Competition & Strategy in 2-Sided Networks

MIT e-Business Annual Conference
Marshall Van Alstyne
June 20, 2006
Networked businesses comprise a large and growing share of global economy

• Not just computers/media/telecom/Internet, also:
  – *Financial services*: ATMs, credit cards, stock exchanges
  – *Transportation*: fuel cell cars
  – *Retail*: shopping centers, bar codes
  – *Energy*: grid + appliances
  – *Health care*: HMOs
  – *Computers*: Operating systems
Issues

1. Network Pricing
2. Winner-Take-All Markets
3. Envelopment
Question: What are “network externalities?”

Hint: they matter for platform growth and development…
Reinterpreting Network Externalities

• “Network Externalities” are demand economies of scale.

• They imply at least some level of interaction as when I email you, or you FAX or IM me.
Reinterpreting Network Externalities

• Where is the *interaction* when your neighbor rents “Lord of the Rings”?

• In fact, his rental may mean you have to wait!
A “2-sided” network externality crosses markets from consumers to developers or developers to consumers
## Readily identifiable platform markets

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Mkt 1 Product</th>
<th>Intermediary</th>
<th>Mkt 2 Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable Documents</td>
<td>Document reader*</td>
<td>Adobe</td>
<td>Document Writer</td>
</tr>
<tr>
<td>Credit Cards</td>
<td>Consumer credit*</td>
<td>Issuing bank</td>
<td>Merchant Processing</td>
</tr>
<tr>
<td>Operating Systems</td>
<td>Complementary Applications</td>
<td>Microsoft, Apple, Sun</td>
<td>Systems Developer Toolkits*</td>
</tr>
<tr>
<td>Plug-Ins</td>
<td>Applications Software</td>
<td>Microsoft, Adobe</td>
<td>Systems Developer Toolkits*</td>
</tr>
<tr>
<td>Ladies’ Nights</td>
<td>Men’s Admission</td>
<td>Bars, Restaurants</td>
<td>Women’s Admission*</td>
</tr>
<tr>
<td>TV Format</td>
<td>Color UHF, VHF, HDTV*</td>
<td>Sony, Phillips, RCA</td>
<td>Broadcast Equipment</td>
</tr>
<tr>
<td>Advertisements</td>
<td>Content*</td>
<td>Magazines, TV, Radio</td>
<td>Advertisers</td>
</tr>
<tr>
<td>Computer games</td>
<td>Game Engine/ Player</td>
<td>Games Publishers</td>
<td>Level Editors*</td>
</tr>
<tr>
<td>Auctions</td>
<td>Buyers*</td>
<td>E-bay, Christie’s, Sotheby’s</td>
<td>Sellers</td>
</tr>
<tr>
<td>Streaming Audio/Video</td>
<td>Content*</td>
<td>RealPlayer, Microsoft, Apple</td>
<td>Servers</td>
</tr>
</tbody>
</table>

* Indicates which market is discounted, free or subsidized.

Source: Parker & Van Alstyne 2002
Definitions

- **Pairs of network users** access a common **platform** that facilitates their interactions
  - Users choose to rely on a platform when doing so improves interaction efficiency/effectiveness, compared to unmediated dealings

- **Network effect:** Network’s value to a user depends on the number of other users
Demand- vs Supply-Side Scale Economies

• Network effects are **demand-side** scale economies: they influence existing and prospective users’ propensity and willingness-to-pay for platform affiliation

• **Supply-side** scale economies are realized when firms reduce unit costs by leveraging fixed costs or experience effects

• Many businesses that exhibit network effects also enjoy strong supply-side scale economies

• However, demand- and supply-side economies are conceptually distinct: *unit cost reductions that result from network growth should not be labeled network effects*
“Side” = distinct group of network users

- **One-sided**: Skype, NYSE
  - Roles alternate: call originator/recipient, stock buyer/seller

- **Two-sided**
  - Credit cards: consumers and merchants
  - Video games: gamers and studios
  - Career sites: job seekers and recruiters
  - Fuel cell cars: drivers and refueling stations
  - PDF: document readers and writers
  - Real estate: buyers and sellers
A two-sided network has *four* network effects

- A *same-side* effect for each side, i.e., preference regarding number of other users on own side
- A *cross-side* effect in each direction, i.e., preference regarding number of users on other side
- Each effect can be *positive* or *negative*
Network Effects, Willingness-to-Pay, and Pricing

- **Network Effect**: Network user’s WTP for platform affiliation depends on number of other network users
- **BUT**, increased WTP does **NOT** always translate into a higher price!!
  - If platform is shared, *rivalry* puts a cap on ability to raise price
  - Proprietary platform provider may engage in *penetration pricing* to fuel adoption
  - In a *two-sided* network, one side may receive a *permanent subsidy*, despite growing WTP
  - *Structural attributes* of platform may make it difficult to exploit network effect (as with Federal Express; more on this later…)
Consider profits in two markets

