Economics of Trade Secrets

WIPO SYMPOSIUM ON TRADE SECRETS AND INNOVATION

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Overview

- Key economic arguments and academic literature
- Empirical data on trade secrets cases
- Theoretical model and analysis

Key Economic Arguments

Literature review: Key Papers

- Cohen, Nelson & Walsh (2000) Protecting their Intellectual Assets
  - Patenting considered inferior strategy by firms
  - Firms prefer trade secrets, lead time and marketing
- Hall, Helmers, Rogers, Sena, (2014) The choice between formal and informal intellectual property: a review
  - Overview of existing research
  - Highlights challenges with empirical approaches
- EU Commission (2013) Survey on Trade Secrets
  - trade secrets are important; concerns about misappropriation
  - Misappropriation - competitors (53%), former employees (45%) and suppliers/customers (31%)
- EU IPO Observatory (2017) Protecting Innovation
  - Use of trade secrets higher than patents
  - Trade secrets preferred when innovation is new, and when is process rather than products

Lit review: Trade Secrets

- Firm's decision to use TS as a means of appropriation
  - Versus patents
    - Bhattacharya and Guriev, 2006; Bulut and Moschoni, 2006; Ottoz and Cugno, 2006, 2008; Kultti, Takalo, and Toikka, 2007; Mosel, 2011; Kwon, 2012; Panagopoulos and Park, 2015
    - Big v. small (Anton and Yao, 2004)
    - Strategic disclosure (Mukherjee and Stern, 2009)
  - Limited empirical evidence:
    - Trade secrets as preferred measure of protection (Cohen et al 2000, Arundel 2001, Anton & Yao 2004, Crass et al, 2016)
    - Relationship between trade secrets and knowledge/employee mobility: See the works of Png (UTSA, University of Singapore) and Marx (inevitable disclosure, Boston University)

