The Economics of E-commerce and Technology

Platform Markets
Platform markets

- A platform brings together groups of users.

**Examples:**
- Real world: Credit cards, HMOs, Shopping malls
- Technology: operating systems, video games, DVDs
- Online: Web search, Amazon marketplace, iTunes.

**Same-side network effects**
- Negative: An Xbox developer prefers less competition.
- Positive: An Xbox user prefers more users.

**Cross-side network effects**
- An Xbox user prefers more developers.
Platform markets

- Platforms differ from traditional retailers
  - Pays for goods up-front, eliminating coordination problem.
  - Assume platform has all bargaining power (but Intel, EA)

- Three-sided network
  - YouTube: consumers, advertisers, content providers.

- Platforms may be
  - competitive (DVD standard)
  - proprietary (XBox)
  - open (WiFi standard)

- Platforms may be compatible (Dell, Compaq) or incompatible (Windows, Mac).
Monopoly Pricing
Pricing

- There are 2 groups of agents, $k=1,2$
- Let $n_k$ be population size, $n_k^e$ be expected population size
  - Demand curve for group $k$ is $p_k(n_k; n_1^e, n_2^e)$.
  - Fulfilled expectations demand is $p_k(n_k; n_1, n_2)$, where $n_k = n_k^e$.
- Cost $c(n_1, n_2)$
- Firm chooses $(n_1, n_2)$ to maximize profits,
  \[
  \pi = n_1 p_1(n_1; n_1, n_2) + n_2 p_2(n_2; n_1, n_2) - c(n_1, n_2)
  \]
  - Ignoring problem of multiple equilibria
- First order condition for $n_1$:
  \[
  p_1(n_1; n_1, n_2) + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1} + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1^e} + n_2 \frac{\partial p_2(n_2; n_1, n_2)}{\partial n_1^e} = \frac{\partial c(n_1, n_2)}{\partial n_1}
  \]
Pricing

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\[ p_1(n_1; n_1, n_2) + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1} + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1^e} + n_2 \frac{\partial p_2(n_2; n_1, n_2)}{\partial n_1^e} \frac{\partial c(n_1, n_2)}{\partial n_1} = \frac{\partial c(n_1, n_2)}{\partial n_1} \]

- Marginal benefit consists of four terms:
  - First and second – same as standard MR curve
    - Marginal and inframarginal effects of increasing quantity.
  - Third – same side network effects
    - How increasing \( n_1 \) raises value of marginal type-1 agent.
  - Fourth – cross side network effects
    - How increasing \( n_1 \) raises value of marginal type-2 agent.
Pricing: Lessons

- Subsidize those who create value for others
  - Search engines subsidize users with free search and email.
- Typically platform have “money side” and “subsidy side”.
  - Example: Adobe gives pdf readers away free.
- Same side vs. cross side network effects
  - Ladies night on Thursday but not Friday.
- Other considerations
  - Attract marquee users (Macy’s pays lowest rents in mall)
  - Adverse selection (Westside rentals, TheLadders, eHarmony)
  - Long run effect of prices (Mac vs. Windows)
  - Mobilization (Charge zero to select equilibrium).
Details of fee structure

- The details of the fee structure varies across websites:
  - Subscription fees (Westside rentals)
  - Fee per posting (Craigslist)
  - Fee per click (Price shopper)
  - Sales commission (eBay)

- Which one depends on fine details. For example:
  - What can platform observe?
  - How much heterogeneity is there?
  - Can system be gamed? Is there adverse selection?

- Example: Overture and the simplicity of pay-per-click
  - First position = 100 clicks, second = 25. Value click at $1.
  - Pay-per-view: WTP is $100 if think first, $25 is think second.
  - Pay-per-click: WTP is $1. Simplifies strategic interaction.
Competing
Competing

- Will there be unique winner?
  - Multi-homing cost
  - Strength of network effects
  - Desire for variety of platform

- Could you win a battle?
  - First-mover advantage
  - High expectations
  - Technology or cost advantage

- Should you share?
  - Network size bigger
  - Compete within market rather than for market.
Threat of envelopment

- Biggest threat may come from business vanishing
  - Rival offers new functionality (e.g. gmail vs hotmail)
  - Convergence of technology (e.g. iPhone vs iPod)

- Change business model
  - Real lost server business to Windows
  - Formed Rhapsody, charging customers for songs

- Form partnerships with other firms
  - Become part of bigger bundle of services

- Sue
  - Real sued Windows for $760m
Mobilizing a Platform Market
Barriers to Mobilization

- Standing risk (e.g. Zune)
  - Users may not make platform specific investments
- Holdup risk (e.g. Intel)
  - Concern platform increases prices after specific investments
- Integration risk (e.g. Nintendo)
  - Suppliers worries platform will start producing complements.
- Favoritism risk (e.g. Covisint)
  - Users worry platform will skew competition
- Relationship risk (e.g. Autobytel)
  - Suppliers don’t want to lose control of customer relationship
- Competitive risk (e.g. B2B exchanges)
  - Suppliers don’t want more intense competition
Penguin Problem

- Same strategies as with one-sided networks
  - Product announcements
  - Introductory discounts
  - Start with small networks
  - Obtain marquee users (exclusively?)

- Permanently subsidize one side
  - The subsidy side then turns up with high probability.
  - Examples: Westside Rentals; Monster.
  - Subsidy needs to overcome homing cost.

- Start as vendor or merchant and transition into platform
Transition: Vendor to Platform

- Firm starts as traditional vendor
  - Makes and sells some product
  - Shanda (online games), CNET (reviews)
- “More of the same” strategy (e.g. Schwab, mutual funds)
  - Vendor supplements own product with 3rd parties
- “Something different” strategy (e.g. Google, AdSense)
  - Add new functionality for second side of market

Which side to start with?
- Start with side with weaker need for other side
- LinkedIn found employees before employers.
- YouTube (customers) vs. Brightcove (website support)
Transition: Merchant to Platform

- Firm starts as merchant
  - Devolves control of inventory, pricing and merchandising
  - Amazon (marketplace), iTunes

- Merchants have advantages over platform
  - Overcome penguin problem
  - Scale means that have lower costs
  - Combine complements to increase values
  - Sustain reputation for quality

- But platform offers greater variety