

Chapter 4

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**Standards Battles, Modularity,  
and Platform Competition**

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- Why Dominant Designs Are Selected
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# Overview

## ➤ Types of standard

- *De jure* standard: officially endorsed by organizations (e.g. IEEE, ISO)
- *De facto* standard: selected by market forces (dominant design)

## ➤ Pressure to selection of dominant design

- Technology cycle almost invariably exhibits a stage in which the industry selects a dominant design
- Many industries experience strong pressure to select a single (or few) dominant design(s)

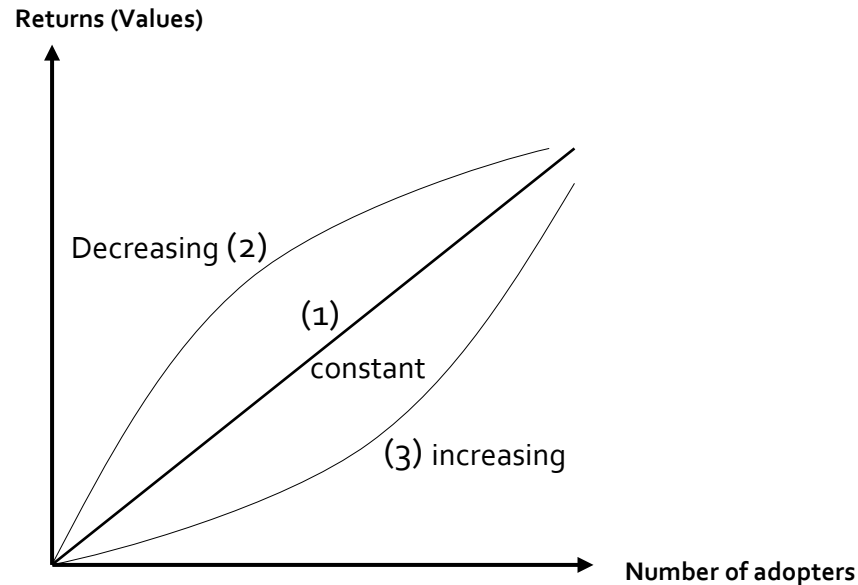
## ➤ Dimensions determining dominant design

- There are multiple dimensions shaping which technology rises to the position of the dominant design
- Firm strategies can influence several of these dimensions, enhancing the likelihood of their technologies rising to dominance

# Why Dominant Designs Are Selected

## ➤ Increasing Returns to Adoption

- The more a technology is adopted, the more valuable it becomes



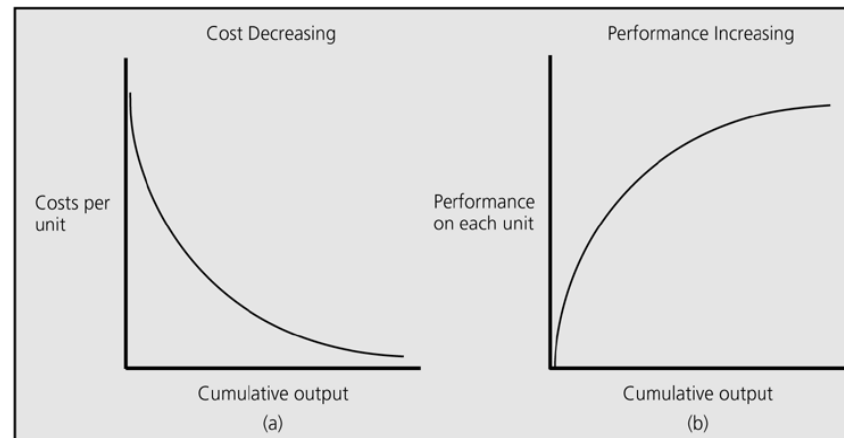
### ▪ Sources

- ✓ The more a technology is used, the more it is improved (learning effects)
- ✓ The more a technology is adopted, the more complementary assets are developed (network externalities)