Lit review: Theft of trade Secrets

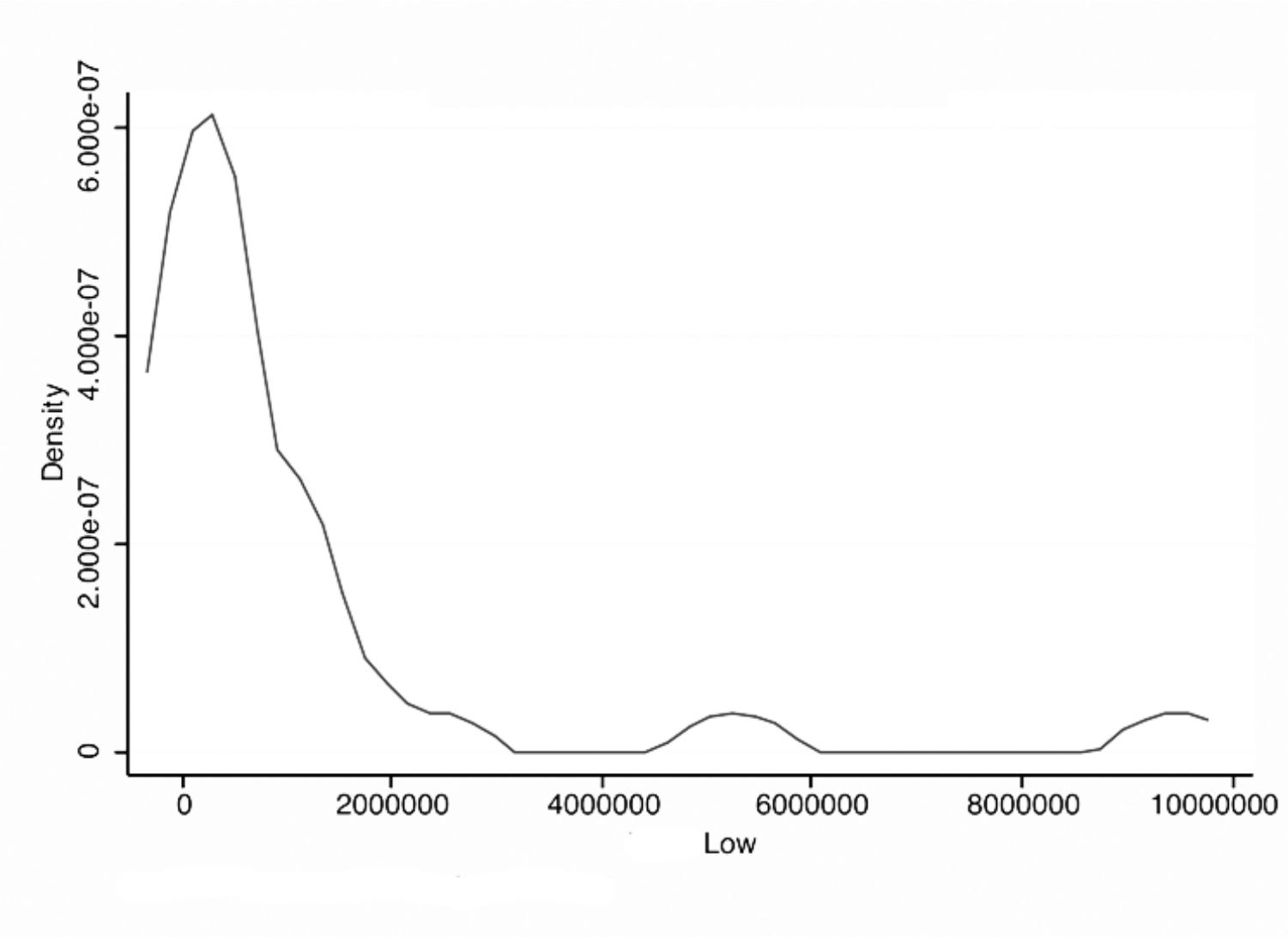
- Impact on firm
  - Negative impact on stock prices (Carr and Gorman, 2001; Cavusoglu et al, 2004)
  - Incentives not to disclose (Argento, 2012)
- Other disciplines raise important issues with respect to civil liberties
- Unexplored overlap with cybersecurity literature:
  - Exploration of policy options
    - Collective security (Andersen and Moore, 2006; Basuchoudhary and Choucri, 2014; Gordon et al, 2015a)
  - Impact of cybercrime
    - Trade secret theft potentially more insidious (Andrijcic and Horowitz, 2006)
    - Mixed findings on stock market/performance impact – generally significant but short-lived (Aquisiti et al, 2006; Davis et al, 2009; Hilary et al, 2016; Gordon et al, 2011; Arcuri et al, 2017)

Empirics

Some Empirics: Economic Espionage Act Data

- Title 18 United States Criminal Code § 1831–1839, updated in 2016
- Evidence: 200 cases from 1996 to 2018
- Interesting firm statistics:
  - 70 victims are listed companies
  - 62% manufacturing, 18% services
  - 13% considered small business
- Interesting defendant statistics:
  - Generally ‘insider’
  - Low level of computer skills
  - Typically a specific trade secret is targeted

Distribution of the Value of Trade Secrets (EEA cases 1996-2008)



