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Users often freely reveal their innovations – and that makes sense!

Professor Eric von Hippel

MIT Sloan School of Management

Key element of a user innovation system: *Innovation Diffusion*

If users innovate but do not also somehow *diffuse* what they have developed, the cost of a user-based innovation system gets very high.

– Absent diffusion, each interested user must independently develop the same innovation again.

Two ways user innovations can diffuse:

- Compensated diffusion: For example, users might license their innovations or informally trade their information on a tit-for-tat basis.

- Uncompensated “spill-overs:” Users might freely reveal their information to everyone (on purpose or by mistake). For example, they might put their innovation on the Web on purpose – or an employee might let it “slip out.”

What is “free revealing?”

- When an innovator “freely reveals” proprietary information, all intellectual property rights to that information are voluntarily given up by that innovator and all parties are given equal access to it—the information becomes a public good.

- For example, placement of non-protected information in a publicly accessible site such as a journal or public website would be free revealing as we define it.

  – Recipients may have to spend to acquire freely revealed information. For example, they may have to pay for a field trip to an innovation site. However, if the provider of the information does not profit from any such expenditures, the information itself is still freely revealed.

Empirical studies find innovating users often *freely* reveal their innovations to other users and/or to suppliers

- Improvements to Open Source software
- Improvements to iron furnaces (Allen)
- Improvements to mine pumping engines
- Improvements to Technicon clinical chemistry analyzers
- IBM copper interconnect technology
- Improvements to library information systems (OPACs)
- Information from user-participants in Lead User studies

Why do users freely reveal?

Economic theory understands why users would:

- hide their innovations (trade secrecy),
- reveal them for a fee (licensing)
- reveal them in error (inadvertent R&D spillovers).

What is harder to understand is why users would freely reveal proprietary innovations – for example, by putting them on the Web.

- *"You paid to develop that – and now you are giving it away for free to rivals? Those rivals will have lower costs than you and will end up putting you out of business!"*

Whether to freely reveal an innovation is a cost / benefit decision

The basic situation:

- Innovators have little ability to protect their innovations under many conditions. The real decision they face is:
  - Reveal voluntarily now
  - Don’t reveal. But others will imitate soon anyway.
- Innovating users that freely reveal retain some private advantages over free riders – especially if they reveal first.

Intellectual property rights may provide little real protection

- Patents cover some types of innovation only.
  - Patents are costly – may not be worth it for minor items.
  - It takes time to get patents
  - Patents can often be “invented around” in many fields
- Copyright covers only “writings” – including software
  - Cheap to get.
  - Does not cover the idea – only the specific expression
- Trade secrecy is difficult to maintain for long
  - Many others tend to know similar things

If many others know “your secret” – you can’t protect it!

“How many others do you think knew the answer to the question you answered?”

	Frequent Providers	*Other Providers*
Many	38%	61%
A few with good Apache knowledge	38%	18%
A few with specific problem experience	24%	21%

Source – Lakhani and von Hippel

Potential costs of free revealing are:

- A loss of proprietary advantage associated with others knowing what I used to know exclusively;
- A loss of potential to get paid for selling what I know;
- Any costs associated with physically getting the information “out there.”

Potential *benefits* from freely revealing a user innovation are:

- If a user reveals its innovation others may improve upon it and reveal those improvements
  - Example: Open Source Software new features and debugging.

- If a user reveals to a supplier others may purchase the innovation too, thus increasing production volumes and reducing purchase costs for the innovator.
  - Example, IBM Copper Interconnect.

Potential *benefits* from freely revealing a user innovation (continued)

- If a user reveals an innovation particularly favorable to the innovating user, and it becomes a standard design, the innovating user has an in-built advantage over other users who adopt it. (Likelihood is higher *if he reveals first*.)

- If a user reveals, he may increase his reputation – *especially if he reveals first*

In sum: Why users often freely reveal

- Innovators often have little ability to protect their innovations. When this is so, the real decision they face is:
  - Reveal voluntarily now
  - Don't reveal. But others will imitate soon anyway.

