

# User Innovation and Patent Doctrine

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# Motivation for this Project

- Patent doctrine implicitly assumes a “seller innovator” whose primary motivation is commercial sale – sellers/manufacturers invent, users consume BUT
- Technology “configures” users AND users configure technology
- Increasing importance of user innovation
  - Open source, digital mechanisms for innovation
- Increasing overlap and interaction between knowledge production systems
  - Expansion of IP subject matter, e.g. basic science, business methods
  - Globalization, e.g. traditional knowledge

# I. USER INNOVATION

## Examples of user innovation

- Manufacturing processes
- Computer programs (especially Open Source)
- Sports moves
- Medical procedures
- Business methods
- “Customized” or “souped up” parts
- Research tools

...

- User innovation can be commercial or non-commercial, not motivated by sale of the invention
- User innovation is increasingly important (von Hippel)

# I. USER INNOVATION

**Users and sellers make different innovations (von Hippel)**

## **USER INNOVATION:**

- “cutting edge” functional improvements
- leading edge users with heterogeneous needs
- “sticky” information about heterogeneous uses
- intrinsic and reputational rewards
- (sometimes) smaller capital investment, less (or different) technical expertise
- (sometimes) competitive use

## **SELLER INNOVATION:**

- standardization, convenience, safety
- sticky information about mass production
- returns to scale – large investment, general use
- (sometimes) larger capital investment

# I. USER INNOVATION

## USE EXEMPTION TO INFRINGEMENT?

- Analysis of incentives to invent, disclose, disseminate shows patent incentives generally less important and patenting social costs higher for user innovation
  - Can doctrine implicitly separate user and seller innovations?
    - User infringement  $\leftrightarrow$  User invention
    - Seller infringement  $\leftrightarrow$  Seller invention
- Use exemption will often leave most important incentives intact**

## II. SHARING IN USER INNOVATOR COMMUNITIES

- **User innovators often are part of information sharing communities (even in commercial context)**
  - Iron-making companies 1850s
  - Venetian glass-making guilds in 1400s
  - Open source software
  - Computer clubs
  - Skateboarders, mountain bikers
  - Scientific researchers (e.g. “mouse” researchers(Murray))
- **Why?**
  - reputational incentives
  - disclosure permits others to improve the invention
  - even competitors benefit from a shared “platform”
  - competition with “outsiders”

## II. SHARING IN USER INNOVATOR COMMUNITIES

- **Simplified rational choice model of competitive user innovator community composed of identical members**
- **$U$  = value to each member of shared invention**
- **$N$  = number of members of community**
- **$C$  = cost of sharing an invention with community**
- **$E$  = benefit of keeping an invention for the inventor's exclusive use**
- **$R$  = reward (e.g. reputation, access to shared resources) for sharing**

## II. SHARING IN USER INNOVATOR COMMUNITIES

- (Share, Share) is optimal as long as  
 $E < (N-1)U + R - C$  BUT  
(Don't, Don't) will be the outcome if  $E > R - C$
- For user innovators sharing is often optimal:
  - C may be relatively small because of high absorptive capacity for user-developed inventions, publication
  - U often high, R often high (e.g. reputation, shared resources)

but collective action problem

### SHARING NORM CAN SOLVE COLLECTIVE ACTION PROBLEM

- If group has sanctioning mechanism, e.g. reputation, cutting off access to resources

### III. SHARING RESEARCH TOOL IDEAS

#### Scientists are Competitive User Innovators of Research Tools

**U** – relatively large for academic researchers due to preferences for progress of the overall research enterprise

**E** – limited by appropriability and need to publish, write grants, grad student mobility

**C** – low if publication is sufficient for sharing,

**R** – relatively high if sharing is by publication because of importance of publication for obtaining funding, attention of other scientists, status, etc.

- Sharing tends to be optimal  $E < (N-1)U + R - C$ 
  - Sharing norm would be beneficial to the group

# III. SHARING RESEARCH TOOL IDEAS

## HOMO SCIENTIFICUS PREFERENCES:

- 1) Performing research
- 2) Autonomy in research direction
- 3) Learning results of the collective research enterprise

## Scarce resources needed to satisfy preferences:

- Funding
- Attention of others

These resources may be leveraged by the research community to enforce a norm

# III. SHARING RESEARCH TOOL IDEAS

## Effects of Availability of Patenting

- Expansion of patentable subject matter plus increasing overlap with commercially interesting research makes patents available
- In principle can now publish and not share, but sharing still optimal for the community if  $(N-1)U > E$
- Sharing often still optimal

**NO-PATENTING NORM**

would resolve coordination problem

# III. SHARING RESEARCH TOOL IDEAS

## EFFECTS OF OVERLAP BETWEEN ACADEMIC AND COMMERCIAL RESEARCH

- **Overlapping Interests with Commercial Researchers**
  - **desire to use research tools developed by commercial researchers in academic research and vice versa**
- **B/C of commercial use, E may be much greater, particularly to commercial inventors**
- **“No patenting” norm is destabilized**
- **However, if commercial and research use can be distinguished, norm of “ignore patents” in research use/ enforce patents for commercial sales may replace it**

