Computers and Society

Economics of Intellectual Property

Chris Brooks

Department of Computer Science
University of San Francisco
-0: Overview

6 What is intellectual property?
6 How do digital information goods differ from physical goods?
6 What ways can a producer protect or license her work?
6 What laws govern usage of intellectual property?
6 Case studies
6 Ethics vs Law
One of the most controversial and contentious issues in the Internet economy is that of intellectual property rights.

Access, usage, copying, recontextualization (sampling)

With physical goods, ownership is relatively straightforward.

With intellectual property, things are more complicated.

To understand the issues involving information goods, it’s important to understand a bit about the economics of information goods.
What is Intellectual Property?

Definition: Intellectual property is the tangible and intangible products of the human mind.

Physical property is either made or purchased.

Intellectual property is the results of one’s ideas.
  △ Art, music, books, poetry
  △ Software

Value comes from both the physical medium (ink, paper, vinyl, aluminum, etc) and the work needed to produce the content.

Price reflects both the medium and the content.
The advent of the Web and electronic commerce have made information goods possible. No physical good purchased; only bits are transferred. This changes many of the rules of the game. How can one make money from selling information?
-4: Examples of Information Goods

- News articles
- MP3s, movies
- Stock quotes
- Weather reports
- Software
- Journal articles
To understand how digital goods change things, we need to know a bit about microeconomics.

The fundamental microeconomic principle is the law of supply and demand.

Roughly, as supply goes up, prices fall.

As demand goes up, prices rise.
Assume that producers have a limited quantity of items to sell.

- Each item has a marginal cost
  - This is the cost associated with producing the $n$th item, plus associated salaries, R&D, advertising, etc.

Consumers have a demand for items.

- This is the amount they’re willing to pay.
Prices serve to moderate supply and demand.  
△ If demand is too high, prices will rise, lowering demand.  
△ If demand is too low, prices will fall, increasing demand.

If prices are fixed or capped (say by marginal cost), then supply will change.  
△ If price is greater than marginal cost, then firms have an incentive to enter the market.
This all leads to the efficient market hypothesis.

When supply and demand have equalized:
- Profits are maximized
- Social welfare is maximized

In some sense, this produces an “optimal” solution.

There may be other criteria that are not met.
- Fairness, moral/societal issues, universal access

This theorem is the basis of laizzez-faire capitalism.
- Let markets work and things will equilibrate on their own.
- The role of the government is to correct market failures.
The “invisible hand” requires a number of assumptions

- Low barriers to entry
- Informed consumers
- Scarcity
- Excludability
- Low switching costs
-10: Features of Information Goods

- Information goods typically have a high *fixed cost* or *first-copy* cost.
  - This is the cost to produce the first copy of a good.
  - $300 million for Lord of the Rings

- This cost can be *amortized* over the number of goods sold.

- High fixed costs make entry difficult.
6 Information goods have little or no marginal cost
   △ This is the cost of making additional copies.
6 Cost of media, or storage and transmission.
6 If marginal cost is low, it’s better to have many consumers.
   △ Absorb high fixed costs.
   △ This is called increasing returns to scale
   △ The more you sell, the greater your profit per item.
   △ Provides an advantage to large producers
Classical economic theory predicts that items in a competitive market will be sold at marginal cost.

What if marginal cost is zero?
- No incentive for sellers.
- Obviously, this is not the way things work.

In real-world markets, copyright gives sellers a limited monopoly.

Cartel structures (e.g. music industry) also keep prices artificially high.
How do digital information goods violate the classical assumptions?

- **Nonrivalry**
  - Nonrivalry means that the amount one person consumes does not affect the amount available for others.

- **Rivalry** allows for price competition among consumers.
  - If there are a limited number of luxury cars, Van Gogh paintings, stock shares, people will pay more for them.
    - This is called *scarcity*

- If there is no limit to the number of goods available, no one will want to pay more than the lowest price.
Nonrivalry leads back to the problem of marginal cost being zero.

- If goods aren’t scarce, no one will pay for them.
- If no one will pay for them, no one will manufacture them.

Historical solution: reintroduce scarcity by allowing the government to create a “natural monopoly.”

- Copyright is an example of this.
- AT&T before breakup, NSF/DARPA control over Internet
Unfortunately, monopolies have undesirable side-effects

- Corporations can exert undue influence over pricing and policy
- Prices set above marginal cost.
- This is nice for producers, but not economically efficient.
- There are people who *would* buy, if the good were available at a competitive price.
Information goods are typically nonexcludable.

Excludability means that you can’t get something without paying for it.

File-sharing networks are an obvious example of nonexcludability.

Again, prices are difficult to enforce.

△ If I can get something for free, why would I pay for it?
Nonexcludability means that information goods are sometimes thought of as a *public good*

- Universally available, funded indirectly
- Streetlights, highways, PBS, NPR, National Weather Service
Producers might also try to exclude non-purchasers

- Tie information to a physical object (book, CD, DVD)
- Encryption, copy-protection and licensing
- User tracking (ASCAP)
- Embrace copying and bundle with content that benefits from wide distribution (advertising)
  - Problem: maximizing revenue now does not maximize consumer surplus (happiness)
  - Network TV - goal is to attract the most viewers. As long as you have the TV on, networks are happy.
  - Compare to pay cable, PPV, where viewer pays directly.
Part of the law of supply and demand requires that consumers can accurately assess their choices.

Information goods are *experience goods.*

- I don’t know how much I’ll like a CD until I hear it.
- Compare this to a traditional good, like a car or a chair.

This means that consumers have a hard time determining how much they’re willing to pay.

This is sometimes called *nontransparency.*

Recommendations, try-before-purchase, reputation become very important.
All of these issues open the door for new ways to price, package, and distribute information.

Solutions that might not make sense in a physical economy become possible when items being sold are digital.

However, old rules and laws may not apply

New rules and laws are needed
Open source and shareware help deal with the transparency problem
△ Users can download and try before paying.
△ What about excludability?

Some solutions:
△ gift economy
△ fee for service
△ increase in status in labor market
One attractive feature of digital information goods is the ability to bundle and unbundle them.

Low marginal cost makes bundling an appealing strategy.

- If it costs me nothing to produce, I may as well include it.
- Advertising or subsidized products can be bundled to increase revenue.
- Examples: Cable TV packages, Microsoft Office, GAIN/Gator
value-added bundling

Bundling can be used to add value to an existing product.

A seller filters, bundles and organizes existing information goods.
- RedHat
- AP news wire
- Brokerages
- Cable packages

Helps consumers deal with the glut of information

Takes advantage of complementarity (two things are more valuable together than separately)
Traditionally copyrights and patents were developed to deal with these issues.

Provide “incentive to innovate” without unduly restricting usage.

Digital goods have presented a new set of legal and economic challenges, with both legal and economic solutions.

Next up: legal issues.