The Economics of E-commerce and Technology

The Nature of Technology Industries

Technology Firms are Different

▸ Main ideas so far can be applied to any firm

  ▸ Porter's five forces

  ▸ Competitive advantage

▸ Technology firms are different

  ▸ Reproducibility

  ▸ Degree of variety

  ▸ Customizability

  ▸ Adaption

  ▸ Experimentation

Reproducibility

▸ **Information goods are…**

- ▸ Costly to produce but cheap to reproduce.
- ▸ That is, high fixed costs but low (zero) marginal costs.
- ▸ No capacity limits

▸ **Examples**

- ▸ Cable companies – cost to lay lines
- ▸ Microsoft office – cost to design program
- ▸ Amazon – cost of building network of warehouses

▸ **The economics is the same as in the offline world**

- ▸ But scale is different (shopping mall vs eBay)
- ▸ Speed is different (Electricity standard vs Blu-Ray standard)

How Not to Make Money: CD Phone Books

‣ **CD Phone Books are digitized versions of Yellow Pages**
  ‣ Nynex covered NYC in 1986. Charged $10,000 per disk.
  ‣ Pro CD covered entire USA. Charged $hundreds in early '90s

‣ **Lots of entry ensued**
  ‣ Over 20 companies by end of 1990s.
  ‣ Cost of disk is $20.

‣ **Product is commodity and no capacity constraints**
  ‣ If firm A charges $200.
  ‣ Then B should charge $190 and steal all market.
  ‣ Then A should charge $180 etc.
  ‣ Prices go down to marginal costs.

Two Business Models

- There are two ways firms can make money when selling information goods

- Differentiate the product
  - Sell something different from other firms
  - Firm has some market power and can recover fixed costs

- Be a dominant firm
  - Be the only firm in the industry
  - Have the lowest costs.
  - Have the first-mover advantage.

Differentiation

Dimensions of Differentiation

▸ Delay (e.g. cinema vs. DVDs, Netflix vs. Blockbuster)

▸ User interface (e.g. Google vs. Yahoo)

▸ Customizability (e.g. Facebook's privacy vs MySpace)

▸ Resolution (e.g. 4k, HD, Regular movies)

▸ Speed of operation (e.g. HP printers)

▸ Flexibility of use (e.g. protected MP3s)

▸ Comprehensiveness (e.g. Mathematica)

▸ Annoyance (e.g. Netflix vs Network TV)

▸ Customer service (e.g. Zappos vs Walmart)

▸ Fashion image (e.g. Apple vs Dell)

▸ Reliability (e.g. Toyota vs Jeep)

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Longtail

▸ There is huge variety of many products
- ▸ Books, Songs, Movies, iPhone Apps, Games etc.
- ▸ Both horizontally and vertically differentiated

▸ Distribution of demand follows power law
- ▸ Frequency approximately inversely proportional to rank.
- ▸ Seen with words in English: $Pr(r)=0.1/r$, where r is rank.
- ▸ Distribution has fat tail, where there is lots of mass.

▸ Niche products matter
- ▸ Typical bookstore has 130,000 titles.
- ▸ One third of Amazon's sales come from outside top 130,000.

▸ Sorting information
- ▸ With more information, need better organization and filtering.