# Why Dominant Designs Are Selected

## ➤ Learning Effects

- The more a technology is used, the more it is developed, and the more effective and efficient it becomes
  - ✓ Grater use of a technology generates more sales revenues
  - ✓ Grater use of a technology leads to grater knowledge accumulation
- Learning curve
  - ✓ As individuals and producers repeat a production process, they learn to make it more efficient and effective
  - ✓ Performance increases, or cost decreases, with the number of units of production, usually at a decreasing rate



# Why Dominant Designs Are Selected

## ➤ Learning Effects

- Prior learning and absorptive capacity

- ✓ Absorptive capacity refers to

- The ability to recognize, assimilate, and utilize new information
    - The phenomenon whereby as individuals or firms learn, they also increase their future ability to learn

- ✓ A firm's prior experience influences its ability to recognize the value of new information and to utilize it effectively

- Use of a particular technology builds knowledge base about that technology
    - The knowledge base helps firms use and improve the technology

- *Technologies adopted earlier than others are likely to become better developed, making it difficult for other technologies to catch up*

# Why Dominant Designs Are Selected

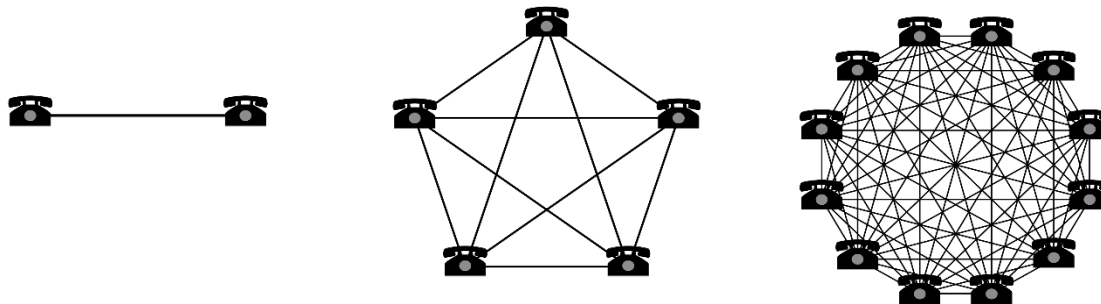
## ➤ Network Externalities

### ▪ Basic concepts

- ✓ Network externalities: the phenomenon that the benefit from using a good increases as the installed base increases
- ✓ Installed base: the number of users of a particular technology
- ✓ Complementary goods: additional goods and services that enable or enhance the value of another good

### ▪ Classic example: Industries physically networked (railroads or telecommunications)

- ✓ Metcalf's law: that the value of a telecommunications network is proportional to the square of the number of connected users of the system



# Why Dominant Designs Are Selected

## ➤ Network Externalities

### ▪ Network externalities arises where

#### ✓ (1) Compatibility is important since the installed base is high

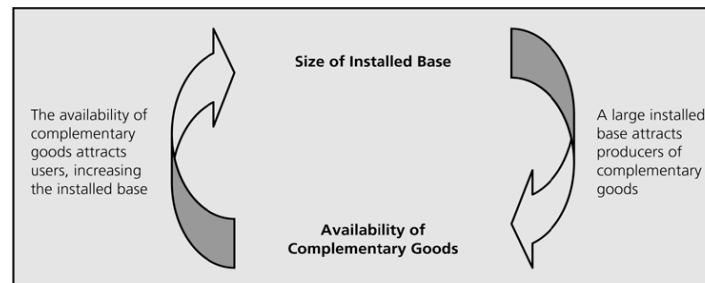
- e.g. many people choose to use “Wintel” in order to maximize the number of people with which their files are compatible
- User’s skill in a particular platform becomes more valuable as the size of IB increases

#### ✓ (2) Complementary goods are important

- e.g. most producers of complementary SW applications choose to design their products to be optimized to work with “Wintel”
- The availability of complementary goods influence users’ choice among platforms

### ▪ Self-reinforcing cycle (Positive feedback loop)

- ✓ A technology with a large installed base attracts developers of complementary goods
- ✓ A technology with a wide range of complementary goods attracts users, increasing the installed base



