Markets for technology and the division of innovative labor: A view from the ivory tower

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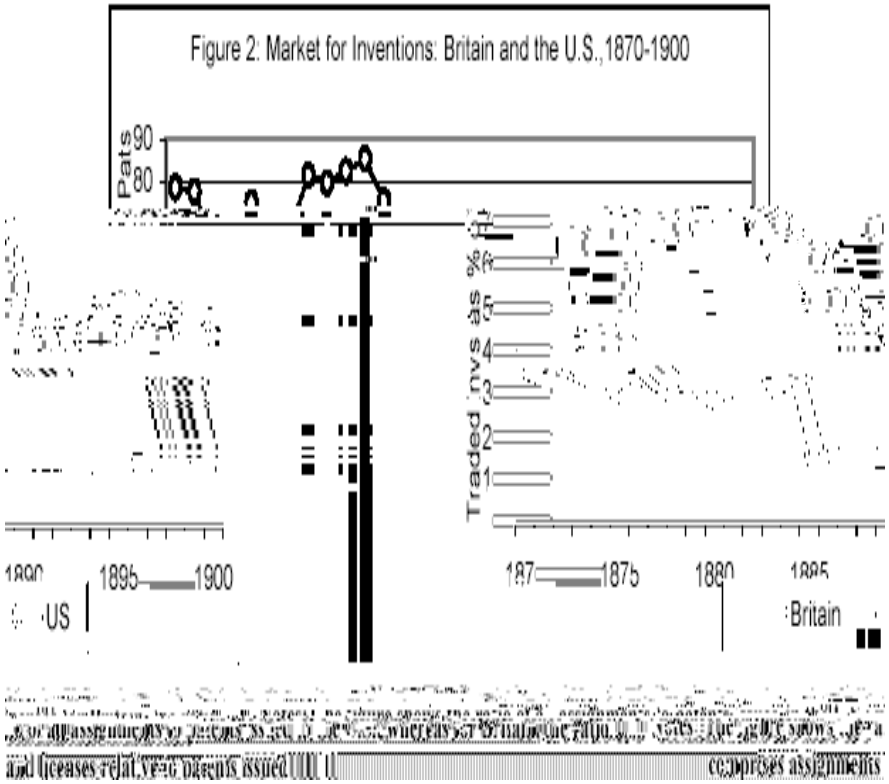
Evolution of Innovation Models

- Early in the 20th century: modern industrial enterprises internalized the R&D function
- End of 20th Century : Greater dependence on outside sources of innovation
  - Licensing
  - alliances
  - “open innovation”
- True? If so, why?

Back to the future?



Estimates of technology licensing in the US, 2002 (IRS + BEA data)

Distribution of IRS Receipts for Types of IP-Licensing Service Commodities across Industry Sectors, 2002, Billions of Dollars

Sector	**Licensing of Rights to Use IP Protected as Industrial Property**	Licensing of rights to use IP protected by **trademarks**	Licensing of rights to use IP protected by **Copyright**	Licensing of Rights to use a business format under a **franchise**	Payments for rights to use **Natural Resources** and Other intangibles	Total
Manufacturing	**59.5**	9.4	1.0	2.9	-	72.8
Distributive Services	**1.0**	6.9	0.1	5.1	-	13.1
Information	**1.9**	4.9	6.6	0.0	0.1	13.5
Finance and Insurance	**0.2**	0.7	0.0	1.4	0.0	2.4
Professional and Business Services	**3.0**	0.2	1.6	1.5	0.4	6.7
Other Industries	**1.0**	0.7	0.1	4.8	0.8	7.5
Total	**66.6**	22.8	9.4	15.7	1.3	115.9

$30-40Bn for mid 1990s
Arora, Fosfuri, Gambardella, 2001

Carol Robbins, Dept. of Commerce, 2006, tab 7

Patents and market for technology: Patents promote licensing by small firms

	Small Firm	Large Firm
% increase in licensing propensity	6%	2%
% increase in the propensity to license patented innovations	1%	–3%