Power laws…
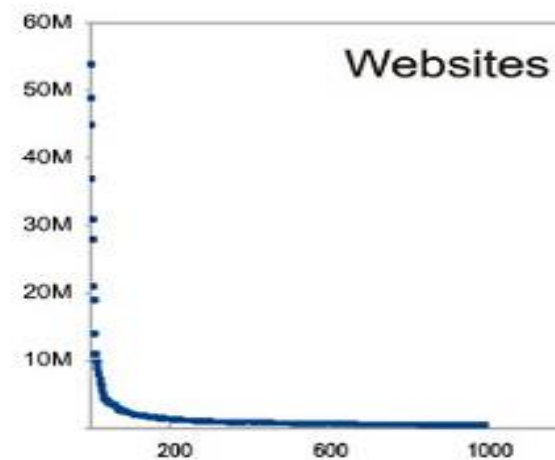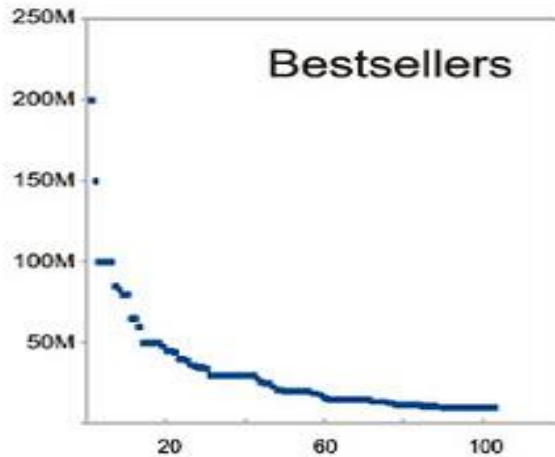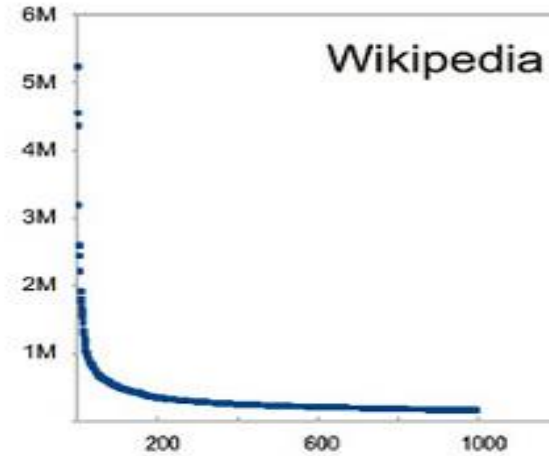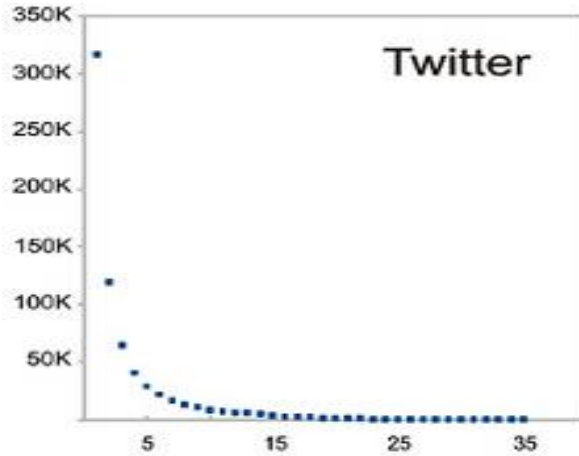
Squeezing the Middle

- Movie industry
  - Number of American movies growing (610 in 2009; 471 in '99)
  - Blockbusters growing bigger (32 movies over $100m; 21 in '99)
- Music sales
  - Album sales declined 20% since 2004.
  - Hits hold up best; Albums ranked 300-400 hold up worst.
- Fragmentation
  - Due to long tail and falling costs of production and distribution.
- Consolidation
  - People want to share same culture (e.g. Terminator).
  - New technology helps distribution and communication.
  - Increased role of brands (e.g. NY Times)

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Dominant Firm

First-Mover Advantage

▶ First firm may deter future entry. Strategies:

▶ Build capacity to respond to a threat

- ▶ Build base of loyal (locked in) customers.
- ▶ Build network.
- ▶ Have more capacity that you need.

▶ Limit-entry pricing

- ▶ Price low in order to prevent entry.
- ▶ Signals you are "tough" and builds customer base.
- ▶ Example: Airlines before Southwest enters.

▶ After entry, play tough.

- ▶ This may scare off first entrant.
- ▶ Give you a reputation and prevent future entry.
- ▶ Example: Walmart and Unions.

Cost or Benefit Leadership

- Average costs made up of
  - Marginal costs (may be already low with information good)
  - Per-period fixed cost (e.g. cost of upgrading software)
- How to reduce average costs
  - Build volume to amortize fixed costs.
  - Build volume to benefit from learning-by-doing.
  - Supply chain management: reduce distribution costs.
- How to raise benefits
  - Invest in superior technology
 - Improved customer service
  - High brand equity

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Other Aspects of Information Goods

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1. Product Customization

- Online firms have lots of information on customers.
  - Demographics: IP address, registration
  - Observation: cookies monitor clickstream (pages visited and for how long), past purchases, partnerships with other sites.
- Use this information to customize experience
  - Targeted advertising.
  - Search results.
  - Product recommendations.
  - Facebook friend finder.
- Data is the oil of the 21st century.