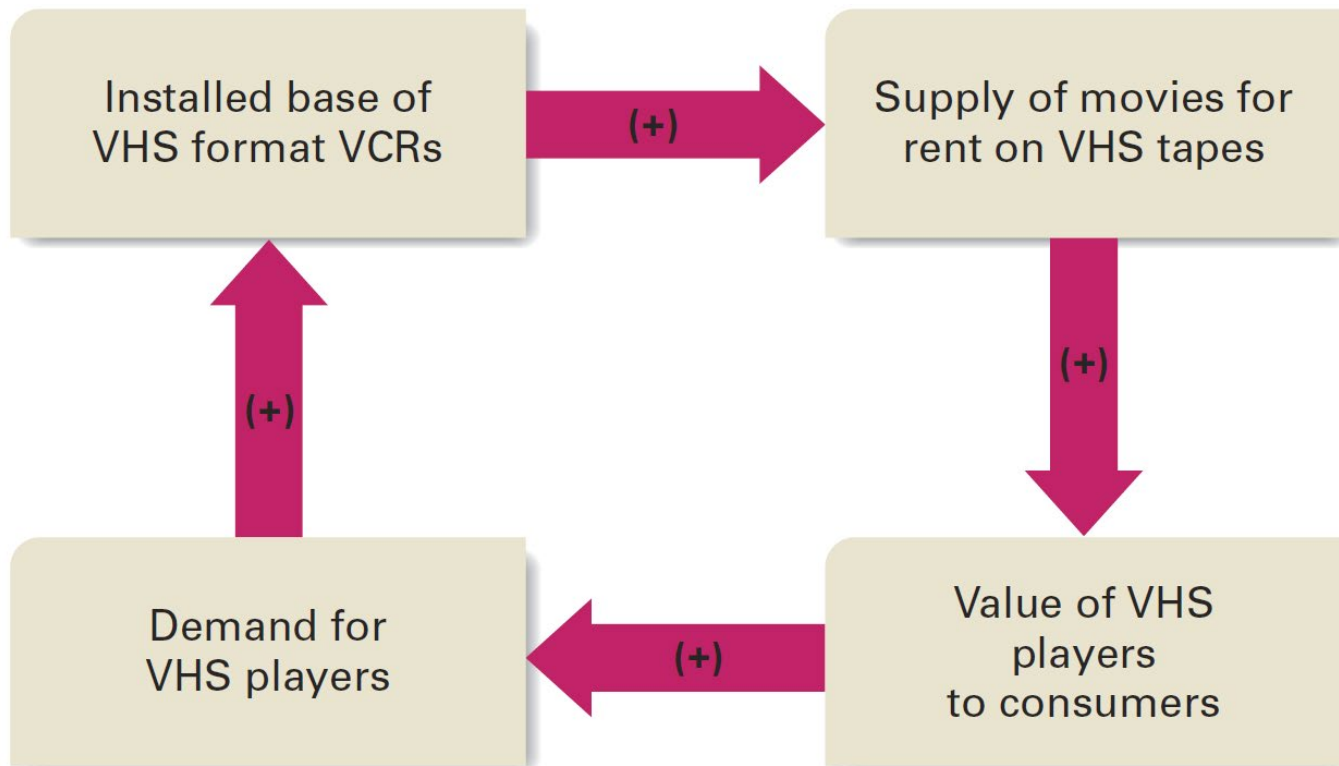


# Why Dominant Designs Are Selected

## ➤ Network Externalities

- Self-reinforcing cycle (Positive feedback loop)

- ✓ Example: VCR format war between Betamax (Sony) and VHS (Matsushita)



# Why Dominant Designs Are Selected

## ➤ Government regulation

- Consumer welfare benefits of having a single dominant design prompts government organizations to intervene, imposing a standard
  - ✓ e.g. NTSC color standard in television broadcasting in the U.S.
  - ✓ e.g. general standard for mobile communications (GSM) in the EU
- The technology design embodied in that standard necessarily dominates the other technology options available to the industry