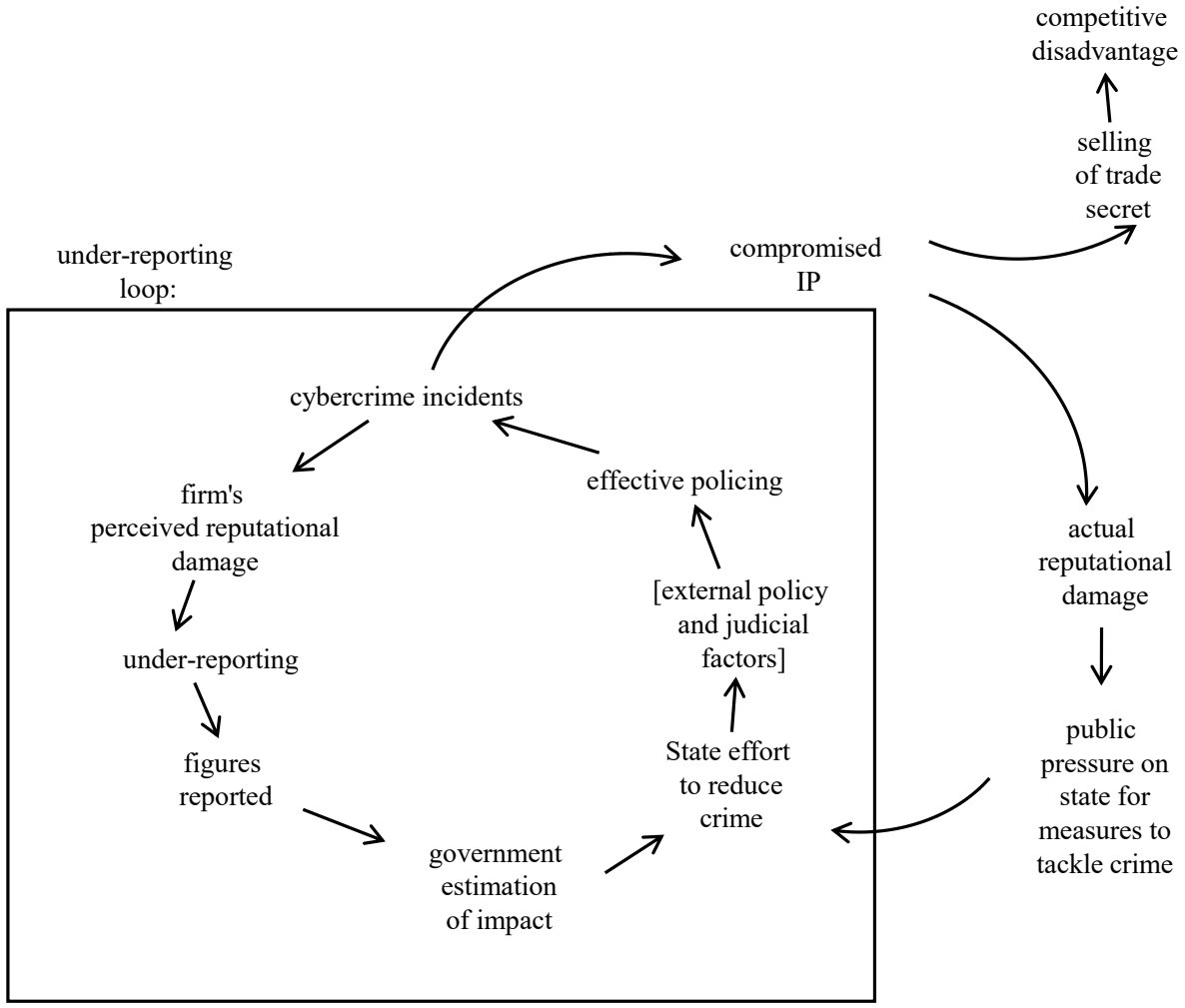
- A few trade secrets are worth a lot, most trade secrets are not
  - Consistent with other types of IP
- Values cited in court documents or media articles with respect to EEA cases
- Variety of valuation methods

Theoretical Analysis – Trade Secret Theft Reporting

Theory:
Trade Secret theft challenges for policy and firms

- Very little known about both trade secrets and trade secrets theft
- Under-reporting problem
  - Incentives not to report
  - Lack of discovery
- Misaligned incentives
  - Herd immunity
  - Deterrence
- Consequently difficult to allocate public and firm resources
- Leads to potential innovation and justice problems

