SI 646 - Information Economics, Winter 2007

MacKie-Mason, Jeffrey K.

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Network Externalities

SI 646
Jeffrey K. MacKie-Mason
Competing against, and planning for information technology is hard
SONY + PHILIPS + TOSHIBA = ☺
You want to make wise decisions about multi-million $ investments.
How do you anticipate the pitfalls before committing?
Anticipate by recognizing features common to many challenges
Recognizing and understanding network externalities helps you plan, compete, evaluate.
CHAPTER 1:
What are network externalities?
What are common features of CD (yay!) and DAT (boo!) problems for Sony & Philips?
Network...
Externalities...
Why “network”?
Networks offer substitutes composed of complements
What is not a network?
Tightly coupled

Key: Strong complementarities.

Multilateral dependencies
Externalities are...?
Why “externalities”? 
What are examples of network externalities in information technologies?
What are examples of network externalities in information goods?
What are examples of network externalities in information distribution?
CHAPTER 2:
How do network externalities work?
Let $p(i,n_e)$ be the amount the $i$th user is \textit{willing to pay} when she expects $n_e$ other users

- $p(i,n_e)$ is \textit{increasing} in $n_e$.

\[
\frac{\partial p(i,n_e)}{\partial n_e} > 0
\]

**Defn**: Value to a user increases in the number of other users
So, there's a different demand curve for each level of expected usage.
Market is in equilibrium when demand is based on expected usage equal to actual usage.

Fulfilled expectations: \( n = n^e \)
Key feature in such markets is **critical mass**
### Network effects

<table>
<thead>
<tr>
<th>Demand for Variety</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>unlikely</td>
<td>high</td>
</tr>
<tr>
<td>High</td>
<td>very low</td>
<td>depends</td>
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</tbody>
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**Tipping likely?**
Excess inertia: Successful networks tend to be large, entry is tough.
Give an example of a standard that tends to promote excess inertia.
Natural monopoly: Network externalities push toward one supplier
Supply-side natural monopoly:

When cost of building an alternative is economically prohibitive
If there are two sets of customers, A and B, and $C(x)$ is the cost of providing service, then there is a natural monopoly if:

$$C(A+B) < C(A) + C(B)$$

(cost subadditivity)
Demand-side natural monopoly:

Large user network benefits tendency to make small networks disappear, large networks emerge and survive.
Should we do something about network externality natural monopolies?

Liebowitz and Margolis: Usually no!
CHAPTER 3:
How do we play the game?
Increases consumer switching costs

Exploits coordination efficiencies

Reduces consumer confusion, search costs, finger pointing, risk

Succeed by closing the platform
Encourages partners

Stimulates innovation

Reduces consumer risk

Succeed by opening the platform
Succeed by buying critical mass

Use critical mass in one layer of a vertical chain of complements to grab critical mass in another layer
Case discussion