# Why Dominant Designs Are Selected

## ➤ The Result: Winner-Take-All Markets

### ▪ Natural monopolies

- ✓ Firms supporting winning technologies may earn huge rewards
  - can enjoy near-monopoly rents in the short run
  - can be in a good position to shape the evolution of the industry in the long run.
- ✓ Firms supporting losing technologies may be locked out of the market

### ▪ Winner-take-all markets

- ✓ Such markets require different firm strategies for success than markets with less pressure for a single dominant design
- ✓ Technologically superior products do not always win
- ✓ How to manage the multiple dimensions of value that shape design selection is important

# Multiple Dimensions of Value

- The value of a technology is strongly influenced by both
  - Technology's standalone value
  - Network externality value

# Multiple Dimensions of Value

## ➤ Technology's Standalone Value

- The things it can do or its sources of appeal
- Driven by functions, aesthetic qualities, ease of use, etc.
  - ✓ Music streaming service: playlist function, recommender system, offline play, etc.
- Buyer utility map
  - ✓ Each cell provides an opportunity to offer a new value proposition to a customer
  - ✓ A new technology offers a change in value in a single or a combination of cells

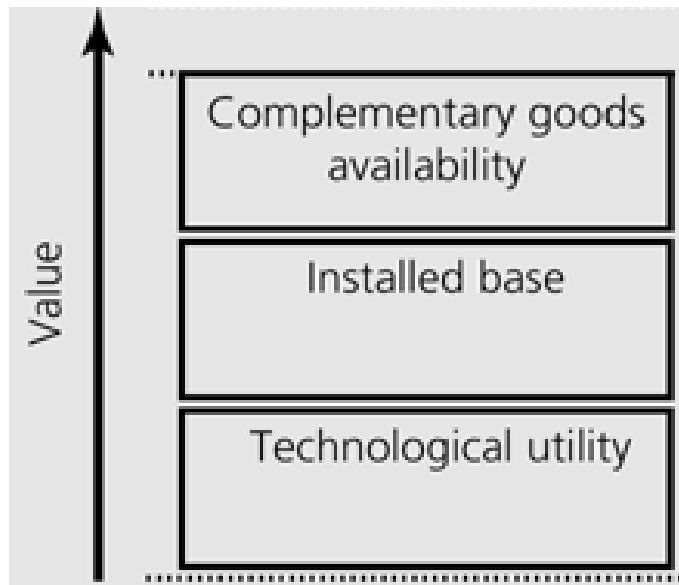
Buyer experience cycle

		Purchase	Delivery	Use	Supplements	Maintenance	Disposal
Utility levers	Customer productivity			Save money on gasoline			
	Simplicity			Operates like a regular combustion engine vehicle			
	Convenience			Does not have to be plugged into electrical outlet	Can purchase fuel at regular gas stations	Maintenance is similar to regular combustion engine vehicle	
	Risk and image						
	Fun			Connotes image of environmental responsibility			
	Environmental friendliness			Emits lower levels of pollutants	Requires less use of fossil fuels		

# Multiple Dimensions of Value

## ➤ Network Externality Value

- includes the value created by:
  - ✓ Size of the technology's installed base
  - ✓ Availability of complementary goods



