

The intellectual commons: From software to biotechnologies.

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Introduction

- Patent is the cornerstone of innovation in Biotech
 - Stronger effect of exclusivity on R&D than in any other sector (Gambardella et al., 2005)
 - Markets for technology facilitate efficient division of labor
 - The ‘anticommons’ problem
 - Royalty stacking for diagnostic kits (Heller & Eisenberg 1998)
 - A potential threat for academic research (Walsh et al, 2007)
 - Celera patents delayed subsequent research on Human Genome (Williams, 2010)
- ⇒ Fuels controversy on whether patent law should apply to genes

Emerging notion of “biotech commons”

- Platforms to facilitating access to pooled resources
 - HapMap, MIT BioBricks
 - Tropical Disease Initiative, BIOS, PIPRA
 - A parallel can be drawn... between innovation in software and biotech
 - (re-)combination of software functionalities
 - (re-)combination of blocks of DNA code
 - Tools for operating the combinations
 - ... and between biotech commons and open source software
 - Collective, partly decentralized innovation
 - IP-based
- ⇒ What can we learn from the OSS experience?

Open Source Software

Commons in Biotechnologies

Joint Innovation	<ol style="list-style-type: none">1) A community of developers develop code and pools in a joint project2) Users are free to use the software	<ol style="list-style-type: none">1) A research community develops genetic parts, devices, systems2) Researchers use genetic parts for subsequent innovation
Common pool of resources	<p>OSS license:</p> <ul style="list-style-type: none">- Free distribution of the software code- Allows re-using code in other programs- (copyleft as an option)	<p>Commons as clearing house:</p> <ul style="list-style-type: none">- Public information on available parts- (Free) access to the parts- (copyleft as an option)
Patents/ anticommons	<p>A recent problem:</p> <ul style="list-style-type: none">- Proliferation of licenses- Software patents	<p>The key problem:</p> <ul style="list-style-type: none">- Exclusivity- High transactions costs

Economic drivers

- OSS: a joint innovation model
 - Fueled by user-driven innovation & information sharing
 - Recently challenged by license proliferation and patents
- Biotech:
 - A way to avoid costly R&D duplications
 - A solution to an “anti-commons” problem, in a context of patents and exclusive licensing

⇒ Questions:

- why would innovators contribute to the commons?
- what is the difference between copyright and patents?

Ingredients of the OSS success

- Communities of user-developers
 - Granular innovation that are compatible with...
 - ... micro-incentives for individuals (using, learning, signalling, having fun, sharing)
 - Network (*snowball*) effect
- OSS is business-compatible
 - 40% of OSS developers are paid!
 - Cheaper, and provides access to consumers
 - Can be combined with proprietary software, hardware, or services
 - Firms contribute in order to set specifications and leverage communities
- Legal aspects
 - No bottlenecks under copyright protection
 - Flexible licensing models (GPL Libraries, L-GPL, BSD) are key in business involvement

Does biotech replicate these ingredients?

- Innovation in biotech is modular, but not granular
 - Substantial R&D costs, that must be recouped somehow
 - Incentives to invest are driven either by public funding, or by patents
- Commons are mainly supported by *academic communities*
 - Resource sharing, to facilitate innovation inside the community and in some cases by third parties...
 - ...by reducing transactions costs
 - ...by alleviating *anticommons* within the community

⇒ This is compatible with public funding of research

Can biotech commons snowball towards firms?

- Corporate patent owners have no clear incentives to join in as contributors
 - Firms are the main cause of anti-commons
 - Patent exclusivity is key in their business model
 - Contributing to the commons would require alternative benefits

What could drive firms' participation?

- Some commons seem compatible with for-profit activity
 - Non-viral copyleft: HapMap, BioBrick, BioLinux
 - Viral: BIOS, Tropical Disease Initiative
- But do they generate incentives to contribute?
 - Why not simply free-ride on the commons?
 - To avoid cost duplication?
 - To accelerate research in a particular direction?
 - Because anti-commons are bad for all?

Conclusion

Software versus biotech commons

- Similar rationale for the commons
 - Collective, coordinated innovation
 - Free access to subsequent innovators
- Innovation is cumulative and modular in both cases, but
 - OSS innovation is compatible with small contributions
 - R&D in biotech requires stronger incentives (patents)
- What potential for biotech commons?
 - A formalization of the public-funded research model
 - To what extent firms can be involved is still unclear: requires incentives to use and to contribute