Theoretical Model (Lagazio et al[1]): Trade Secret Theft and Under-reporting



The Under-reporting Loop

Relationships surrounding a cybercrime resulting in trade secrets theft

[1]Lagazio, M., Sherif, N., Cushman, M., 2014. A multi-level approach to understanding the impact of cyber crime on the financial sector. Comput. Secur. 45, 58–74

Theoretical model:
Victim firm and government authorities

- Government authority seeks to
  - reduce level of trade secret theft
  - increase private investment in security
- Firm seeks to
  - Reduce costs of theft
  - Protect trade secret
- Game theoretical modelling
  - Analysis of other variables – public, security
  - Suggests a firm is *more* likely to invest in high security if breaches can remain private

Theoretical Analysis: Policy Implications

- Underreporting of theft and underinvestment in security is a problem
- Potential solutions
  - Mandatory theft reporting requirements
    - Risk of unintended consequences
  - Financial reporting requirements (10-K form)
  - Data breach reporting requirements
    - Expand to include trade secrets
    - Mixed evidence of success in data (reduce identity theft by 6% (Romanosky et al, 2008); increase investment in cybersecurity (Hoofnagle, 2007); small increase in disclosure (Hilary et al, 2016)
  - Courts - adjustment of “reasonable protection”

Conclusion:
- Trade Secrets are important for innovation and the IP system
- There is still a lot to understand

THANK YOU

Economic Impact of Trade Secrets on Innovation

WIPO Trade Secrets Symposium

PRESENTED BY
Dr. Pallavi Seth

November 25, 2019

THE Brattle GROUP

Agenda

What are trade secrets?

What is trending?

- Litigation Data

Why keep innovations a trade secret?

- Patents v. Trade Secrets

Case Discussion:

- *Activity Tracking Devices*, Jawbone v. FitBit (USITC 337-TA-963)
- *Crawler Cranes*, Manitowoc v. Sany (USITC 337-TA-867)

Incentive to Innovate

- The major economic justification for IP protection is to provide a framework under which innovations can be rewarded

- Benefit to society from innovations can take the form of:
  - New products that meet consumer demand
  - Lower costs
  - Lower prices
  - Other

- **Goal is to promote economic welfare through optimal balance of the creation and diffusion of innovative ideas**

Incentive to Innovate

- Trade secrets are a way to protect intangible, informational goods and may enable a firm either to produce a superior product, or to produce a product less expensively

- Incentive to innovate is the underlying basis for trade secrets:

  - Share with employees
  - Share with commercial partners
  - Reverse engineered
  - Costs to maintain secrecy
  - Hinders labor mobility