Google Analytics
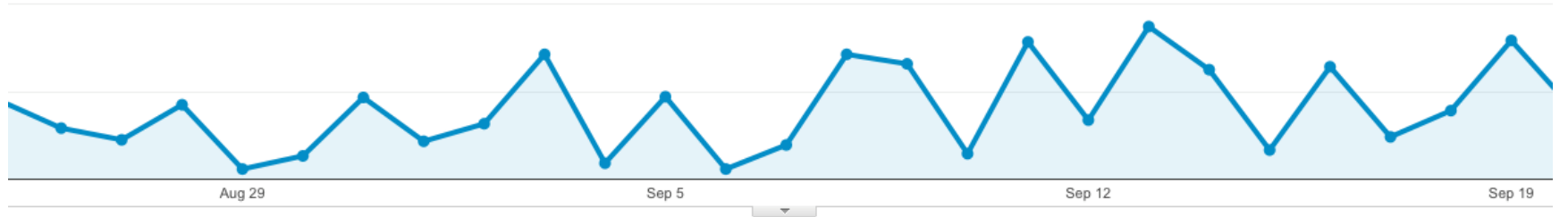
Geographic Distribution
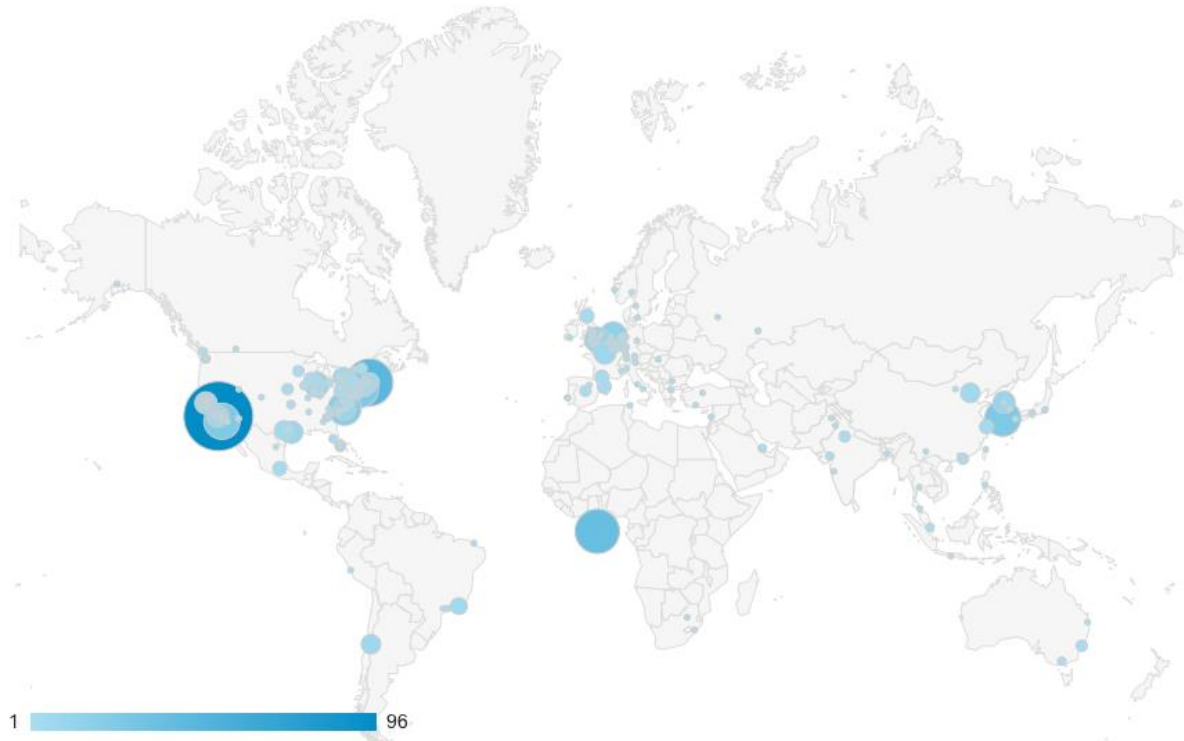
Behavior
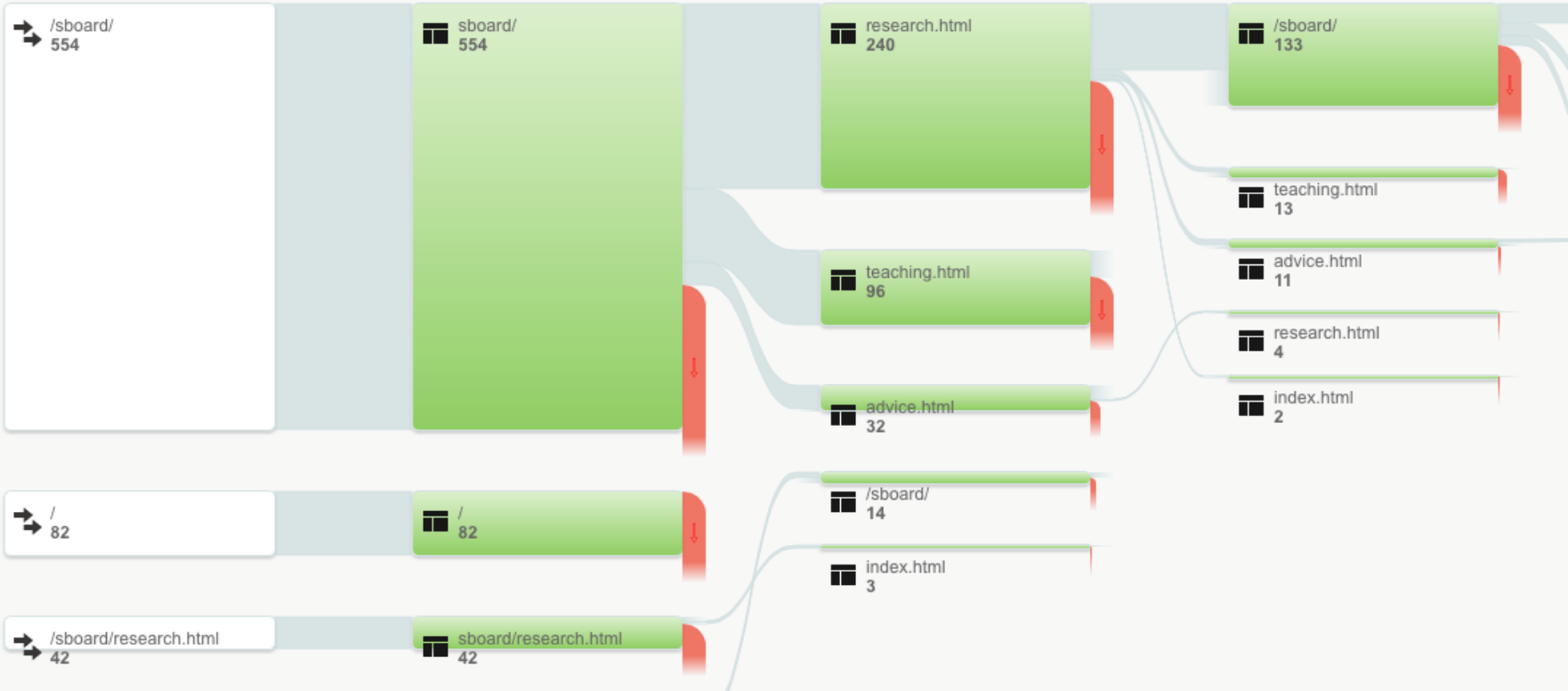
2. Content Creation

