

Lecture 9

Strategic Patenting

E5104 – Economics of Innovation

Bernhard Ganglmair



Strategic Patents?

(12) **United States Patent** **Chaudhri et al.**

(54) **UNLOCKING A DEVICE BY PERFORMING GESTURES ON AN UNLOCK IMAGE**

(75) Inventors: **Imran Chaudhri**, San Francisco, CA (US); **Bas Ordling**, San Francisco, CA (US); **Freddy Allen Anzures**, San Francisco, CA (US); **Marcel Van Os**, San Francisco, CA (US); **Scott Forstall**, Mountain View, CA (US); **Greg Christie**, San Jose, CA (US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/204,572**

(22) Filed: **Aug. 5, 2011**

(65) **Prior Publication Data**

US 2011/0296356 A1 Dec. 1, 2011

Related U.S. Application Data

(63) Continuation of application No. 12/477,075, filed on Jun. 2, 2009, now Pat. No. 8,046,721, which is a continuation of application No. 11/322,549, filed on Dec. 23, 2005, now Pat. No. 7,657,849.

(51) **Int. Cl.**
G06F 3/033 (2006.01)

(52) **U.S. Cl.** **715/863**; 713/154; 713/182; 345/15

(58) **Field of Classification Search** 345/156; 713/154, 182; 715/863
See application file for complete search history.

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(10) **Patent No.:** **US 8,286,103 B2**
(45) **Date of Patent:** **Oct. 9, 2012**

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Primary Examiner — Mark Rinehart

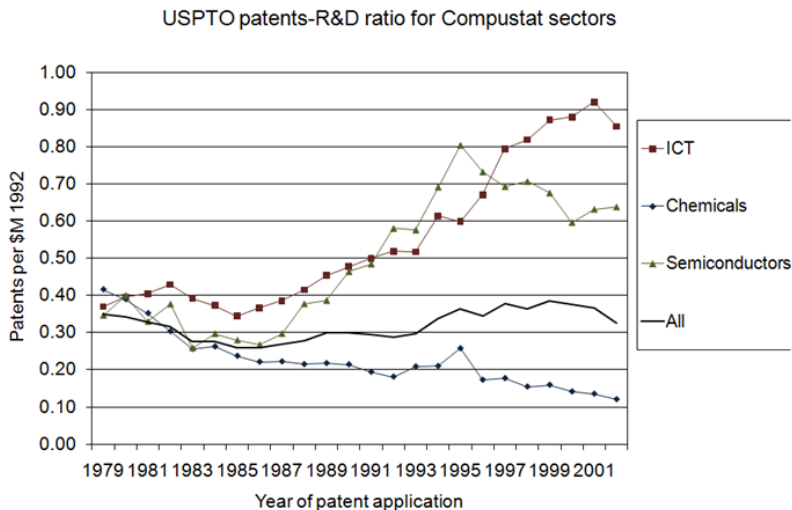
Assistant Examiner — Andres E Gutierrez

(74) *Attorney, Agent, or Firm* — Morgan, Lewis & Bockius LLP

(57) **ABSTRACT**

A device with a touch-sensitive display may be unlocked via gestures performed on the touch-sensitive display. The device is unlocked if contact with the display corresponds to a predefined gesture for unlocking the device. The device displays one or more unlock images with respect to which the predefined gesture is to be performed in order to unlock the device. The performance of the predefined gesture with respect to the unlock image may include moving the unlock image to a predefined location and/or moving the unlock image along a predefined path. The device may also display visual cues of the predefined gesture on the touch screen to

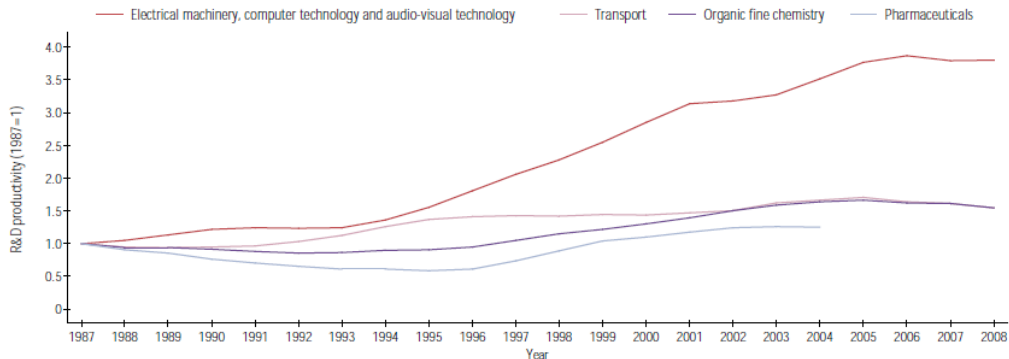
Changes in Patenting Propensities?



