

*Open Innovation meets Markets  
for Technology and Division of  
Innovative Labor*

# *Open Production v Open Innovation*

- A producer does not carry out all the steps inside the firm
  - buys inputs from others and sells outputs to other producers
- Transactions facilitated by contracts and by property rights
  - But also commercial relationships, reputation,
- This is normal
  - a guy did so 230 years ago
- Open innovation: innovator does not carry out all the steps
  - Buys (or obtains) inputs from others
  - Sells (or provides) output to other producers
- Transactions facilitated by contracts and property rights
  - 'but also business models where inputs are given away free
- Why isn't this normal?

## *The Knowledge Economy or “knowledge as commodity” Economy?*

- The distinctive feature of the last two decades has been the emergence of knowledge as a tradable asset.
  - Technology market places
  - Active technology licensing by manufacturing corporations – IBM, TI, Dow, P&G, ...
  - Specialized technology suppliers
  - Specialized intermediaries
  - Management Gurus writing on IP
- Patents are not the sole cause but are an important facilitator.
- This s\*\*\* ain't new – it has happened before
  - Cf. Maharishi Merges, Lamoreaux and Sokoloff; Khan and Sokoloff



Division of labor is limited  
by the extent of the  
market

- *Division of innovative labor*<sup>TM</sup> 😊 is limited by the extent of the *market for technology*
  - ▣ Market for technology – licensing, R&D contracts, ...
- The market for technology is conditioned by the intellectual property environment
  - ▣ patents: crisp, not big

# *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 <b>Natural Resources</b> and Other intangibles	Total
Manufacturing	<b>59.5</b>	9.4	1.0	2.9	-	72.8
Distributive Services	<b>1.0</b>	6.9	0.1	5.1	-	13.1
Information	<b>1.9</b>	4.9	6.6	0.0	0.1	13.5
Finance and Insurance	<b>0.2</b>	0.7	0.0	1.4	0.0	2.4
Professional and Business Services	<b>3.0</b>	0.2	1.6	1.5	0.4	6.7
Other Industries	<b>1.0</b>	0.7	0.1	4.8	0.8	7.5
Total	<b>66.6</b>	22.8	9.4	15.7	1.3	115.9