Source: Arora and Ceccagnoli, “Patenting and licensing”, 2005

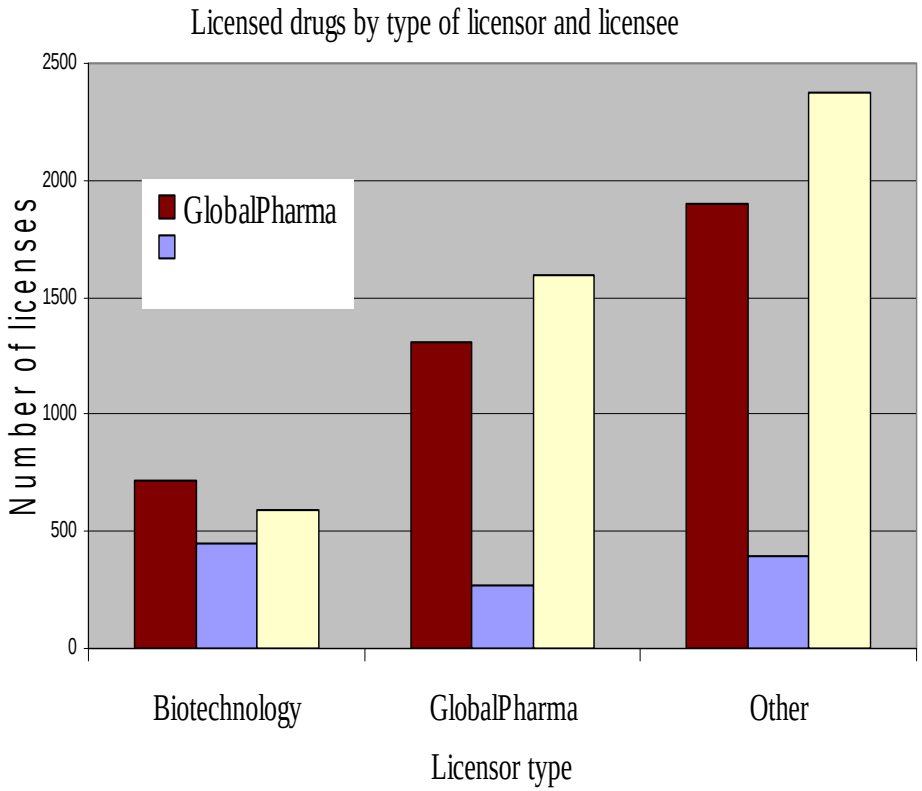
Patents promote entry of specialized tech suppliers in chemicals

Implications of markets for technology

Information security software: non-producer patents, licensing, entry and exit are correlated

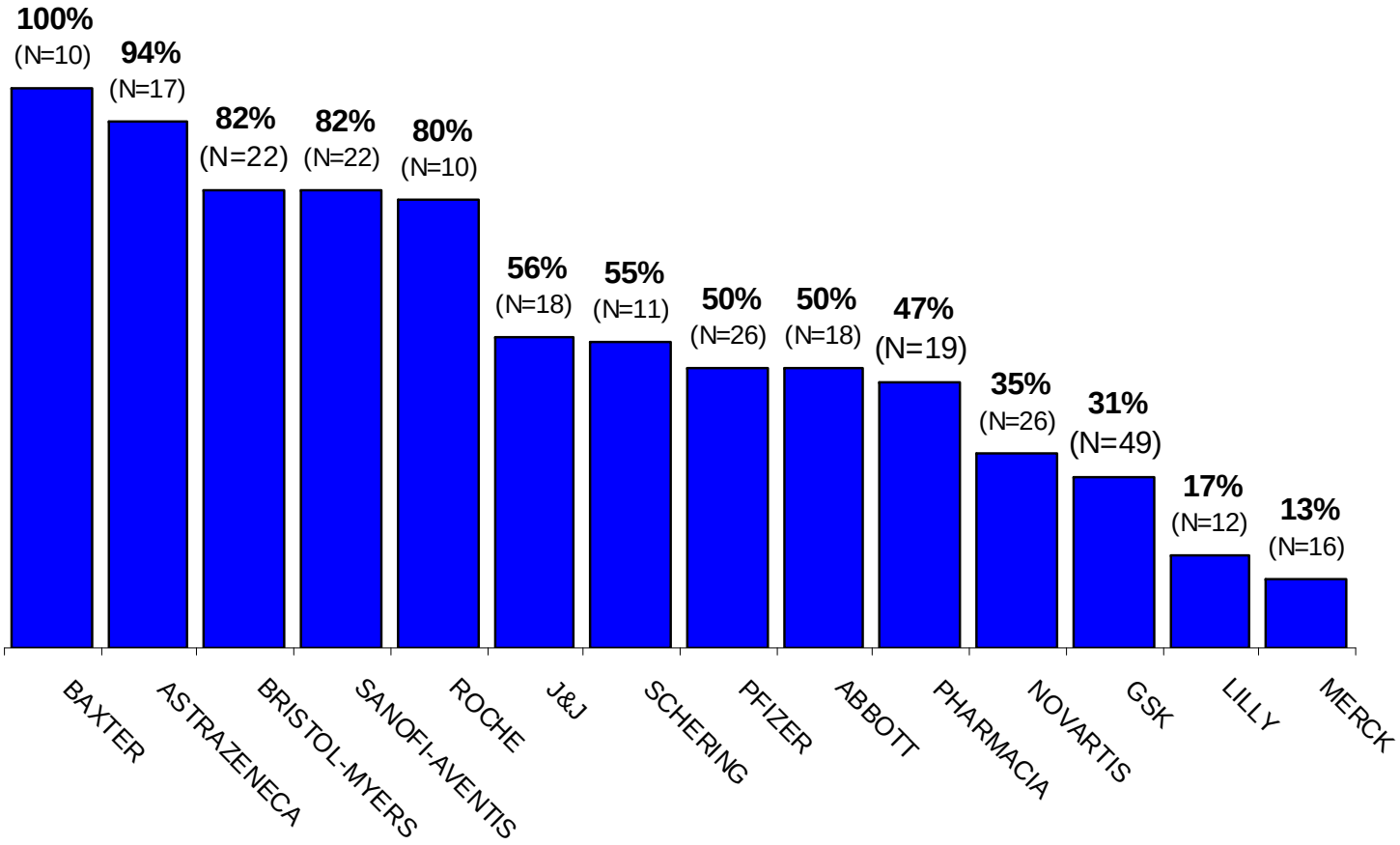
- Encryption markets
  - More patent intensive (Giarratana, 2004)
    -