Source: Hall and Ziedonis (2001)

Changes in Patenting Propensities?

Worldwide patent propensity by technology (first filings over constant US\$ business sector R&D expenditure)



Source: Fink et al. (2013)

Introduction

- Patenting propensities differ across technologies
 - Level differences only partly explained by technology-inherent differences
- (1) Why is patenting propensity in ICT 1.5 times that in semiconductors?
- Patenting propensities change over time
 - Differences over time only partly explained by changes in technology-inherent differences
- (2) Why did patenting propensities in ICT and semiconductors increase?

The Patent Paradox

- Overall increase in US patenting since early 1980s
- Coincides with strengthening of patent system
- And yet, firms often report patents to be ineffective and to be less important (Carnegie Mellon Survey – Cohen et al., 2000)
- Why did firms patent more?
- Focus on Hall and Ziedonis (2001) study of the semiconductor industry

Background: Strengthening of Patent Rights

- 1982: a number of changes to strengthen patent holders rights
- Creation of CAFC – Court of Appeals of the Federal Circuit, leading to
 - Broader view of scope, increased evidentiary standards
 - More preliminary injunctions
 - Larger damage awards
- Resulted in substantially more cases won by patentholders rather than potential infringers

Background: Why Semiconductors?

- *We never anticipated at Fairchild that a lot of other participants were going to enter the business later on. So we tended to patent relatively few things [...] Gordon Moore (2004)*
- Among the industries least reliant on patents to appropriate returns to R&D (Yale, Carnegie-Mellon surveys)
- Pivotal role of lead time, secrecy, and complementary manufacturing capabilities
- Yet witnessed a dramatic surge in patenting by semiconductor firms during the late 1980s and early 1990s.

Summary of Interview Results

- Capital-intensive manufacturers
 - Strong demonstration effect of Texas Instrument and Kodak-Polaroid cases
 - “Ramping up”; “harvesting latent inventions”; “If in doubt, patent”
 - Prevent holdup; safeguard tangible assets (manufacturing plants)
 - Need to improve bargaining position with other patent owners
 - Control outflow of royalty payments and secure own royalty income
 - Gain access to external technology on more favorable terms
 - Changes in management of patent process
 - “Patent advocacy committees”; increased bonuses; goals
- Design firms
 - Secure rights in niche product markets
 - Critical role of patents in attracting venture capital

Empirical Analysis: Data

- 110 pure-play U.S. semiconductor firms (SIC 3674)
 - Added small number of publicly traded firms from other SICs using ICE Status reports
 - compiled entity-level patent portfolios
 - matched with Compustat data
 - dropped firms with fewer than 3 years of data
- Result: a sample of 95 firms and 946 observations in unbalanced panel, 1980–94.
 - Omitted firms primarily small post-94 startups

Empirical Approach

- Basic specification

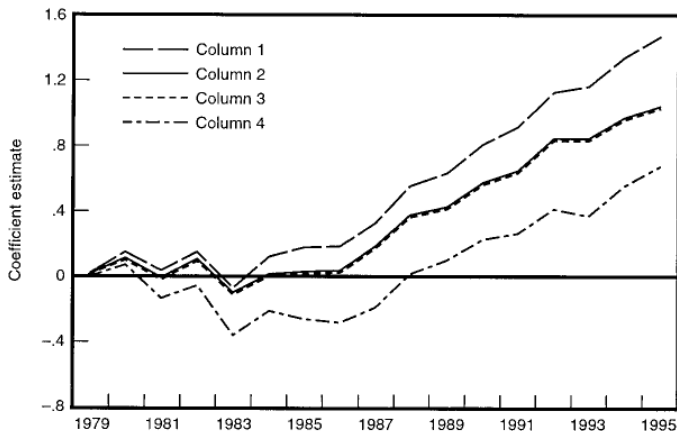
$$E[y_{it}|X_{it}]\lambda_{it} = \exp(X_{it}\beta + \gamma_t)$$

