

Econ 124 & PP 190-5/290-5
Innovation and Technical
Change

IP and the patent system in practice
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Quiz Tuesday Oct. 5

- Length: 45 minutes
- Format: questions drawn from study questions
- Bring one blue book
- Questions?

Outline (Sept 28 and 30)

- What is intellectual property?
- Overview of IP protection mechanisms
- How does the patent system work in practice?
 - How do firms protect their IP?
 - The strategic use of patents and the increase in patenting
- Current policy problems
 - Growth in patenting worldwide
 - Subject matter expansion
 - Research tools
 - IP and development

How do firms protect IP?

- Two surveys of industrial R&D
 - Yale survey (Levin, Klevorick, Nelson, and Winter 1983)
 - Carnegie-Mellon survey (Cohen, Nelson, and Walsh 1994)
- Asked industrial R&D managers about
 - sources of knowledge (domestic, intl, methods)
 - contribution of universities and competitors
 - appropriability conditions
 - nature and role of patents
- Separate questions for product and process innovations

Methods for Appropriating the Returns to Innovation

- Patents
- (Trade) Secrecy
- Lead time (being first to introduce new product)
- Complementary sales and service
- Complementary manufacturing facilities
- Know-how and product complexity

Effectiveness of Appropriability Mechanisms for Product Innovations

Mechanism	1st	2nd	3rd	4th	5th
Yale Survey 1983					
Patents	5	6	20	13	
Secrecy	0	0	19	25	
Lead time	17	21	6	0	
Sales & service	24	19	1	0	
Carnegie-Mellon Survey 1994					
Patents	3	4	5	12	20
Secrecy	14	14	7	8	1
Lead time	22	6	10	4	2
Sales & service	3	9	11	15	6
Manufacturing	4	14	13	7	6
Share of firms ranking the means 1st, 2nd, etc.					

Recent changes in the U.S. patent system

- 1980 patentability of artificially engineered genetic organisms
 - Diamond v Chakrabarty
- 1980 increased university patenting
 - Bayh-Dole Act
- 1981 patentability of software
 - Diamond v Diehr
- 1982 creation of CAFC/court
 - Patent validity more likely to be upheld
- 1985/6 TI sues several Japanese semiconductor firms
- 1986 Kodak-Polaroid decision on instant cameras
 - \$1B judgment; injunction that shut down Kodak business
- 1994 TRIPS agreement leads to change in term/but not "first to file" or elimination of grace period
- 1998 patentability of business methods
 - State Street and ATT vs Excel

Summary of our interview results - Capital-intensive manufacturers

- Strong demonstration effect of TI and Kodak-Polaroid cases
 - "Ramping up"; "harvesting latent inventions"
 - "If in doubt, patent"
- Safeguard assets; avoid halt in production
 - Semiconductor manufacturing plant costs \$1B
 - Expensive to shut down, even for a week
- Improve bargaining position with other patent owners
 - Gain access to technology on more favorable terms
 - Secure royalty income
- Changes in the management of patent process
 - Patent advocacy committees
 - increased bonuses and targets

Summary of our interview results - Design firms

- Secure rights in niche product markets
 - Traditional exclusion role for patents
- Critical role of patents in attracting venture capital
 - When financing a firm that only has an idea, VC needs assurance that the idea is "owned"
- But...* growth in patenting entirely due to manufacturing firms

The patent explosion

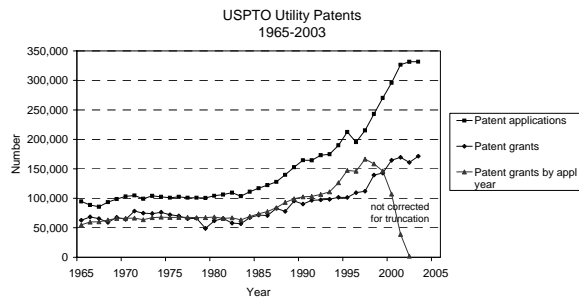
- U.S. utility patent grants between 1965 and 2003
 - Application lags => only complete through 1997
- Sharp break in trend in 1983/84
 - Applications and grants were roughly flat, then begin to grow at about 5-6% per year
 - Real R&D increases only 2.4% per year over same period
- Growth slows in 2001