- Users also design own experience
  - WordPress – people to create blogs.
  - Craigslist – online classified.
  - Vine – six-second videos.
- Crowdsourcing
  - Wikipedia allows users to create own encyclopedia.
  - Ushahidi provides crisis information.
  - Kickstarter crowd-funds projects.
  - Open source software design.
- Business model
  - Provide toolkit for people to build product.
  - Provide structure for interaction between people.

How we used to do this…The OED

- Started 1857
    - 'A' published in 1888
    - 'Z' published in 1928
    - 22,000 pages
- Big data
    - Hundreds of volunteers
    - 3.5m quotation slips
    - Scriptorium had 1,029 pigeon holes
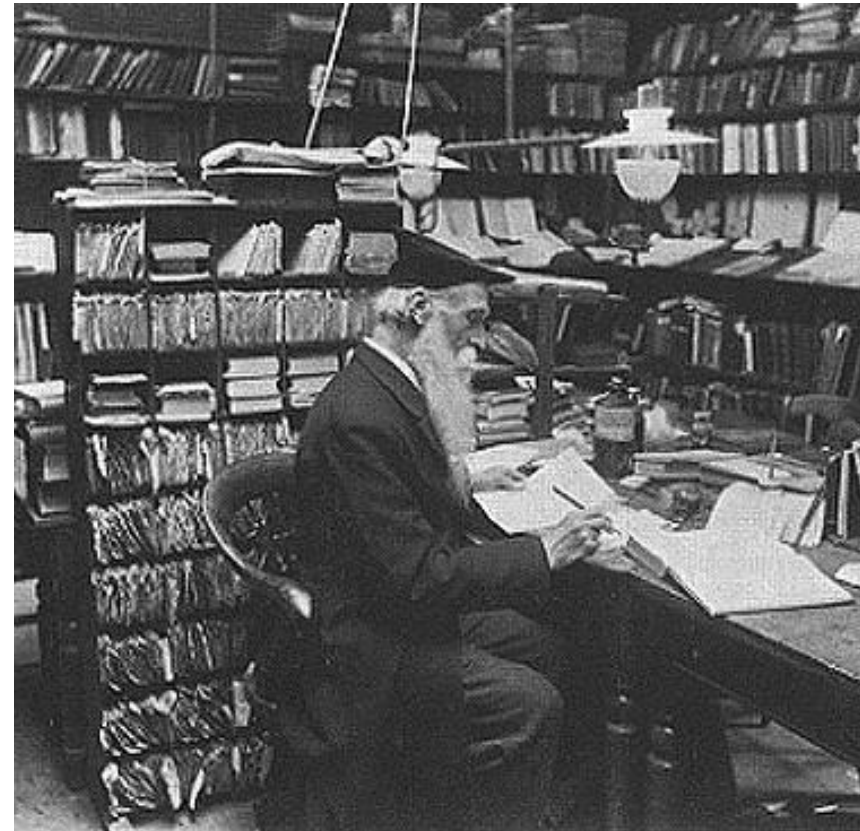
3. Reproducibility and Property Rights

- Information is a public good (i.e. it is nonrivalrous)
    - With traditional goods there is physical cost of reproduction.
- Excluding people from information
    - Reduces consumption and welfare
    - Gives rents to seller, encouraging innovation
    - May lower subsequent innovation
- How to exclude
    - Intellectual property: patents, copyright, trademarks.
    - Trade secrets.
- Hard to enforce with online economy
    - Perfectly reproduce and instantly transmit around the world.
    - Information regarding how to break protection also free.
- Are some firms too worried? Cassette player. Video recorder.

4. Experimentation and Adaptation

‣ Traditional industries

   ‣ Changing product is rare occurrence (e.g. car models).

   ‣ Hard to gauge reaction (surveys, focus groups).

‣ Experimentation online

   ‣ Easy to run controlled experiments.

   ‣ Refine pricing, matching algorithms, recommendations etc.

‣ Adaptation

   ‣ When the state of the world changes, firm can react quickly.

   ‣ Also react to competitors (e.g. first-price ad auctions).