- Innovating users that freely reveal do often gain some private advantages over free riders – especially if they reveal first.

So – users often freely reveal because – often – it is their most profitable option.

Consider informal information trading

- Illustrates why trading information of low competitive value can pay

Agenda

1. Why people freely reveal their innovations to manufacturers – and other users

2. Informal information *trading*

Know-How Trading Patterns Among Steel Minimills

	In-House	
Steel Minimill Firm	Process Devel?	Know-How Trade?
Four Largest Firms		
Chaparral	**MAJOR**	Yes
Florida Steel	Minor	Yes
North Star	Minor	Yes
Nucor	**MAJOR**	Yes
Other		
Bayou Steel	Minor	Yes
Cascade Steel	Minor	Yes
Charter Elec	Minor	Yes
Kentucky Electric	Minor	Yes
Marathon Steel	Minor	Yes
Raritan River	Minor	Yes
Outlier		
Quanex	Minor	**NO**

How Frequent is Know-how Trading?

Minimill Personnel Sample:
All minimill employees listed in the 1986 Directory of Iron and Steel Plants who were directly responsible for a technical aspect of production (e.g. meltshop supervisor) but not top management: N = 477, Responses = 294.

Question:

Within the last year have you been asked for technical information by a colleague working in another minimill company?

Response:

Yes, at least once = 85%
Yes, more than 10 times = 19%

Source: Schrader, 1990

Firms can increase the amount of information they possess by trading:

	Situation Pre-Trade	Situation Post-Trade
Firm A	Unit A	Unit B + Unit A
Firm B	Unit B	Unit A + Unit B

Information trading can pay under SOME conditions

Consider the Total Profit (also sometimes called "rent") that a proprietary "unit" of know-how yields to a firm exclusively possessing it as made up of two parts:

Total Profit = Profit + Δ Profit

Profit = the portion of Total **Profit** which a firm expects after trading the unit of knowhow to another firm. (Both firms then possess the traded knowhow.)

Δ **Profit** is the extra **Profit** which a firm expects if it possesses the knowhow unit exclusively.

Example: ASSUME TWO FIRMS START WITH KNOW-HOW UNITS OF DIFFERENT CONTENT BUT EQUAL VALUE:

Before trade each firm has: **Total Profit = Profit + Δ Profit**

After trade each firm has: **Total Profit = 2 (Profit)**

Therefore trading pays only when **Profit > Δ Profit**

KNOW-HOW TRADING AS A "PRISONER'S DILEMMA

Assume as before that two firms have one unit of unique proprietary know-how each. Assume also that each firm's unit, although different, has an identical **Profit** and **∆ Profit** associated with it.

Then, pre trade, each firm has: Total Profit = **Profit + ∆ Profit.**
After a cooperative trade, **R**, each firm has: **R** = **2 Profit**

All four possible outcomes of a single play of this game are:

T = 2 Profit + ∆ Profit	**R = 2 Profit**
P = Profit + ∆ Profit	**S = Profit**.

A Prisoner's Dilemma exists if **T > R > P > S and 2R > T+S** (A strategy of continuing cooperation has been shown empirically to pay best over many plays of a Prisoner's Dilemma game.)

Therefore, know-how trading pays
(conditions for a Prisoner's Dilemma are met)
if ***Profit > ∆ Profit*** *but not if* ***Profit < ∆ Profit***

FIRMS THAT DO TRADE HAVE AN ADVANTAGE OVER NON-TRADERS

Assume firms A and B trade $ research results with low competitive value but that Firm C does not trade

	Situation Pre-Trade	Situation Post-Trade
Firm A	low unit + high unit	low + low + high
Firm B	low unit + high unit	low + low + high
Firm C (non-trader)	low unit + high unit	low + high

Information trading examples

(1) Oil Geologists trade easily reproducible know-how;

Profit > Δ Profit

Unless it involves an upcoming oil leasing competition;

