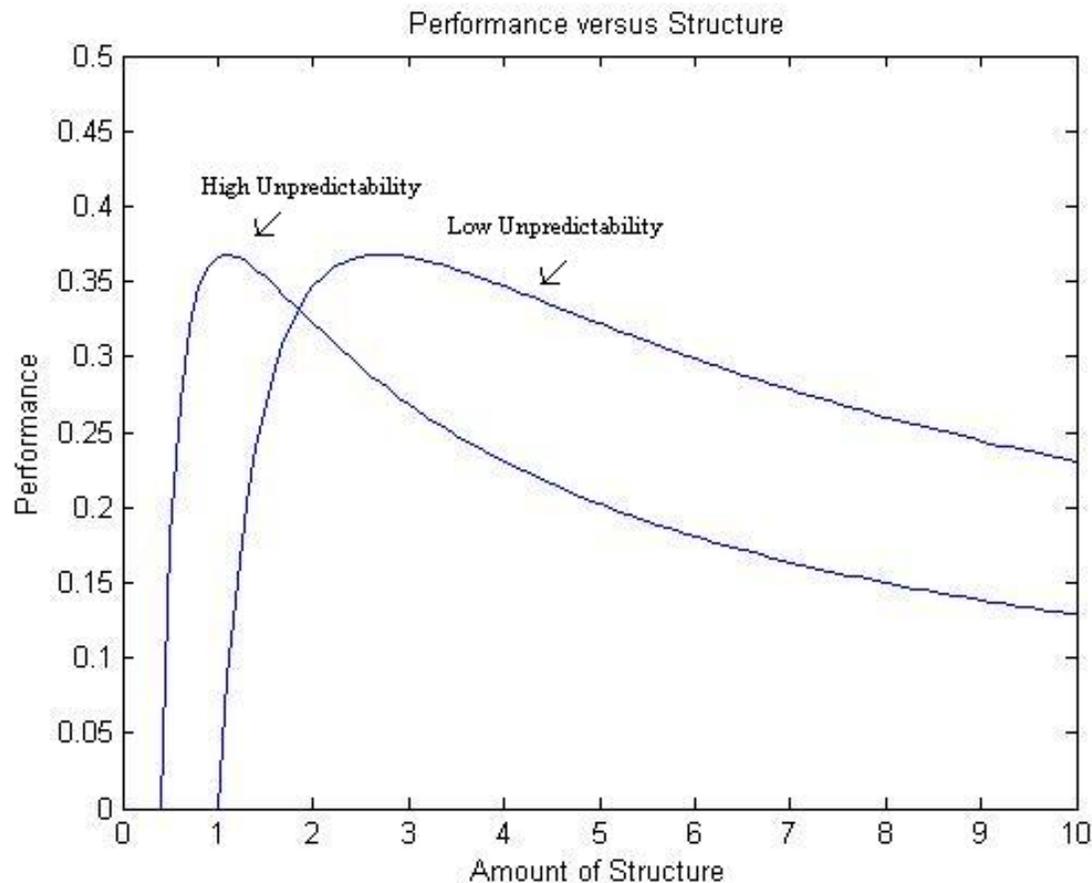


Inverted U-shaped Relationship btwn the Amount of Structure and Performance



- Fundamental Relationship illustrates the tension between efficiency and flexibility
- Observed in multiple industries and for multiple types of structure:
 - Hierarchy
 - Roles
 - Rules
 - Networks

New Modeling and Evidence suggests Asymmetry and Dependency on Market Dynamism



- Asymmetry: more forgiving with too much structure
- Optimum is less structured and more severe in less predictable environments
 - e.g., during discontinuities, better to use simple rules

Examples: Simple Rules in Dynamic Markets

Company	Simple rules
Intel®	<ul style="list-style-type: none">• Priority Rules helped Intel shift from DRAMs to Microprocessors• Simple Rules about minimum project size• Copy Exactly
Pfizer®	<ul style="list-style-type: none">• Clear ranking molecule types as research priorities• Maximum number of molecule types pursued at any one time• Projects “killed” according to step charts
Miramax Films®	<ul style="list-style-type: none">• Movies must<ul style="list-style-type: none">– Center on a basic human condition and flawed, but sympathetic character– Have a clear beginning, middle, and end• Disciplined financing (50% more efficient than industry standard)

The Crying Game Pulp Fiction
The English Patient
Life is Beautiful
Shakespeare in Love

For Next Session:

- **Novartis:**
 - New industry (for us! 😊 pharma) with new technologies (genomics) and new customers (new therapeutic areas)
 - Focus on effective organization to bring new technologies to new markets
 - How should Novartis reorganize now?

- **Two-page paper #2 due Session 6**