Market One
(Acrobat Reader)

Market Two
(Acrobat Distiller)

Initially, there are profits to be made in both markets.
Consider profits in two markets

Market One
(Acrobat Reader)

Market Two
(Acrobat Distiller)

But subsidizing market one can increase demand and profits in market two more than the loss in market one.
Consider profits in two markets

Market One
(Operating Systems)

Market Two
(Developers)

Initially, there are profits to be made in both markets.
Consider profits in two markets

Market One
(Acrobat Reader)

Market Two
(Acrobat Distiller)

But subsidizing market two can increase demand and profits in market one more than the loss in market two.
Business Model Pop Quiz: Why do video game and PC platforms — seemingly similar industries — charge different sides of their respective networks?

- **Video games**: end user is subsidized; game developer pays
- **PCs**: end user pays; application developer is subsidized
Both PC and Console Owners Value Variety and Quality of Games/Software, But…

- Game quality is crucial: each game costs $50 and each console owner consumes only eight, on average
  - Royalty helps weed out low quality games
- Console is sold to price sensitive teens or their parents; PC is often a business expense or a household necessity
  - So, upfront subsidy of console is important
Pricing

1. Ability to capture cross-side effects
2. User sensitivity to price & quality
3. Value added
4. Marginal costs
5. Interfering same-side effects

1. Mistake of Netscape
2. Denver vs. Boston real estate markets
3. Mistake of Apple
4. Mistake of FreePC
5. Mistake of Covisint
Winner-Take-All

• Network effects ⇒ increasing returns ⇒ winner-take-all, i.e., one platform prevails
• Examples: Windows, eBay, PDF, DVD, fax, real estate MLS
• Winner-take-all implies loser takes nothing!
• So, should you share platform with rivals?
• If not, should you race to acquire network users?
Proprietary vs. Shared Platforms

- **Proprietary** platforms have a single provider -- often a sole sponsor (e.g., Skype, Monster.com)
- **Shared** platforms have multiple providers
  - Jointly sponsored platforms are often shared (e.g., DVD; VISA; real estate association)
  - A sole platform sponsor may license rights to serve as provider to multiple parties (e.g., Apple licensing iPod to HP; MBNA American Express card)
When Winner-Take-All Markets Dominate

- Multi-homing costs are high
- Network effects strong and positive
- Preference for differentiation

<table>
<thead>
<tr>
<th></th>
<th>no</th>
<th>yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit cards</td>
<td></td>
<td>PCs</td>
</tr>
<tr>
<td>Gas engines</td>
<td></td>
<td>Auctions</td>
</tr>
<tr>
<td>Yellow pages</td>
<td>Apple graphics</td>
<td></td>
</tr>
</tbody>
</table>
If WTA, for Fighting vs. Sharing Compare

**Market Size** x **Market Share** x **Margin**

<table>
<thead>
<tr>
<th></th>
<th>If Fighting:</th>
<th>If Sharing:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Size</strong></td>
<td>• <em>Short term</em>: stranding risk</td>
<td>• Maximal network effect</td>
</tr>
<tr>
<td></td>
<td>• <em>Long term</em>: monopoly pricing and holdup risk</td>
<td>• Competitive pricing</td>
</tr>
<tr>
<td><strong>Market Share</strong></td>
<td>• 100% or 0%!</td>
<td>• Depends on cost and differentiation advantages</td>
</tr>
<tr>
<td><strong>Margin</strong></td>
<td>• <em>Short term</em>: R&amp;D, marketing investments</td>
<td>• Depends on cost and differentiation advantages</td>
</tr>
<tr>
<td></td>
<td>• <em>Long term</em>: Monopoly pricing</td>
<td></td>
</tr>
</tbody>
</table>
Platform Envelopment

- Platform providers share users in separate but adjacent markets
- B enters A’s market, bundling both products and undercutting A’s “money side”
Envelopment in Digital Music

- **RealNetworks** = dominant streaming media provider
  - Player free to consumers; content providers paid for server
- **Microsoft** bundled Windows Media into NT server
- Real redeployed into **Rhapsody subscription music**
- **Yahoo!** enveloped Rhapsody, bundling Yahoo! Music into portal
- Yahoo! Music is vulnerable to envelopment by **Apple**
- Apple is vulnerable to envelopment by **Cingular**
Defensive Strategies

• **Innovate** (e.g., Adobe moving from document presentation to document management)

• **Cede and redeploy** — preferably through platform envelopment! (e.g., RealNetworks move from streaming media to subscription media)

• **Find a “big brother”** (e.g., RealNetworks + Comcast, Cingular in response to envelopment threat from Yahoo et al. in subscription media)

• **Sue** (e.g., RealNetworks collects $760 million from Microsoft, forces unbundling in EU)
Questions?


[marshall@mit.edu](mailto:marshall@mit.edu)