- y number of successful patent applications by firm i in year t
- Regressors X :
 - Firm age (log)
 - Firm Size (log of employment)
 - R&D Intensity (log; deflated, relative to employment)
 - Capital Intensity (log; deflated, relative to employment)
 - $D = 1$ if firm entered after 1982 (35 firms)
 - $D = 1$ if firm is manufacturer (v. 28 specialized design firms)
 - $D = 1$ if firm is Texas Instruments
- Time dummies, 1980-1994

Results

- Clear surge in patenting by U.S. semiconductor firms since the early-to-mid 1980s, not accounted for by R&D, entry, etc.

Residual Growth in Patenting: US Semiconductor Firms (Relative to 1980)



Changes in the Determinants of Patenting U.S. Semiconductor Firms

Variable Name	1979-83	1984-88	1989-93
Log R&D or log R&D per employee	0.457 (0.199)	0.530 (0.200)	0.041 (0.125)
Log firm size (1000s employees)	0.800 (0.056)	0.880 (0.048)	0.887 (0.074)
Log capital per employee	-0.030 (0.237)	0.128 (0.184)	0.574 (0.177)
Dummy (Texas Instruments)	1.094 (0.186)	0.940 (0.117)	0.654 (0.209)
Year dummies, missing R&D dummy, firm age included in all regressions U.S. Semiconductor Firms 1979-1995 (946 observations)			

What is “Strategic Patenting”?

- “Original” purpose of patent: appropriate returns to innovation by granting protection from imitation and freedom to operate
- Strategic purposes:
 - Offensive/defensive blocking (thickets, fences, etc.)
 - Bargaining (licensing, litigation, etc.)
 - Exchange
 - Reputation
- Creates incentives for firms to patent, not necessarily linked with innovative activity

Summary – Strategic Patenting

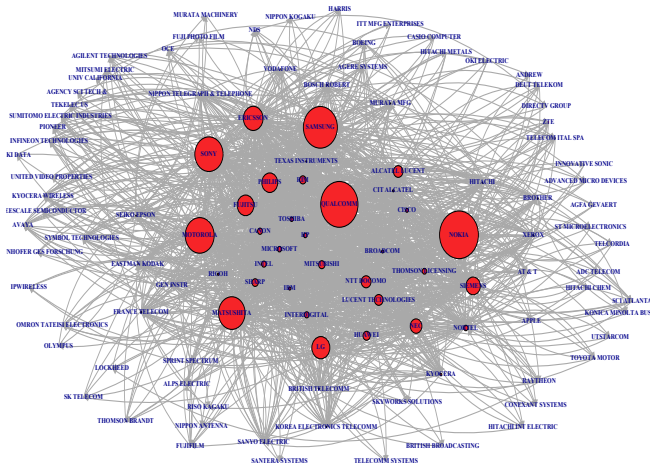
- Quantitative and qualitative evidence that “pro-patent” shift altered semiconductor firms’ incentives to obtain US patents
- **Patent portfolio races** among large, capital-intensive firms
- Capital intensity and not R&D predicts patenting
- Upsurge reflects managerial change, but ...
- Primarily in the management of the patenting and licensing process, not in the management of R&D
- Strong evidence for strategic patenting
- **Patent portfolio races** also occur in other industries for different reasons

Patent thickets – Outcome and Result

- Strategic patenting increased patent filings
- Also exogenously increased technological complexity
- Cumulative nature of technology
- ▷ Patent thickets
 - Effects: can large numbers of patents in specific complex technologies create barriers to entry?
 - Barrier to entry as externality
 - Strategic tool to foreclose entrants
 - Strategic challenges for companies
 - Policy responses?

What are Patent Thickets?

"a dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology" (Shapiro, 2000).



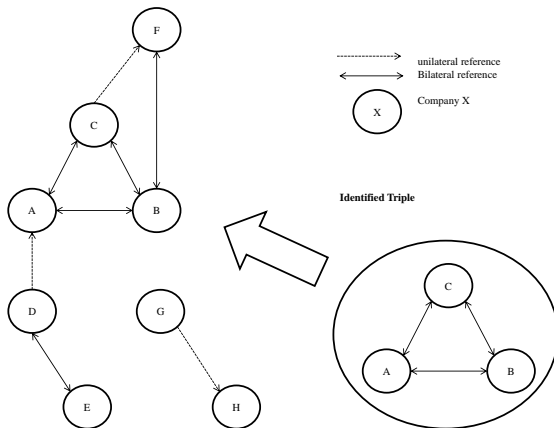
Network of Critical References in the Technology Area Telecommunications in 2005

What are Patent Thickets?