Profit < Δ Profit

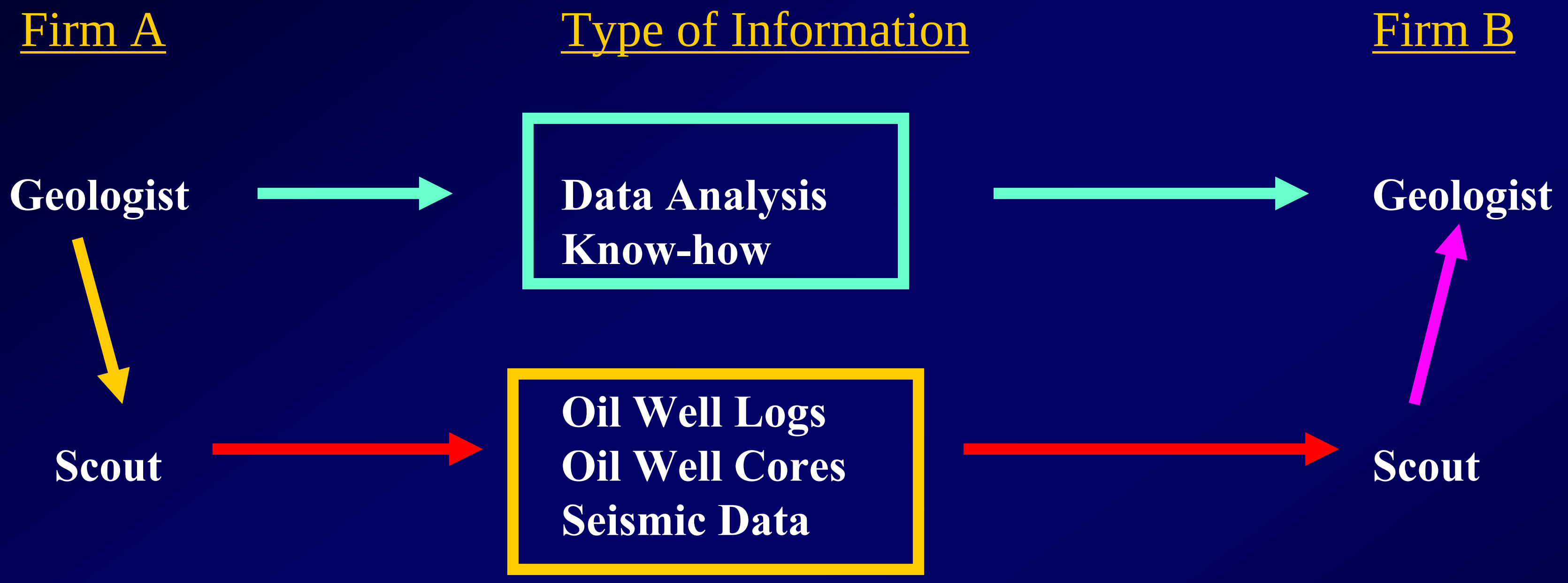
(2) Aerospace engineers trade easily reproducible know-how;

Profit > Δ Profit

Unless it bears on a competition for an important contract;

Profit < Δ Profit

Oil Scouts Trade *"Black Box"* Information Only



Firm A

Type of Information

Firm B

Geologist

Data Analysis
Know-how

Geologist

Scout

Oil Well Logs
Oil Well Cores
Seismic Data

Scout

When Scouts can be used, Oil Companies tend to force their use. Hypothesized advantages:

- Specialists have better networks, are better traders;
- Collects IOU's in one place, minimizing # outstanding,
  and time they are outstanding.

Some Rules of Oil Scout Behavior

(As per Scouting Association codes of ethics)

- **"A scout must represent only one company...".**

- **"The information a scout obtains should be invariably first transmitted to the employer."**

- **"A member may not dispose of information without the consent of the employer."**

- **"Scouts should never knowingly dispense information of an untrue or doubtful character".**

Source: 1988 HOSA Code of Ethics