Markets for technology as a substitute for public knowledge?

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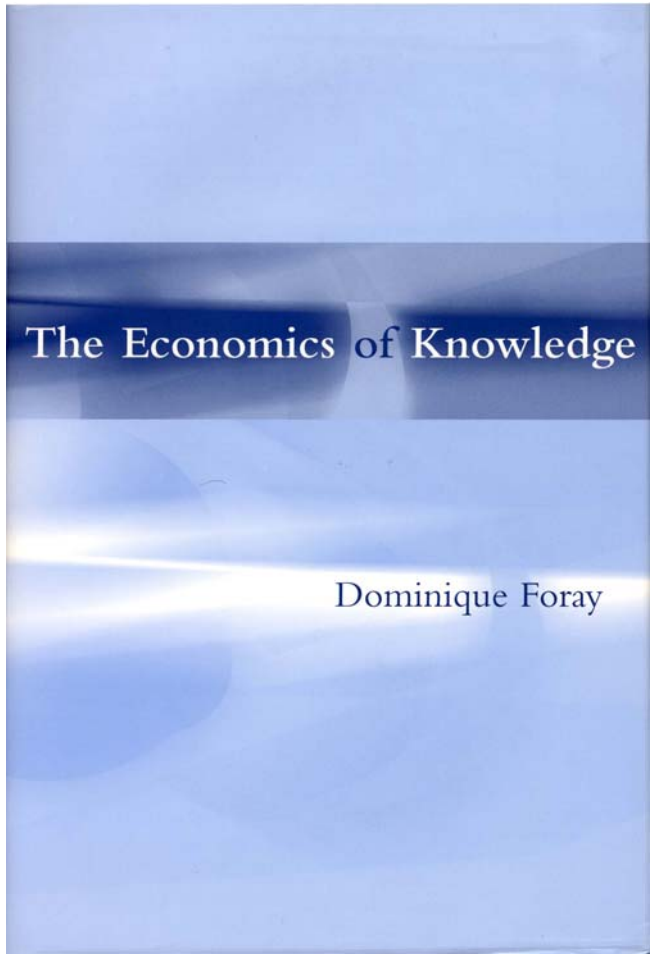
From the literature..

- The importance of a *freely* accessible stock of knowledge is crucial
- The efficiency of innovation activities is fundamentally dependent on this domain of « public knowledge and information »



The role of public knowledge in various models of innovation

- Science driven discovery and innovation
  - Cockburn & Henderson
- Communities based innovation
  - Von Hippel
- Modularity-based innovations
  - Baldwin & Clark, Aoki
- ICT-based innovations
  - The « fortune of the commons »
- PPPs to promote non profitable innovative activities
  - Benkler, Maurer
- In each model the shared collection of basic knowledge provides the building blocks for new inventions and enhance the productivity of innovative activities

- Without a continuous flow of public knowledge, innovation is therefore likely to be blocked
- Public domain of knowledge
  - « controlled by the State »
  - « inherent public property »

Structural changes in industrial R&D (1985-2001)

- Increased vertical specialization and entry of numerous new firms in the upstream phase of the innovation process (information technology, biotechnology)
- Increase of interfirm R&D (contract based) alliances (rather than equity based)
- Considerable growth in patenting and licensing (involvement of universities)
- ***A greater reliance on market relationships for the governance of innovation***

Can markets for technology ***substitute*** to the public domain of knowledge?

- Can markets for technology be effective enough to fulfill the critical need for knowledge dissemination?
- Baumol's world: markets for technology are driving the rapid dissemination of knowledge: « *in the real world, innovative firms are often remarkably quick to license new technology. Capitalist incentives explain why* » :
  - If the price is right, it will pay the firm that owns the knowledge to permit others to use it
  - It will happen if the firm which wants to buy is a more efficient user than the owner

Can markets for technology ***substitute*** to the public domain of knowledge?

- But we cannot think of another market with so many market failures
- Cockburn & Henderson survey (addressed to LES members in 2005):
- Transactions in knowledge are more complex and costly
- There are many « missing markets »
- So a large fraction of the total inventory of IP appears to be unlicensable
- On average, more than 1/3 of firms ' total inventory of IP is rated as being unlikely to be licensed even though the firm would be will to transact
- What are the main obstacles?
  - About 1/3 case, the would be transactor was unable to identify a potential buyer
  - And when entering into negociations, about 50% failed to reach an executed agreementDifficulty in finding appropriate licensee: 55%
  - Operating managers are reluctant to let us license: 38%

These numbers imply that even for inventions that the owner want to license, the probability of this occuring is only around 5%

Can markets for technology ***substitute*** to the public domain of knowledge?

- Obstacles to licensing impose two major types of costs:
- « deals not done »; underutilization of IP
- Market failures in the sense of wrong prices for technology
  - Price signals in competitive markets are widely believed to induce behavior by participants that results in socially optimal resource allocation
  - Where prices are « wrong » there is no such guarantee and quite poor outcomes may be reached
- Baumol's world does not exist yet; perhaps will never exist

Community-based projects in S-T&E

- C-b-P come to the front as an increasingly important incentive structure that has to be viewed as a valuable alternative to the conventional model of innovation (including Baumol's variations)

Community-based projects of innovation

- Primary objective: to create an information commons – welfare implications:
  - No deadweight loss from above marginal cost pricing
  - Might induce sellers of competing commercial offerings to reduce their prices
- Second objective: to produce some scale and network effects in cases where projects require scientists, innovators to work closely with others outside the lab, the small firm, the garage

Community-based projects of innovation

- Value
- Scale of problems require many eyes
- Many problems are beyond the capabilities of single organization
- Allocation of IPR among individuals can be very costly
- Coupling high rate of innovation with rich spillovers is something like a first best solution (no trade off any more!)

Community-based projects of innovation

- Weakness
- Problem of collective action; incentives to defect
- 1000 voices: weak public message
- Communities typically rely heavily on single individuals (who are like to become tired!)
- « infection » of sequential downstream activities reduced incentives for downstream development and commercialization

Community-based projects of innovation

- Taxonomies
- 2 legal regimes
  - Codes, data, information are released into the public domain with no restriction on further use and appropriation
  - Codes, data, information are distributed under the copyleft regime that impose some kind of viral legal provision designed to maintain free access
- Publicly funded?
  - Yes
  - No: critical need to develop symbiotic relations with other activites

	Public domain, no restriction	Copyleft regime
Publicly funded	Open science Human Genome Project	HapMap IHMP
Not publicly funded	SNP (strategic objective) Alliance for Cell signalling	Open source

Resume

- What is key in the innovative economy: public knowledge or knowledge dissemination?
- ***Knowledge dissemination*** is the critical factor to enhance the productivity of innovative activities
- But ***the public domain remains the best way*** to ensure effective dissemination…
- .. while **many failures** have to be fixed on the markets for technologies