- Patent thickets consist of patents that protect components of a modular and complex technology
 - ⊗ Modular: different sets of components can be assembled to yield a variety of technological products
 - ⊗ Complex: products consist of tens or hundreds of such modular components.
- Patent claims overlap
- If overlapping patents belong to different firms and there is 'reciprocity' in ownership fragmentation, patent thicket can exist.
- Technology areas with large number of patents often lead to patent thickets
- But not necessarily so ...
- Still, positive correlation between number of patent filings and prevalence of thickets

How to Measure Patent Thickets in Practice

- von Graevenitz et al. (2012; 2011): firm triples. Triple is defined as a group of three firms in which each firm has critical prior art limiting claims on recent patent applications of each of the other two firms.



How to Measure Patent Thickets in Practice

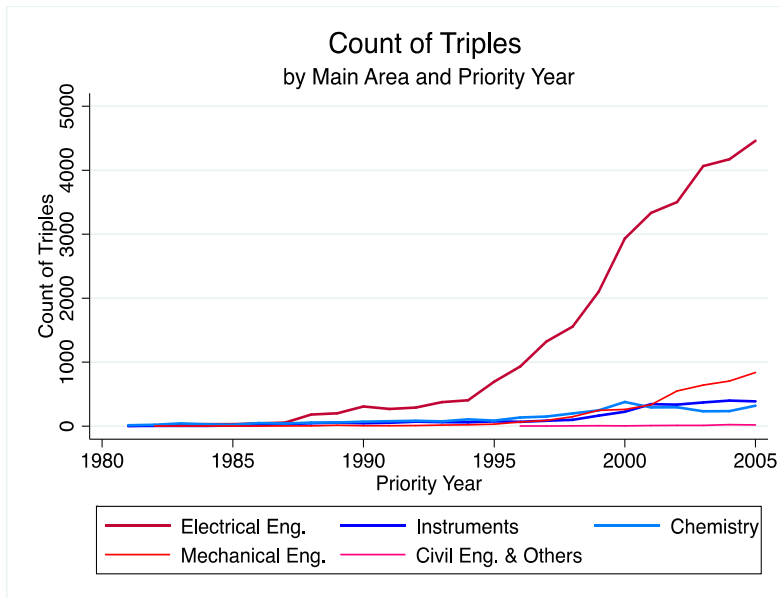


EUROPEAN SEARCH REPORT

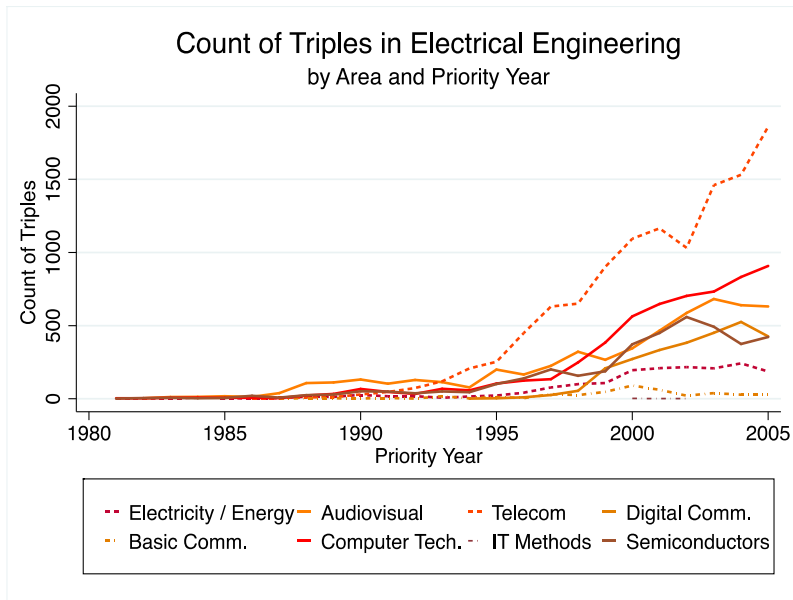
Application Number
EP 10 18 1843

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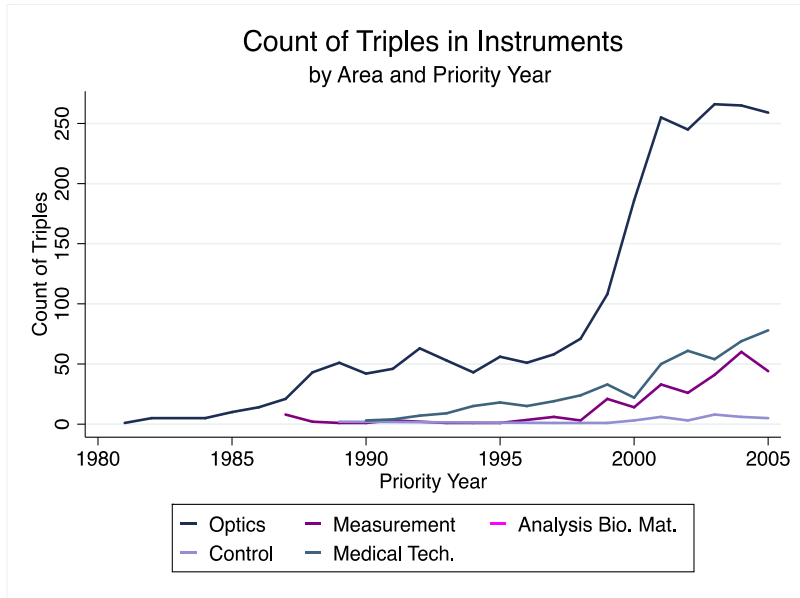
Thickets ...



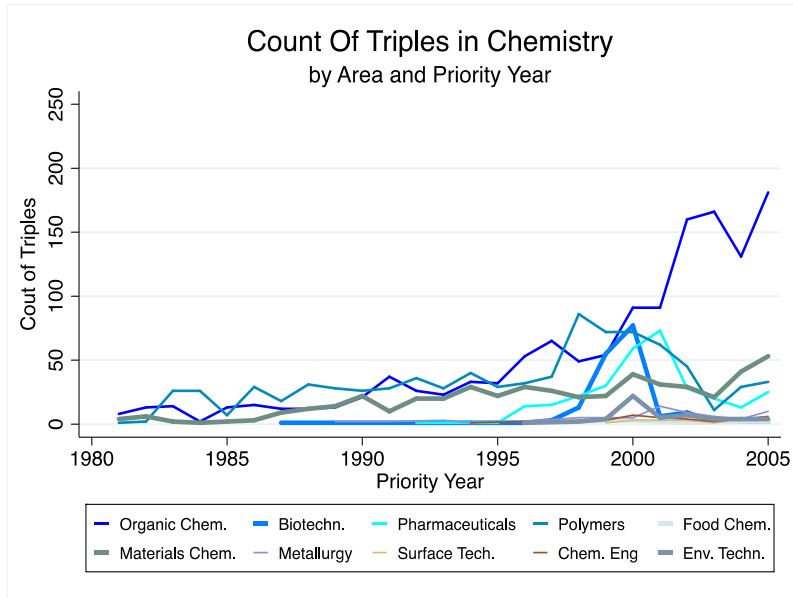
Thickets ...



Thickets ...



Thickets ...



Effects of Patent Thickets

- High levels of patenting raise cost of entry into affected technology areas
- Foreclosing new entrants?
- Large numbers of patents created as strategic behavior by large firms
- Such large patent portfolios create sunk cost of entry that affects especially smaller firms
- Cost of entry: cost of creating a patent portfolio that is sufficiently large to constitute a bargaining chip in negotiations over cross licensing, standards, patent pools, or in court proceedings
- Sunk because the majority of such patents are marginal – they do not in fact protect a technology that would find a buyer in a market for technology
- Patent thickets also create substantial transactions costs for the large incumbents caught up in the thickets

Summary: The consequences of strategic patenting

- Patent thickets exist
- “Innovation thickets” rather than patent thickets?
- Thickets as a negative externality?
- Thickets as a strategic tool?
- Challenges for companies, especially smaller entrants
- Do patents impose costs on innovation beyond the standard monopoly problem?
- What are possible policy responses? Are any policy responses needed at all?