Technical v. Business

Technical Trade Secrets

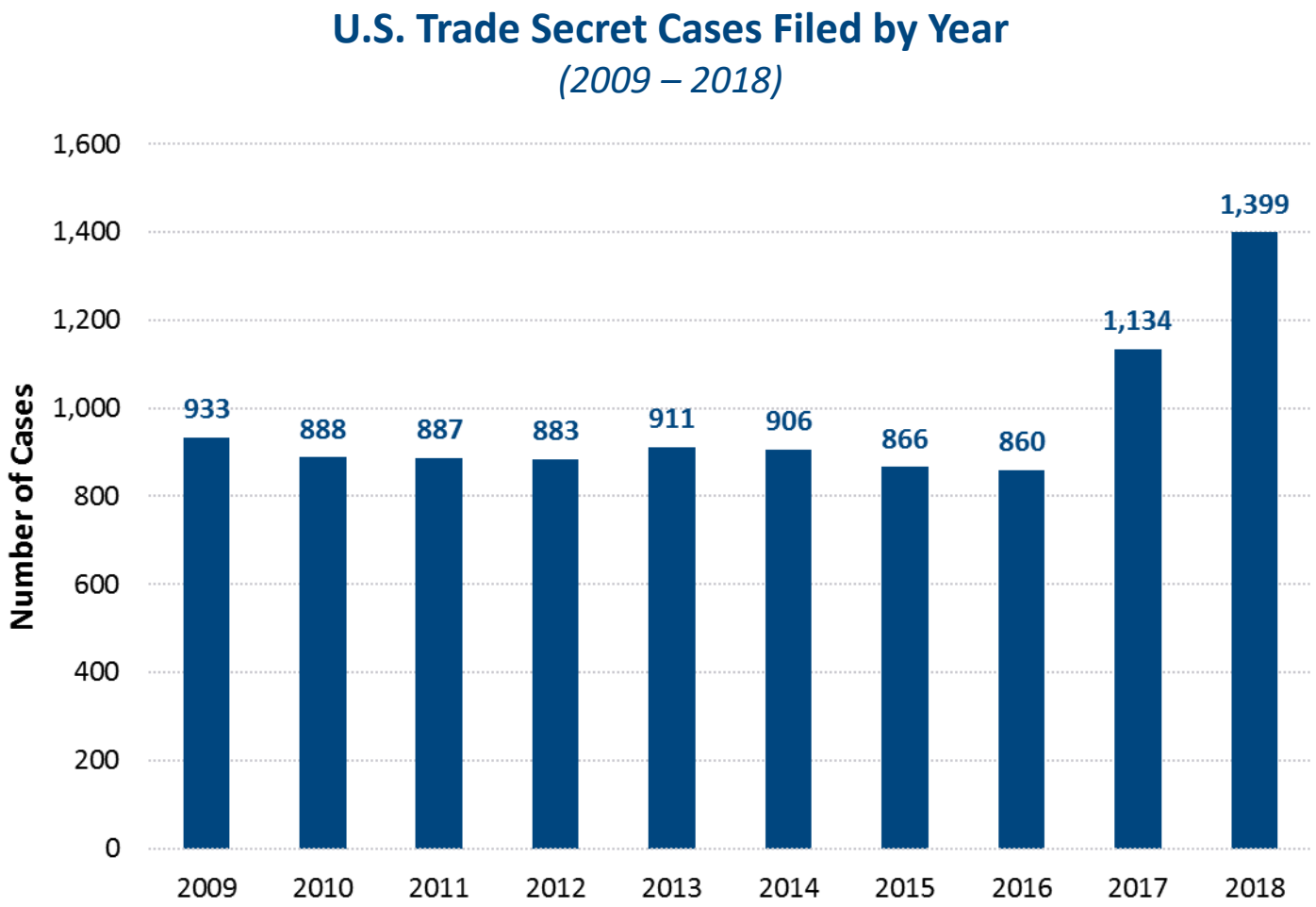
- Manufacturing processes
- Chemical formula
- Scientific results

- Coca Cola (Coke)
- WD 40
- Kentucky Fried Chicken (KFC)
- Google Search Algorithm