Various compatible SW developed for Windows

The number of installed PCs with which the user can interact

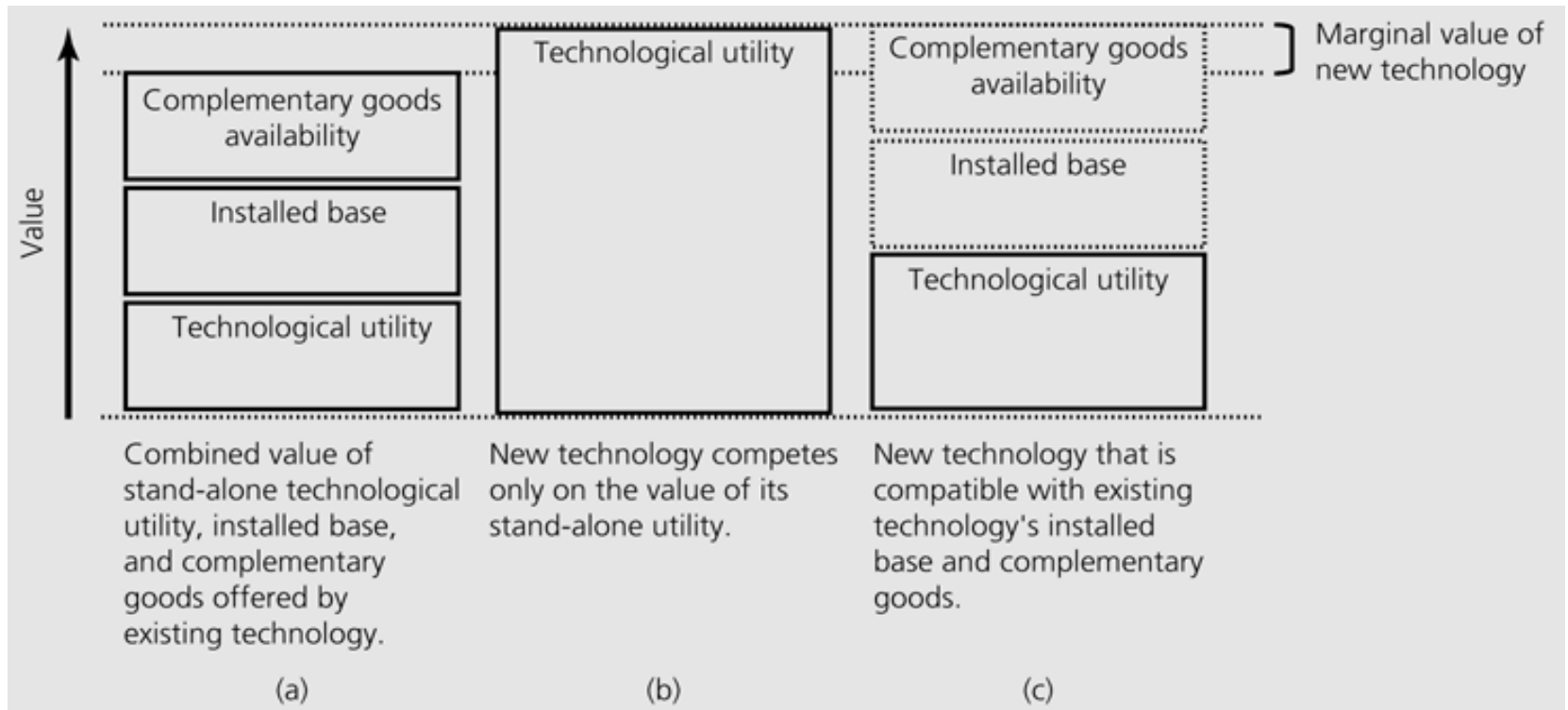
Ability to make it easy for consumers to use their PCs