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USPTO Utility Patents

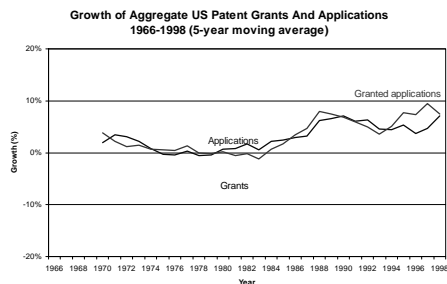


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Growth of patent grants and applications



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Sources of the change - regions

- Break it down by regions
 - United States
 - Greater Europe
 - Asia (mostly Japan, Taiwan, and Korea)
 - Other countries: developed (Canada, Israel, etc.) and developing (very few)
- Results
 - Structural break in 1983/1984 due to inventors resident in the U.S.
 - Structural break for Asian inventors was earlier (1981)

Sources of the change - technologies

- Break it down by technology classes
 - No break in chemicals and pharmaceuticals
 - Significant (and in 1984) in other technologies
 - increased 8.4% per annum in electrical, computers, and communication equipment
 - increased 5.5% per annum in mechanical and other technologies
- Growth accounted for by US firms in electrical, computers, comm. eq., and instruments industries

Conclusions

- Patents are not the most important means for securing returns to innovation, except for products in a few sectors
- One product or innovation \Leftrightarrow one patent can be a misleading model of the innovation process
- Patents are used in a number of ways not foreseen by the original design of the system

Some current policy issues (1)

- Increase in patenting rates and consequent increase in patent office workloads worldwide, traced to
 - Subject matter expansion (business methods/genome)
 - Required inventive step decreasing
 - Increased strategic use (=> harvesting existing innovations)
- Research tools and university patenting
 - Negative effects on open scientific research?

Some current policy issues (2)

- IP protection in developing countries
 - Should it be enforced the same way as in developed countries?
 - Indigenous technology; IP for traditional plant forms.
- Subject matter expansion
 - Business method patents
 - Should they be allowed?
 - Do they pass the non-obviousness test?
 - Are they too broad?
 - Gene-sequence and life-form patenting
 - In what form should these be allowed?
- Cumulative and overlapping innovation
 - the patent thicket and increasing transactions costs to innovation

Research Tools

- Examples:
 - Cohen-Boyer patent for method of inserting genes into bacteria
 - Genentech - use of bacteria to express human proteins
 - Computer text editors & spreadsheets
- Used for a non-revenue producing activity
 - Should a license be required simply for research
 - If not, how do we provide incentives to create them?
- Mady v. Duke controversy

Are business methods and software patentable?

- Yes, in the US, Australia, Japan, and Korea
- In Europe including UK, and Canada
 - no business methods patentable
 - software patentable only if it has a "technical effect"
 - European debate now 2 years old, no decision
- Are algorithms patentable?
 - no, but applications of algorithms are
 - How can we tell the difference?
- Until recently, patent examiners not experienced in this area, so low quality patents may have issued
- 2001 – a number of changes made to patent regs with respect to business methods patents
 - Second pair of eyes
 - Prior use defense against infringement

- Extra slides (not in lecture)

Systems Innovation

- Examples:
 - Cellphones, in general (chipsets, phone parts, materials, battery technology, etc.)
 - Semiconductor chips (both cumulative and involve a large number of IP pieces owned by different parties)
 - Computer systems

Using IP to Facilitate Systems Innovation

- Helps to negotiate cross-licensing agreements using well-defined technology “packages”
- Enables the establishment of standards with “reasonable” licensing fees
- Grants property rights to small innovative entrants

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History of U.S. patent reform efforts

Reform Proposal	Committee on the Relation of the Patent System to the Stimulation of New Industries (1936)	National Patent Planning Commission (1943)	President's Commission on the Patent System (1967)	Advisory Commission on Patent Law Reform (1992)
reform of obviousness standard; presumption of validity	recommended	recommended		
opposition/revocation		considered & rejected	recommended ex parte pre- and post-grant	recommended reform
Pre-grant publication	recommended	not considered	recommended	recommended
Single appellate patent court	recommended	recommended		n/a
patent trial courts	recommended the use of technical advisors		recommended the use of "Civil Commissioners"	recommended
compulsory licensing	considered & rejected	considered w/o recommendation		
20-year term		recommended	recommended	recommended
first-to-file			recommended	recommended

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Source: Mark Janis (2001), "Patent Abolitionism," U of Iowa Law School