Experimentation…

# Figure 2: Brand Keyword Click Substitution
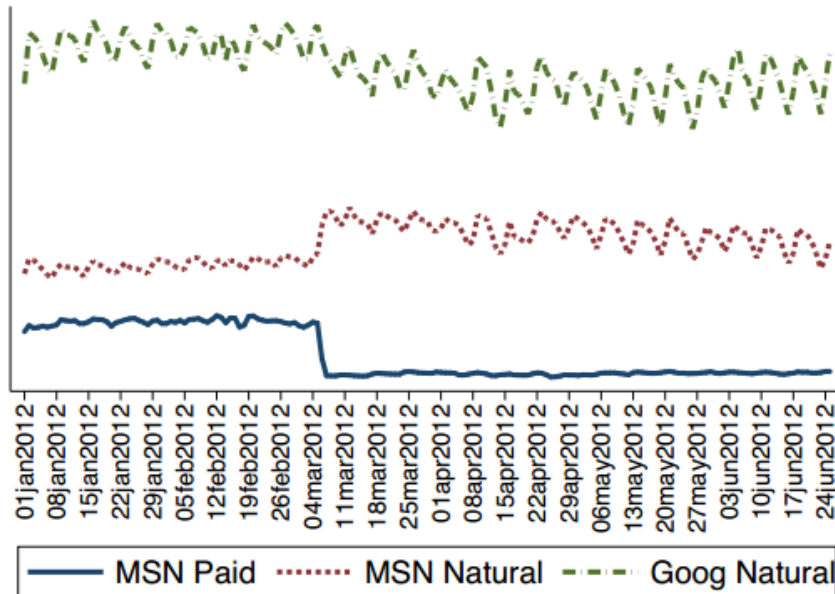
(a) MSN Test
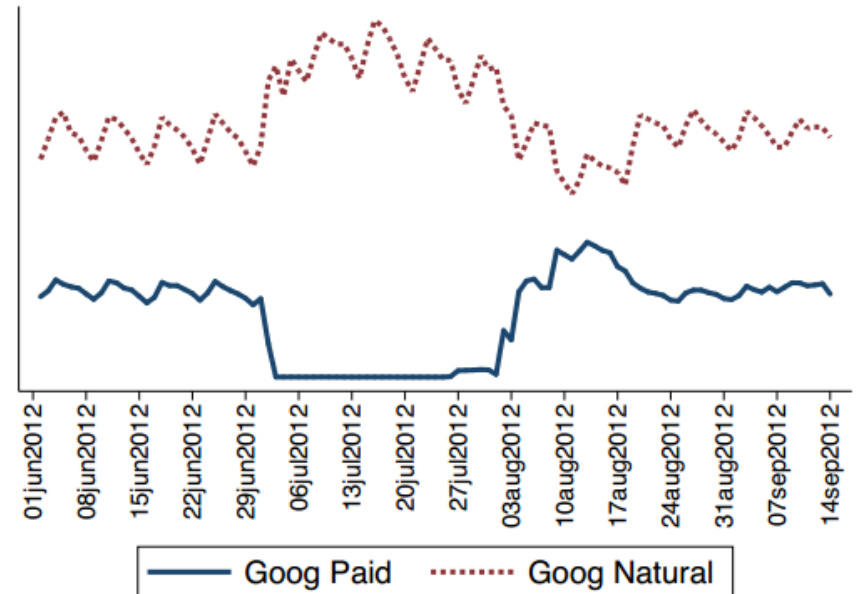
(b) Google Test