# Multiple Dimensions of Value

## ➤ Network Externality Value

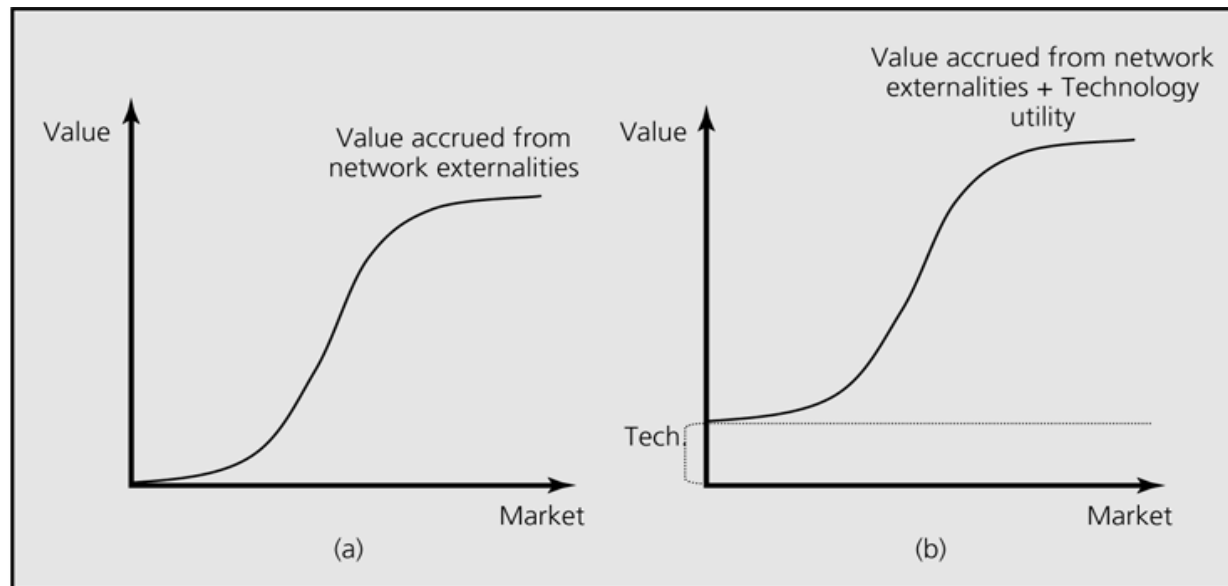
- To successfully overthrow an existing dominant technology, new technology often must either offer:
  - ✓ Dramatic technological improvement (b)
  - ✓ Compatibility with existing installed base and complements (c)



# Multiple Dimensions of Value

## ➤ Competing for design dominance in markets with network externalities

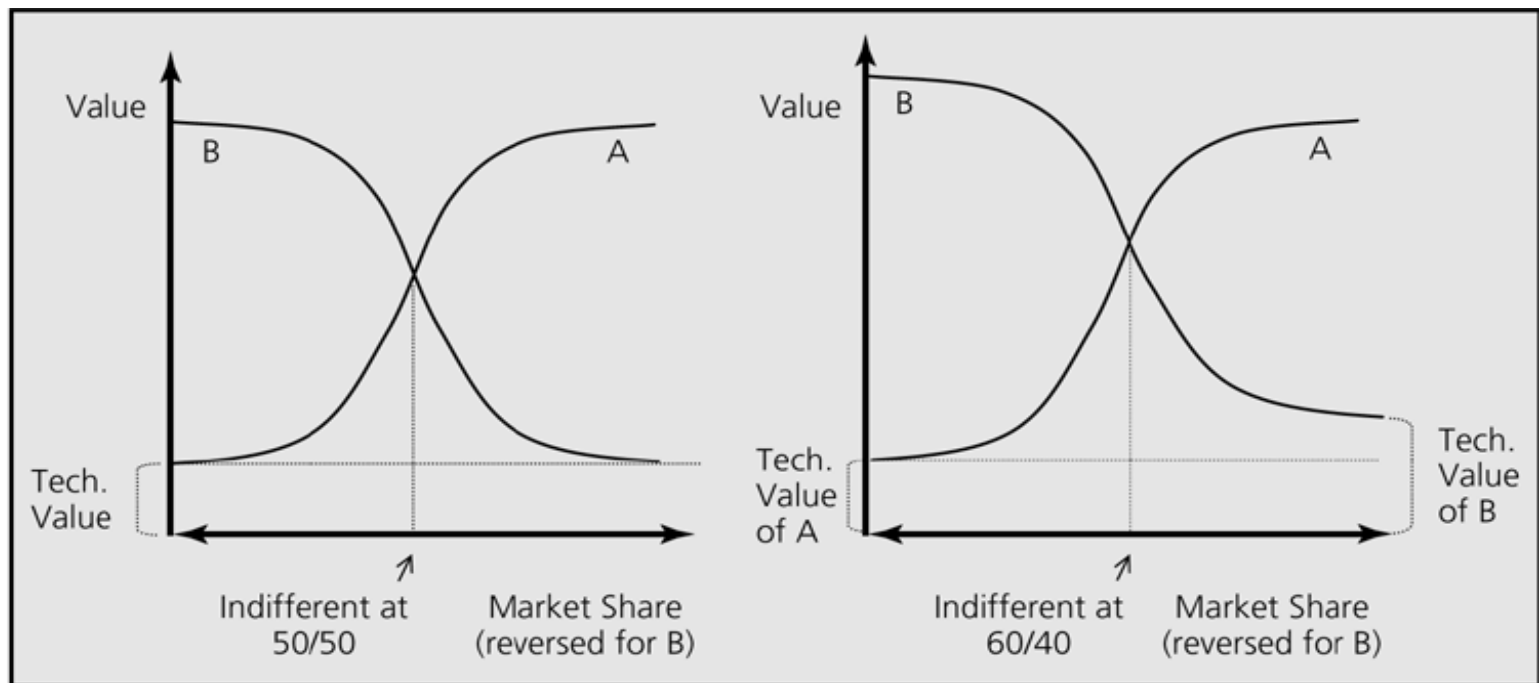
- Graph of the value a technology offers in both standalone value and network externality value
  - ✓ Do network externalities create pressure for a dominant design or a few dominant designs?
  - ✓ How large of an installed base is necessary before most of the network externality benefits are captured?