**\$30-40Bn for mid 1990s**

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

# Growth of patents and MFT coincide after 1980s

S. Athreye, J. Cantwell / Research Policy 36 (2007) 209–226

217

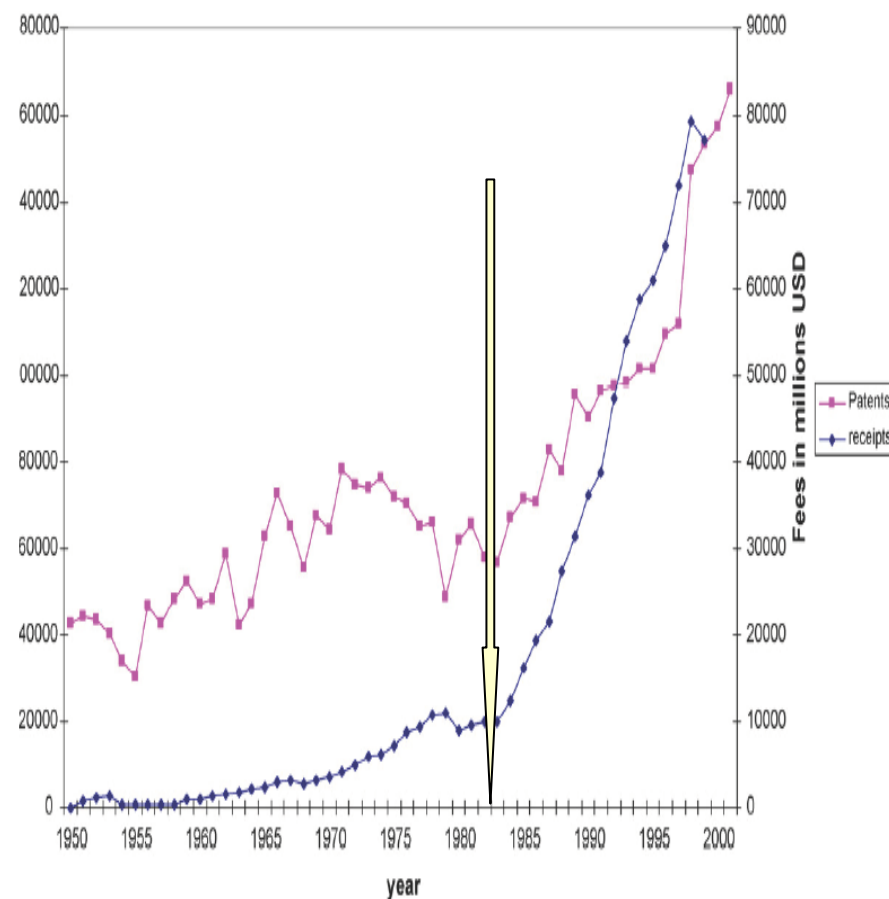
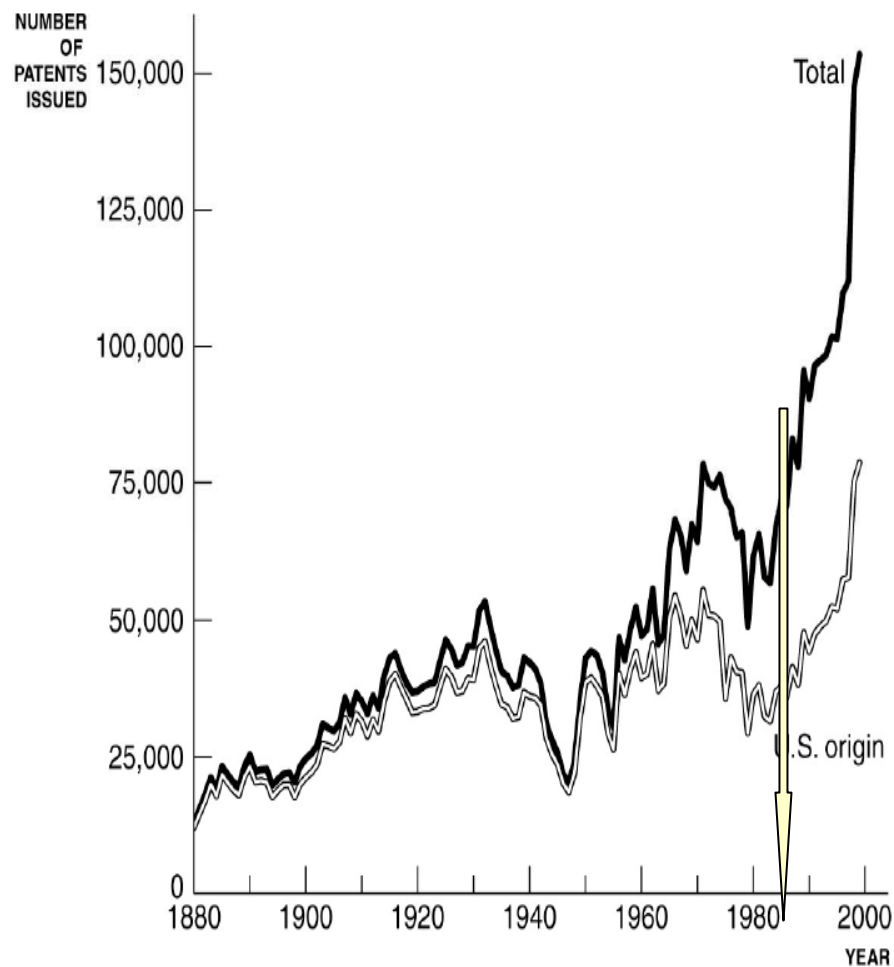
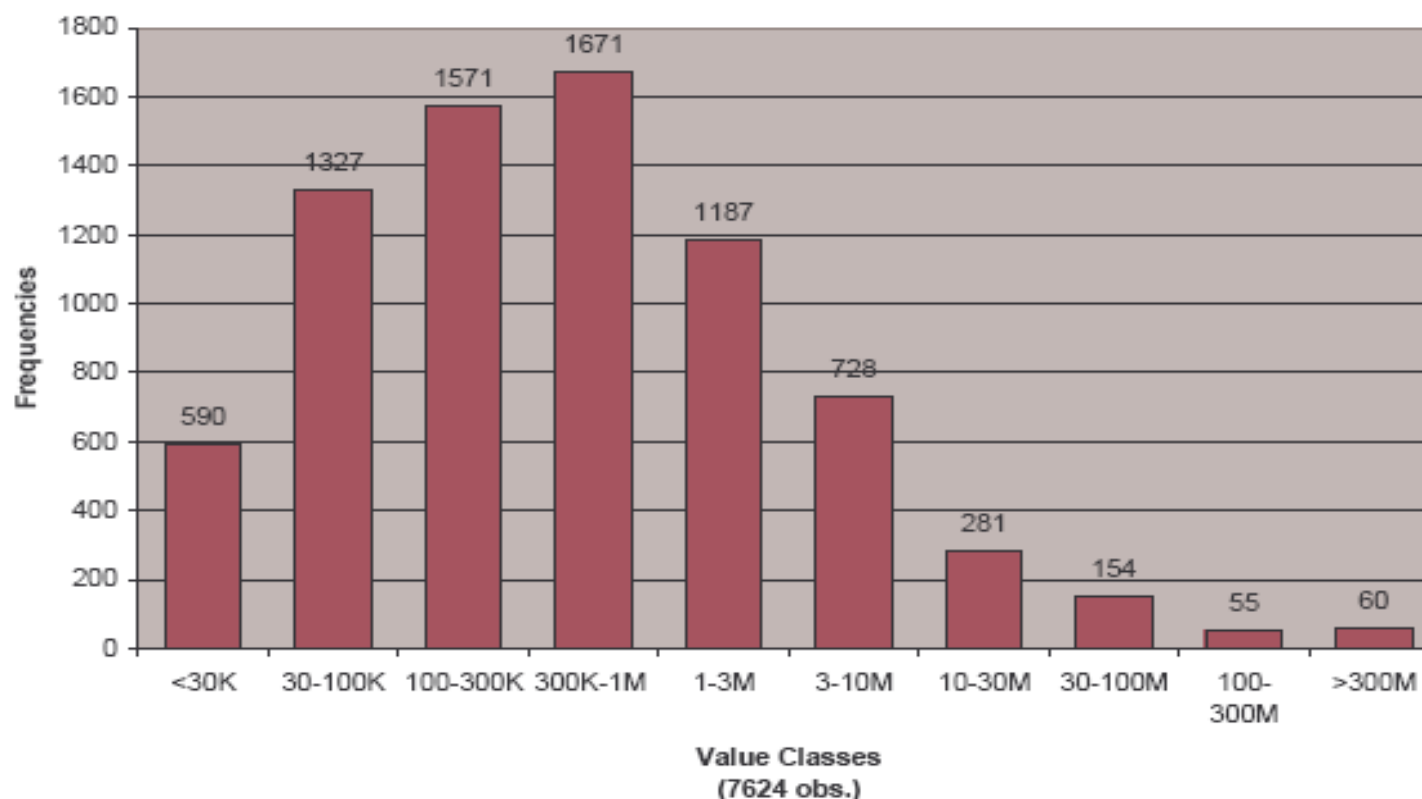