Business Trade Secrets

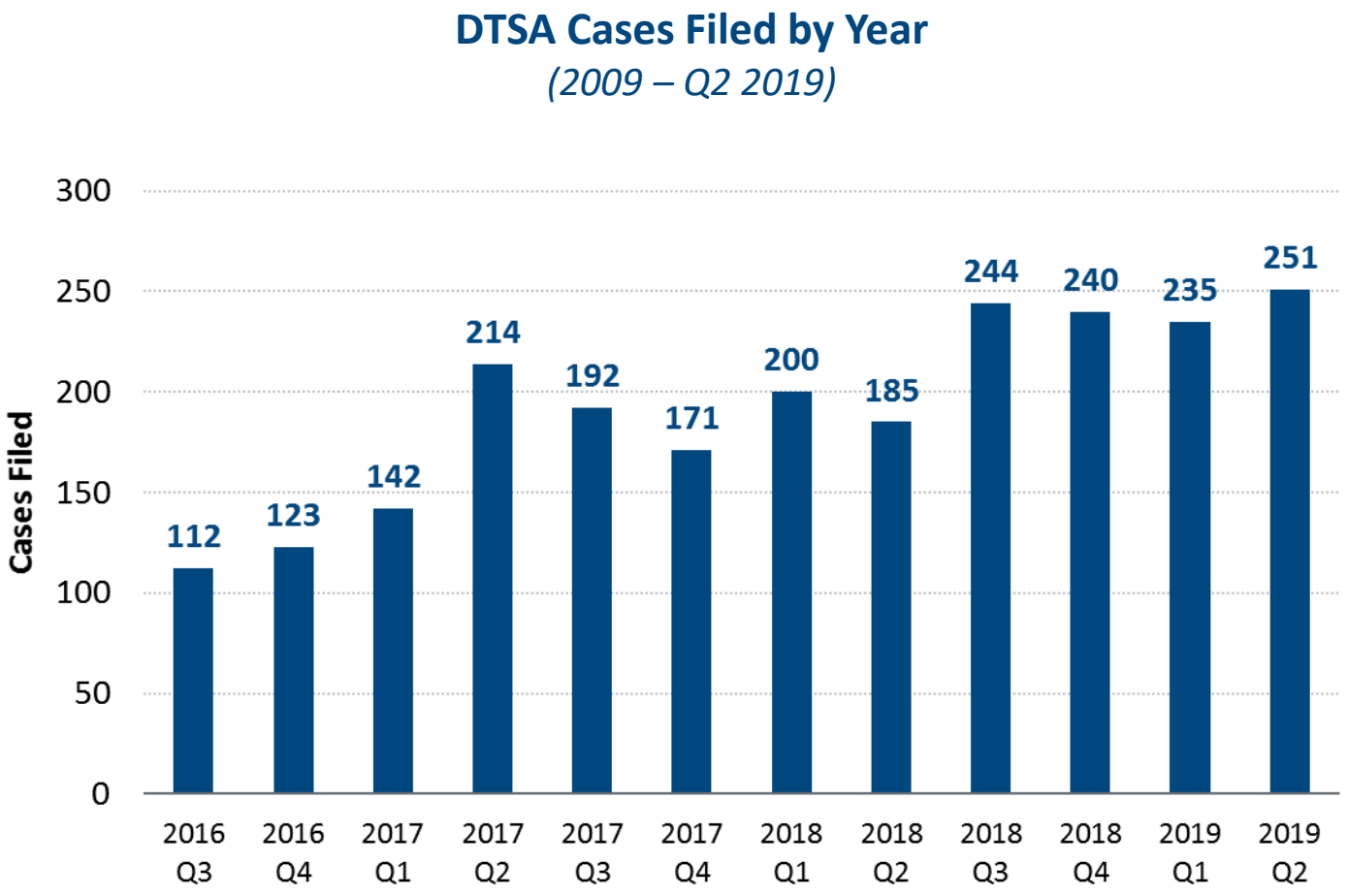
- Owner's cost structure
- Owner's pricing strategy
- Owner's business strategies
- Financial health of the firm
- Specific customer requirements or plans
- Product development and timelines
- Customer lists
- Supplier information