# Multiple Dimensions of Value

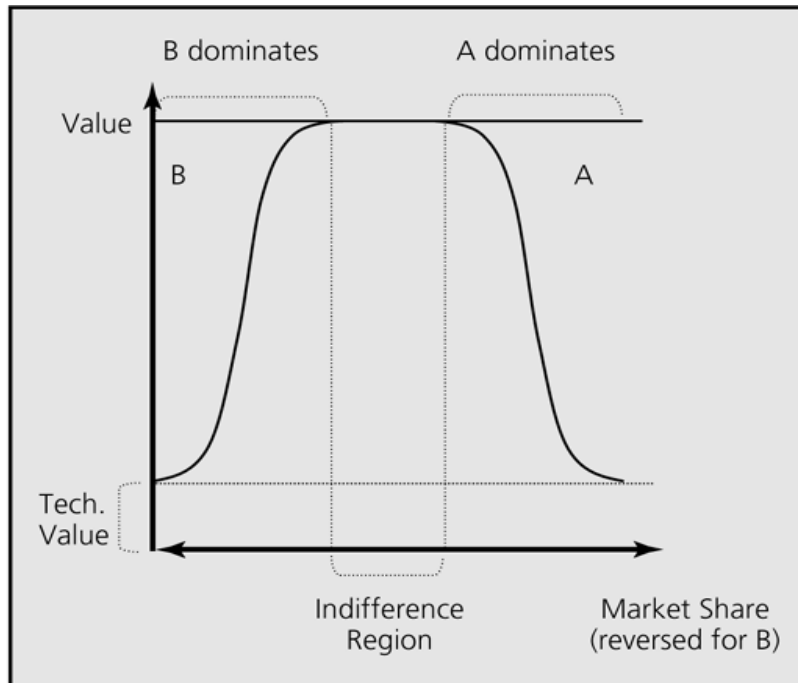
- Competing for design dominance in markets with network externalities
  - Graph of two competing technologies



# Multiple Dimensions of Value

## ➤ Competing for design dominance in markets with network externalities

- When customer requirements for network externality value are saturated at lower levels of market share
  - ✓ Firms in these markets may compete with multiple dominant designs
  - ✓ Customers face a greater region of indifference between the two technologies
  - ✓ e.g. mobile OS market



# Multiple Dimensions of Value

## ➤ Are Winner-Take-All Markets Good for Consumers? (Theory in Action)

### ▪ Contradiction

- ✓ Economics emphasizes the consumer welfare benefits of competition
- ✓ Network externalities suggest users get more value when one technology dominates
- Should governments intervene in markets?