Fig. 2. Growth in non-US held patents and worldwide royalty and license revenues.

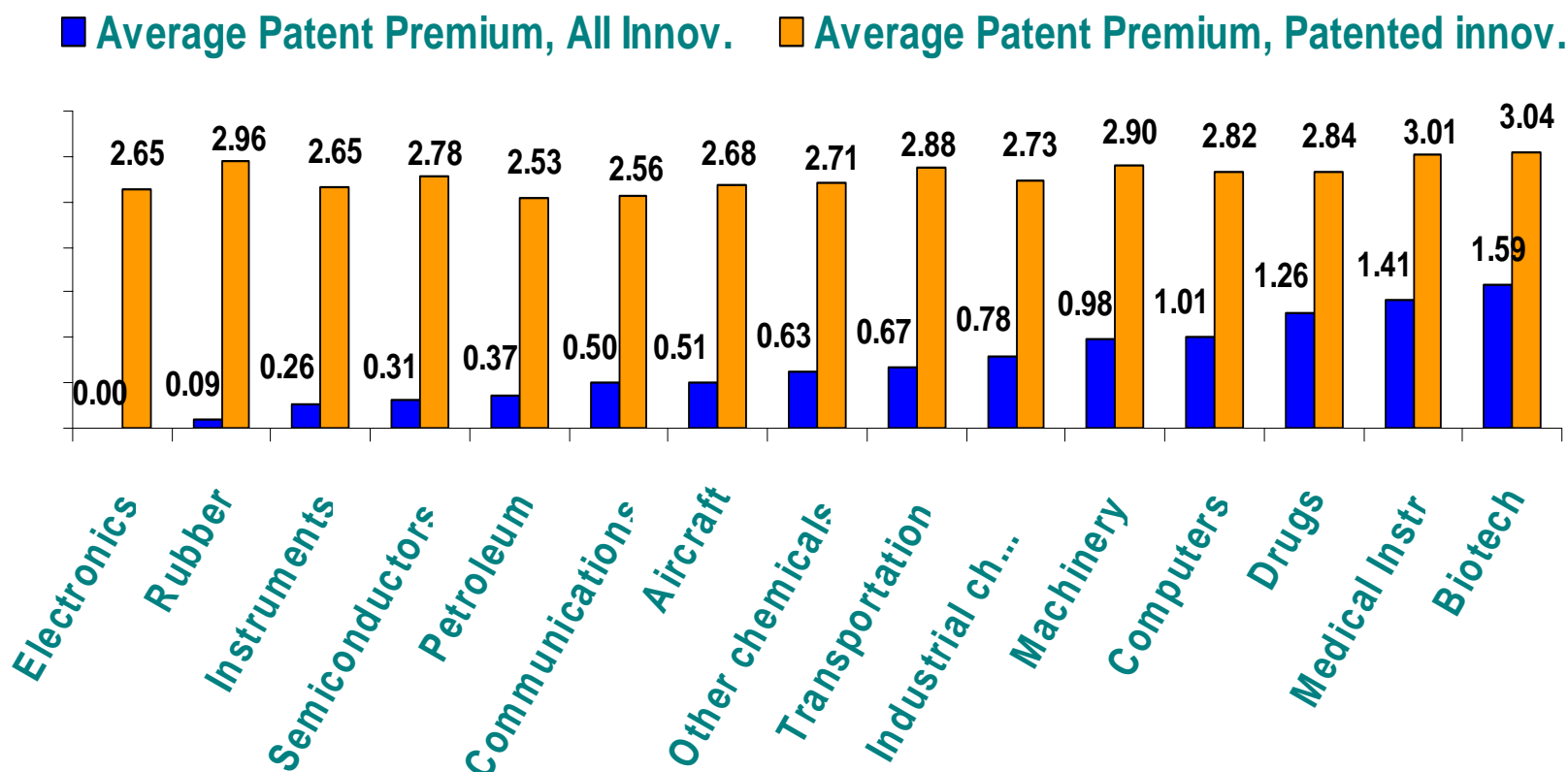
## *Distribution of Patent Values* (Gambardella, Harhoff and Verspagen, “Value of patents”, 2005)



**Patent value distribution is skewed but high average value between 300K and 1 million Euro**

# Patent protection is valuable, and stimulates R&D, even in industries that do not patent a lot.

(source: Arora, Ceccagnoli and Cohen, 2003, NBER)