Trend in Trade Secret Cases



Source: The Brattle Group and Kenneth Corsello, Counsel, IBM Corporation

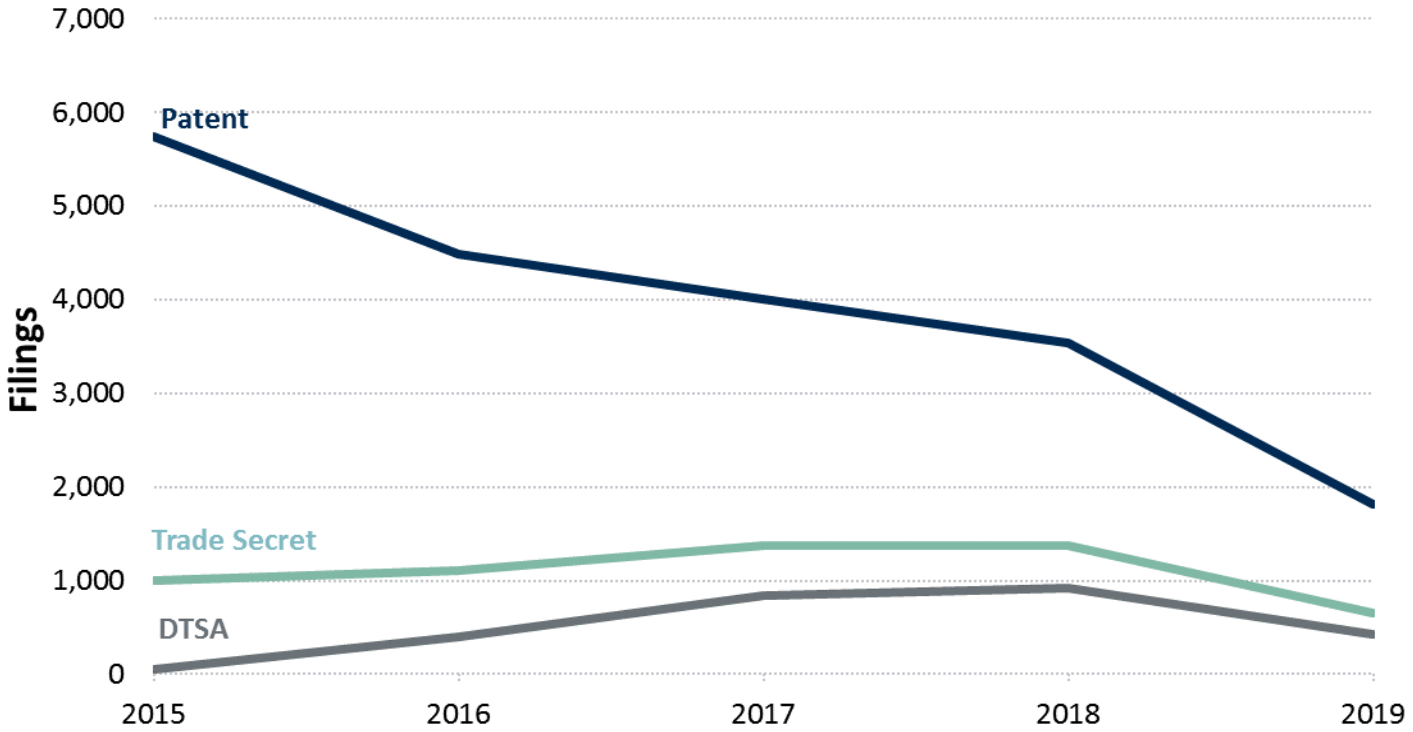
Trend in DTSA Cases Filed



Source: The Brattle Group and Kenneth Corsello, Counsel, IBM Corporation

Patent v. Trade Secret v. DTSA

U.S. Patent v. Trade Secret v. DTSA
Cases Filed by Year
(2009 – Q2 2019)



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Patents v. Trade Secrets

- From a business perspective some factors to consider:
  - Stage of Innovation
  - Level of Innovation
  - Cost
  - Duration
  - Ability to Reverse Engineer
  - Level of Competition
  - Technology/Industry
  - Other Considerations

CASE DISCUSSION
Activity Tracking Devices

Activity Tracking Devices

337-TA-963 (2015)

Jawbone v. Fitbit

Image Source: https://heavy.com/tech/2015/06/fitness-tracker-comparison-fitbit-vs-jawbone/