The market for technology in bio-pharma is significant



Pharma firms rely extensively on outside knowledge for their products.

Percent of new drugs with more than 50% of patent attached to the drug being not held by the commercializing firm, for companies with >10 NDAs --> 1989-2004



Source: Ceccagnoli, Graham, Higgins, Lee; 2008

Markets for technology and their discontents

Whither bio-pharma?

Patenting and academic research?

Anti-commons?

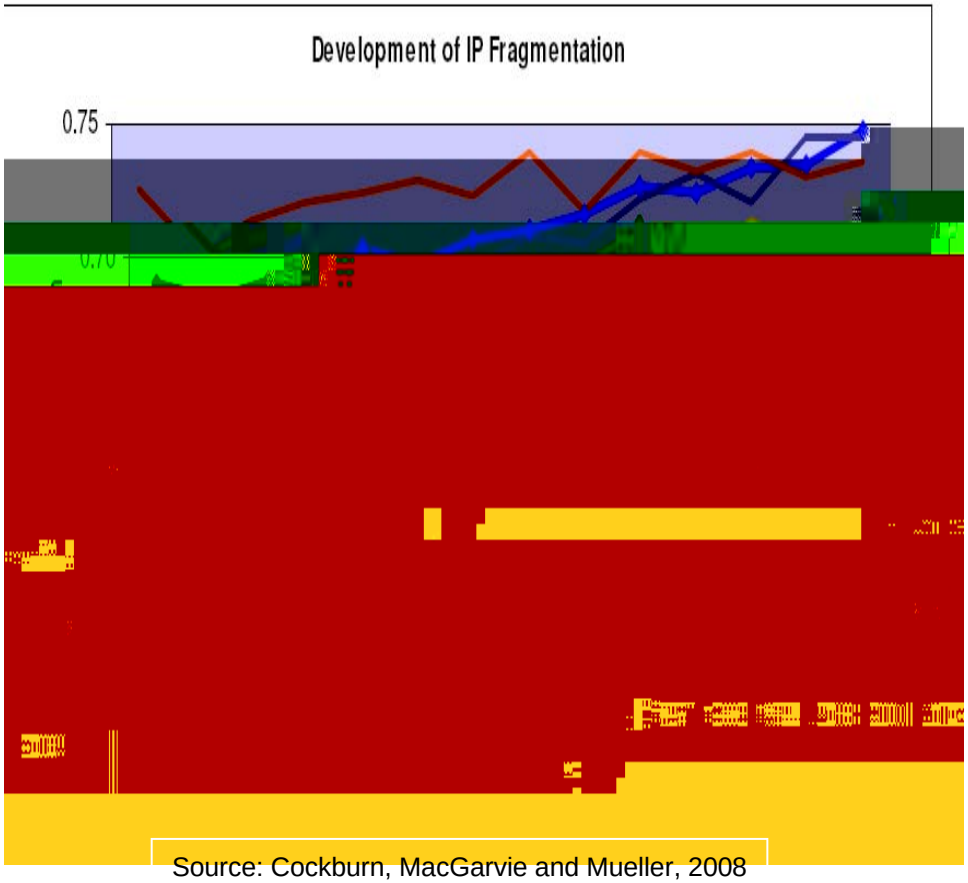
Foundational patents: university patents may be as guilty as others in blocking research

Table 4-2 Principal Assignees of Patents by Category

Source: National Academy of Sciences, 2005

"WE HAVE MET THE ENEMY AND HE IS US"

Thickets and patent fragmentation



Source: Cockburn, MacGarvie and Mueller, 2008

- Patent landscape becoming more complex
- Substantial litigation costs (and perhaps rising) (e.g., Lanjouw and Schankerman, 2003)
- Potential for harm exists – limited evidence as yet.

Anti-commons: An uncommon tragedy?

Patents as potential roadblocks

- Bad patents create problems.
- Bad patents in the hands of players with short term strategies create bigger problems – BUT

- Patent policy must not discriminate against business models based on licensing.
- In a knowledge based economy, prejudices in favor of material production is simply a prejudice. SO

- Investing in improving the quality of patents is a good idea.
- Getting the USPTO to recognize that its mission is not to serve inventors but to serve society.