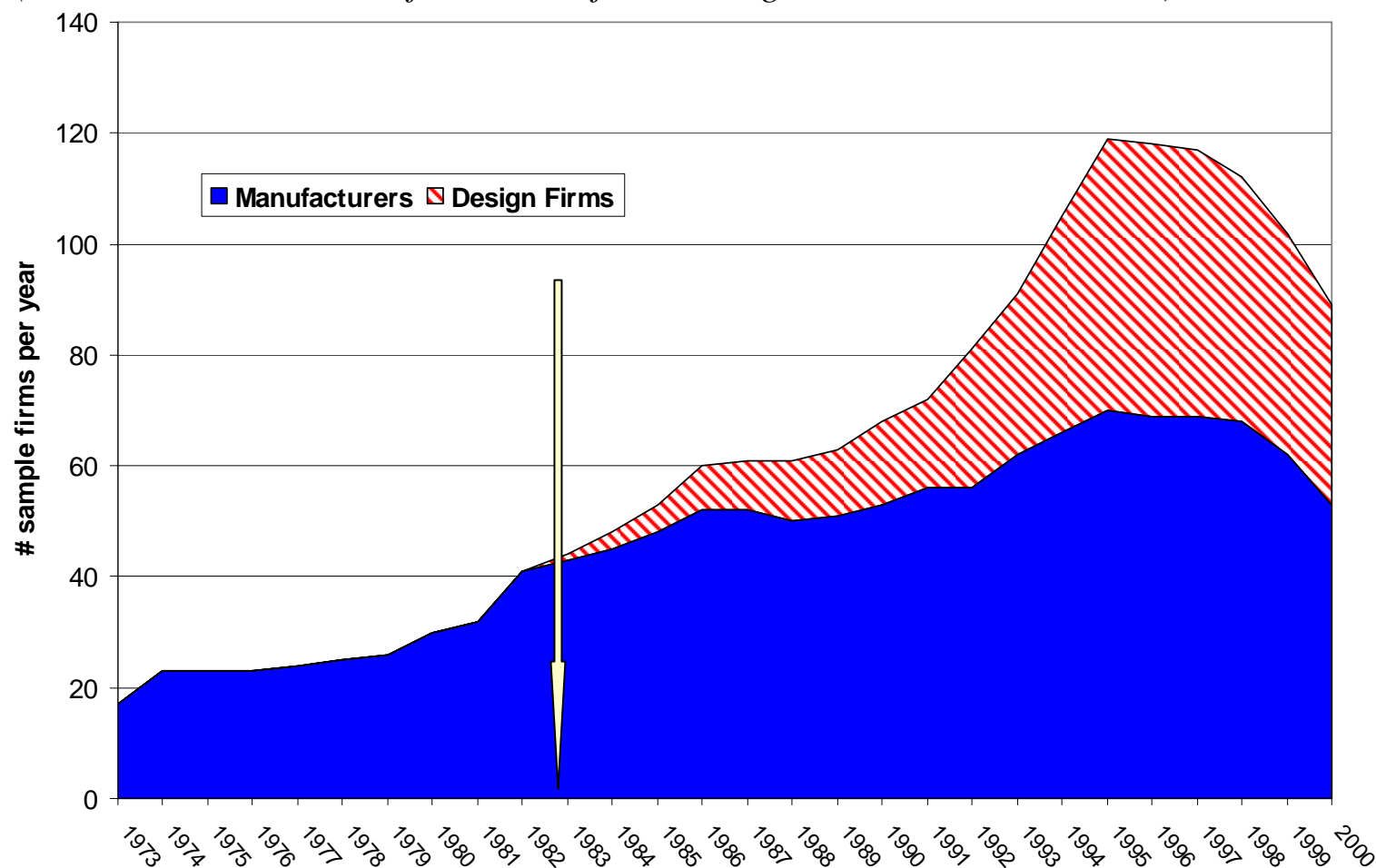




# *Patents promote entry of specialized design firms in semiconductors*

## *U.S. semiconductor mfg. and design firms, by year*

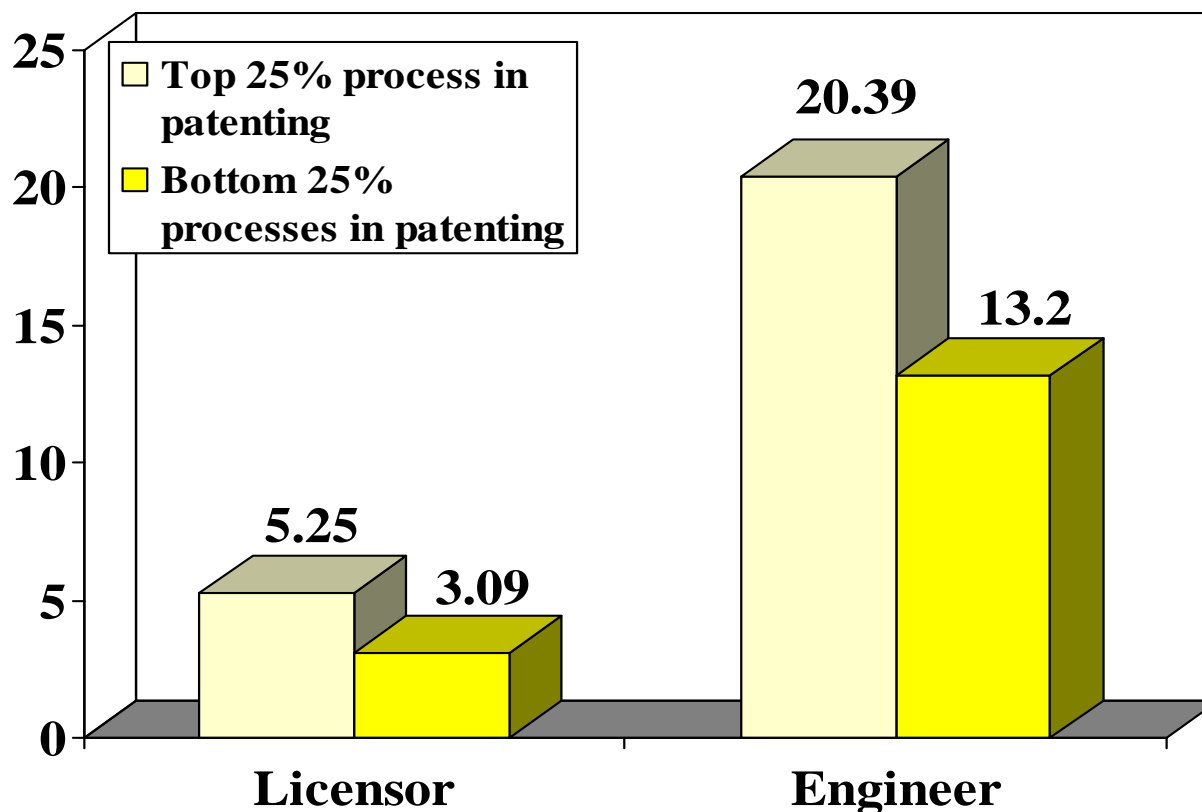
*(Ziedonis, 2003, "The Enforcement of Patent Rights in the United States")*