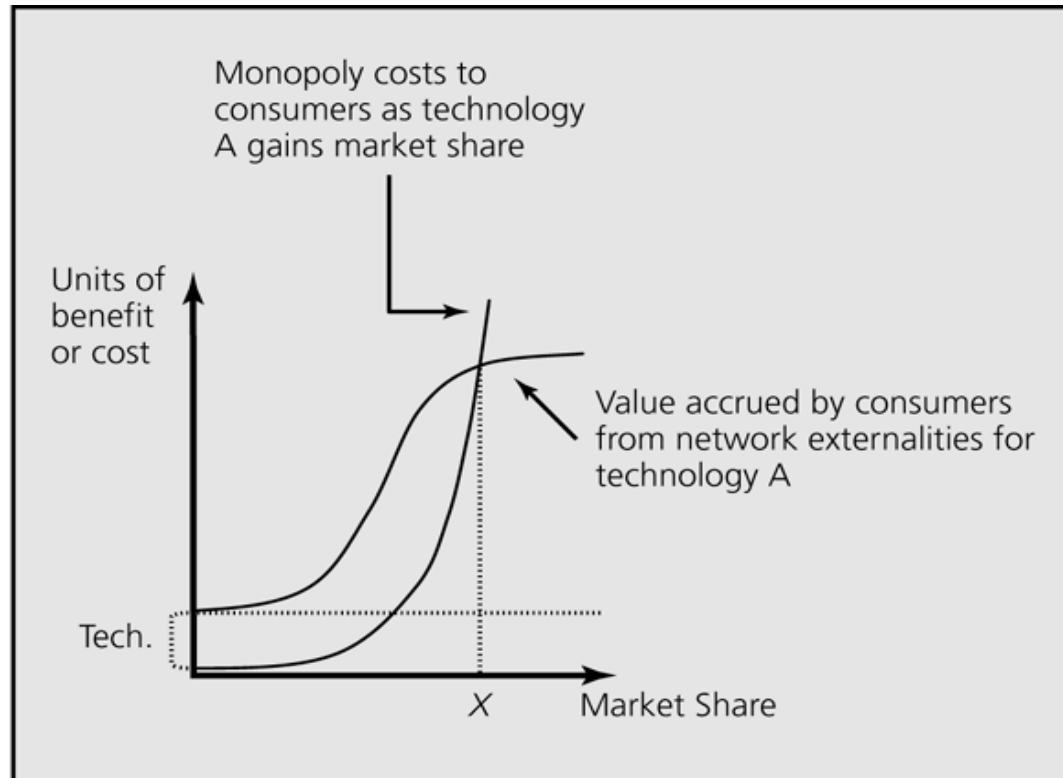
### ▪ Network externality benefits Vs. monopoly costs

- ✓ Compares the values customers reap from network externalities at different levels of market share with the corresponding monopoly costs
- ✓ Network externality benefits are likely to grow logistically
- ✓ Monopoly costs are likely to grow exponentially
  - Monopoly costs: Higher prices, Less product variety, Poor customer service, etc..

# Multiple Dimensions of Value

## ➤ Are Winner-Take-All Markets Good for Consumers?

- Network externality benefits Vs. Monopoly costs
  - ✓ Where monopoly costs exceed network externality benefits, intervention may be warranted



# Modularity and Platform Competition

- Industry players use modularity to create a platform ecosystem where many different firms contribute to the product system
  - Modular systems are those that can be separated and recombined to change their configuration, scale, or functions
    - ✓ Standardized interfaces ensure that components are compatible
    - ✓ In some product systems modularity enables components from different producers to be recombined (for example, smartphones with different apps); in others only components from a single firm are recombined (for example, Ikea shelving systems)
  - In a platform ecosystem, some core part of a product mediates the relationship between a wide range of other components or complements and prospective end-users.
    - ✓ A platform's boundaries can be well-defined with a stable set of members or amorphous and changing
    - ✓ The success of all members of the ecosystem depends in part upon the success of other members
    - ✓ Members often invest in co-specialization or exclusivity agreements.