Adaptation in AdWords Auctions
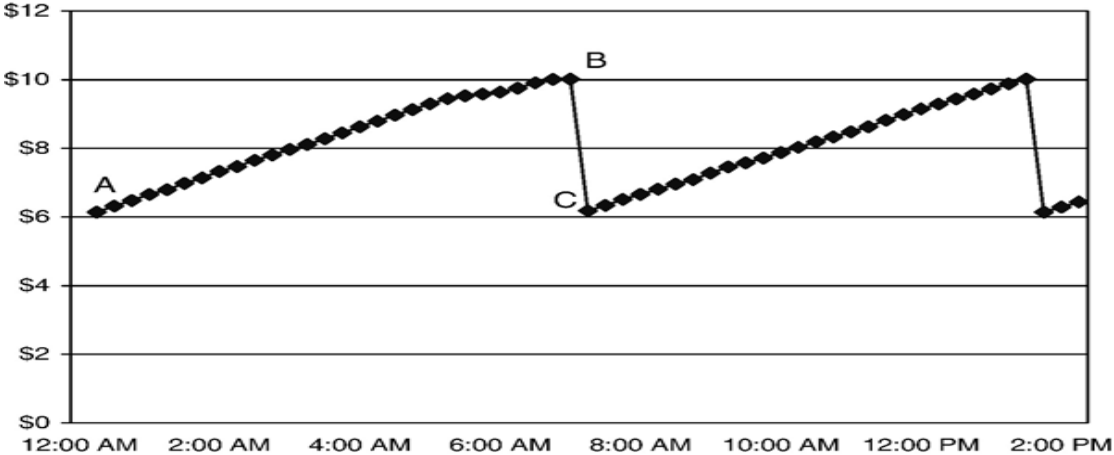
(a) 14 hours
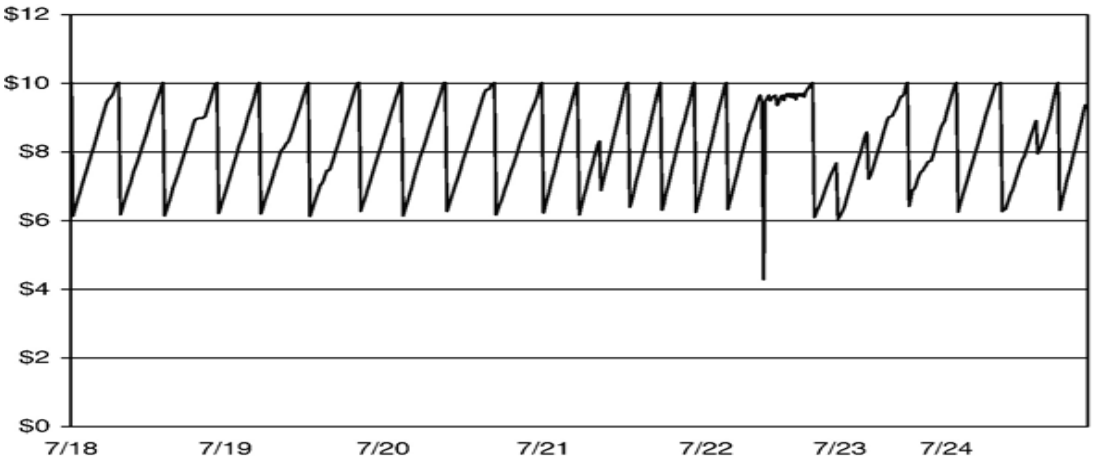
(b) 1 week

Adaptation (gone wrong)

5. Platforms and Market Design

▸ **Platforms control many aspects of exchange**

  ▸ Online firms have lots of information about customers.

  ▸ They can also control what participants know about the product, the market and each others.

▸ **Examples**

  ▸ Letting participant monitor each other (e.g. Yelp).

  ▸ Reputation mechanisms (e.g. eBay).

  ▸ Anonomizing interactions (e.g. Hotwire).

  ▸ Market rules (e.g. Google ad auctions).

  ▸ Structuring search (e.g. Facebook).

  ▸ How people see prices (e.g. Kayak fare forecaster).

6. Product trials

▸ Experience good: The quality is known after consumption.

  ▸ What is today's NY Times worth?

  ▸ How good is this iPhone app?

  ▸ All information is experience good!

▸ Strategies

  ▸ Reveal parts of information (e.g. free song, Amazon's "look inside")

  ▸ Given temporary access to information (e.g. put on Youtube)

  ▸ Promotional pricing (e.g. low prices for new subscribers)

  ▸ Building a brand/reputation (e.g. NY Times)

  ▸ Testimonials (e.g. Trip Advisor)

  ▸ Influential reviewers (e.g. movies)

  ▸ Freemium (e.g. Dropbox)

7. Information and Attention

- The internet promises to lower search costs
  - Easy to visit many stores.
  - Price comparison websites.
- However, there is information overload
  - Increase in number and types of sites.
  - Increase in products at a given site.
- Important to "organize the world's information"
  - Locating, filtering and communicating what if useful.
- Examples
  - Drudge vs. Google news.
  - Netflix or Spotify need to recommend music.

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