**The division of innovative  
labor**

# *Patents promote entry of specialized tech suppliers in chemicals*

**Average # of Specialized Engineering Firms by process category,  
139 process technologies (1980-90)**

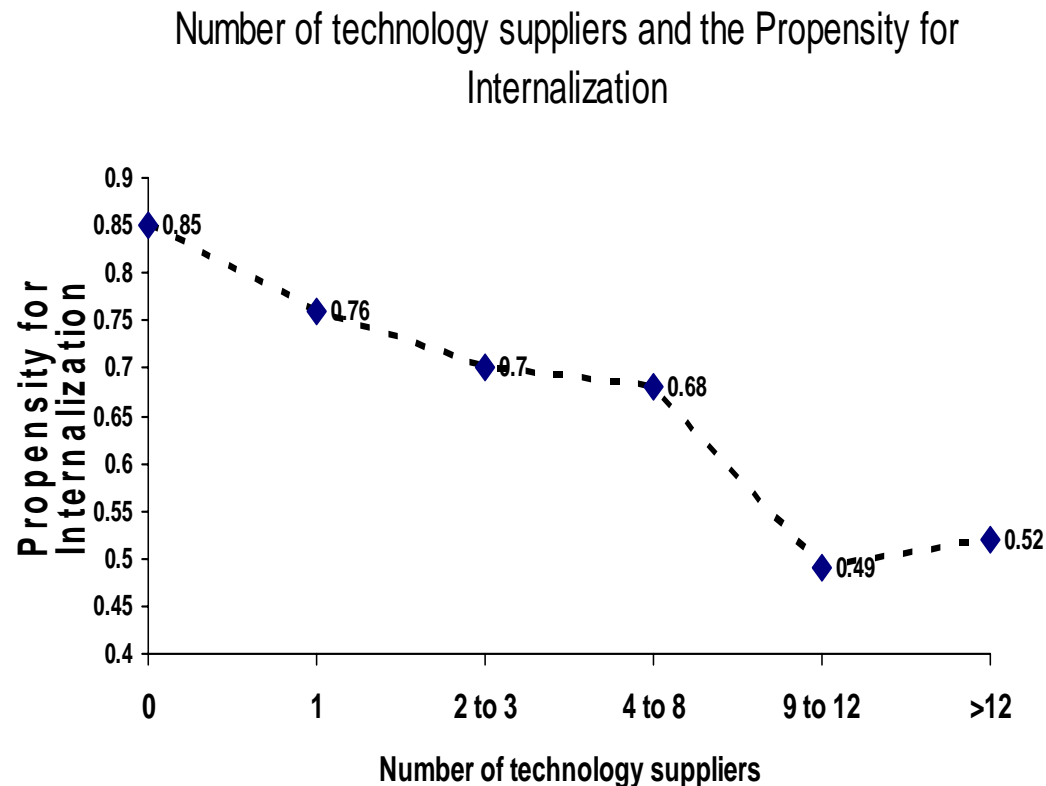


**The division of innovative  
labor**

Source: Arora, Fosfuri & Gambardella, "The division of inventive labor", 2003

# *Competition in market for technology market increases licensing by all technology holders i.e., more open innovation*

*Presence of specialized technology suppliers induces chemical MNCs to license their technology rather than invest directly in for*



Arora and Fosfuri, 2001

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

- Based on CMU Survey, 1991-93
- Patents are used for licensing by smaller firms lacking complementary assets, and for commercialization by larger firms.
- Patents support entry by smaller, research oriented firms

***10% increase in Patent Effectiveness Leads to:***

	<u>Small Firm</u>	<u>Large Firm</u>
% increase in licensing propensity	6%	2%
% increase in the propensity to license patented innovations	1%	−3%

Source: Arora and Ceccagnoli. 2005