### III. SHARING RESEARCH TOOL IDEAS

- **Evidence of Ignore Patents norm (W. Cohen)**
  - University researchers do not even check for patents
  - Making patented research tools “in house” is routine and accepted practice
  - Universities and Industry do not assert patents on tools against researchers
  - Detecting infringement would probably be easy due to open labs
  - Norm entrepreneurs (NIH) promote making tools widely available to academic researchers
  - Even industry researchers “ignore patents” during the research phase

## IV. NORMS OF SHARING RESEARCH MATERIALS AND TACIT KNOWLEDGE

- **Problems with Materials Transfer (W. Cohen et al)**
  - **Problems obtaining materials**
    - significant delays and abandonment
    - onerous terms of transfer, e.g., publication restriction, reach-through royalties
  - **Price and patenting per se not the problem**
  - **Problems worst across boundary between university and industry**
    - No uniform transfer agreement
    - No “forbearance”
    - Restrictive terms requested

## IV. NORMS OF SHARING RESEARCH MATERIALS AND TACIT KNOWLEDGE

- (Share, Share) is optimal as long as

$$E < (N-1)U + R - C$$

**BUT**

**E is larger b/c of natural exclusivity**

**C is larger for sharing materials and tacit knowledge b/c  $C \sim N$**

- **Materials may be difficult to duplicate**
- **“magic hands”**
- **Standardization**

**SHARING NORM CAN BREAK DOWN**

## **IV. NORMS OF SHARING RESEARCH MATERIALS AND TACIT KNOWLEDGE**

### **Promote Sharing of Materials and Tacit Knowledge**

- **Minimize cost to inventor and/or spread cost through community**
  - **by centralizing distribution**
    - **centralized repository**
    - **commercial provider**
  - **by diffusion through community**
  - **by codifying knowledge through standardization (role of commercial tool suppliers)**
    - **licensing practices can recognize this potential**

# IV. NORMS OF SHARING RESEARCH MATERIALS AND TACIT KNOWLEDGE

## Promote Sharing of Materials and Tacit Knowledge

- Increase R by giving co-authorship, other collaborative benefits
- Increase penalty for non-compliance with norm
  - journals, requirements for publication and material sharing
  - funding agencies, similar requirements
  - reputational penalties
- Norm entrepreneurship
  - leading university White Paper (2007) attempts to encourage academic resistance to onerous licensing terms and encouraging licenses that reserve rights to share w/in academic community

# V. SHARING IN PASTEUR'S QUADRANT

## MIXED USER INNOVATOR COMMUNITY

- Efforts to promote academic “material commons” reasonably successful
  - UBMTA success w/in academia
  - Central depositories also used to facilitate sharing
- Preferences of industry researchers
  - E may be larger
  - R for disseminating to others may be smaller
  - U may be smaller
- Sharing is less preferable but still may be optimal in some circumstances
  - particularly in newer industries
- Sharing norm may be more difficult to enforce
  - violations harder to observe

# V. SHARING IN PASTEUR'S QUADRANT

## MIXED USER INNOVATOR COMMUNITY

- **Mixed sharing norm? OR Use norms to police the boundary (cf. O'Mahony OSS)**
- **Natural exclusivity of materials and tacit knowledge may be used to differentiate sharing norms between research communities**
  - **sharing norm among academics**
  - **gift exchange or market between academia and industry**
  - **consistent with empirical observations?**
- **Difficult to use patents to differentiate sharing norms between communities b/c of expense of detection and enforcement**
  - **“ignore patents” norm?**

# V. SHARING IN PASTEUR'S QUADRANT

## MIXED USER INNOVATOR COMMUNITY

- **Police side deals**
  - norms re terms of tech transfer agreements
- **Promote reciprocal exchange with industry researchers by restricting access to academic research tool commons**

## SUMMARY

- **User innovator community sharing norms expected in many cases**
- **Norms evolve with changing law, technology, social context, different norms for different situations**
- **Policy can encourage sharing by manipulating E, C, R, U and severity of sanctions w/in community**
- **Need for more specific, case study approach**

## V. ISSUES/QUESTIONS

1. **Doctrine: How else to incorporate a more complete picture of users into patent law?**
2. **Shifting view of public and inventor (cf. Kara)**
  - **public as potential inventors needing protection (democratic but seller-centered model)**
  - **inventors as experts, “romantic inventor,” need to protect the efforts of these “special” individuals/ public invisible?**
  - **public as consumers whose needs should be met? Created? Taken into account in design?**
  - **public as user inventors, needing protection from overbearing corporate IP holders**
3. **Shifting view of the inventive entity**
  - **individual, corporation, research group, community, network, user, etc.**