CASE DISCUSSION: ACTIVITY TRACKING DEVICES
Background

- High-stakes wearable devices market
  - Emerging activity tracking industry
- Parties
  - Jawbone: early entrant in wearable technology; military grade noise-eliminating technology
  - Fitbit: market leader in fitness wearables
- Background
  - Patent and Misappropriation of Trade Secrets
  - Jawbone claimed that six of it former employees were “poached” by Fitbit and “systematically plundered” Jawbone’s trade secrets
  - About 300,000 confidential files: Product line-up; Supply chain; Financial data; Designs; Consumer surveys; and Financial health

CASE DISCUSSION: ACTIVITY TRACKING DEVICES
About the Activity Tracking Industry

- An emerging industry – firms heavily investing in R&D (in some instances 50 percent of revenues)
- Important implications of characteristics of the industry on strategic decisions:
  - Multi-attribute differentiated products
  - Segmentation
  - New model introduction
  - Product features
  - Shaping Consumer Demand
- Extraordinary returns can accrue to the first supplier to “figure it all out”

Economic Impact of Theft of TS

- Cost and Time Avoidance
  - **Technological and manufacturing information** could provide misappropriator with cost advantages
    - Signal that technology is ripe for development
      - Certain concepts in the technology may be commercially more viable
      - Accelerate the development of comparable capabilities for its own products
      - Workaround solutions to problems - provides misappropriator with a shortcut
    - Allows misappropriator to target its own development efforts in a way that could inflict more competitive injury
    - Cost advantage could cause price erosion

Economic Impact of Theft of TS

- Cost and Time Avoidance (contd.)
  - **Consumer research** information could provide misappropriator with cost advantages
    - Consumer studies can be iterative and expensive (money and time intensive)
    - Signal consumer preferences and features that are ripe
      - Accelerate the development of comparable capabilities for its own products
    - Allows misappropriator to target its own development efforts in a way that could inflict more competitive injury
    - Cost and time advantage

Economic Impact of Theft of TS

- Product Targeting
  - Pre-launch information about features and capabilities of competitors products can be damaging
  - Misappropriator can craft a competitive response giving innovating owner of trade secrets less time to reap benefits of its innovation
  - Shortcut the normal product development process
  - Lost sales and price erosion

Economic Impact of Theft of TS

- Business Information
  - While retail prices are easy to determine, manufacturing prices are not publically known
    - Access to manufacturing prices provides misappropriator with an advantage to negotiate its own prices and contracts – to undercut the owner
    - Profit margins
  - Information about cost structure could provide misappropriator with information where owner is on the cost-learning curve and cost advantages between the companies
  - Price erosion, strategic decision, sequence and pace of new product introduction

CASE DISCUSSION
Crawler Cranes

Crawler Cranes

337-TA-887

Manitowoc v. Sany

Image Source: https://www.manitowoccranes.com

CASE DISCUSSION
Crawler Cranes

- Variable Position Counterweight Technology (VPC)
- Parties:
  - Manitowoc Cranes – Wisconsin-based high capacity crane manufacturing
  - Sany – Chinese, heavy equipment manufacturing
- Summary determination noting that respondent engaged in misappropriation of trade secrets (February 2014)
- Commission Opinion (May 2015)
  - Cease and desist order against respondent, Sany, with respect to the asserted trade secrets for 10 years

CASE DISCUSSION
Crawler Cranes

- Sany Misappropriated Trade Secrets That Included:
  - Manitowoc's Marketing And Business Plans
  - Cost And Pricing Information
  - Manufacturing Process And Procedures
  - Engineering Design Standards And Plans
- Sany Argued That The Trade Secrets Were Not Protectable Because They Were Generally Known Ideas Without Value. Commission Did Not Agree:
  - "Manitowoc Spends A Substantial Amount Of Time And Resources Setting Its Dealer Discount Prices . . . [And] Determines The Cost And Pricing Information On A Model-by-model Basis."
  - "Manitowoc's [Technical Trade Secrets] For Processing Large Weldments Are Valuable Because They Are Important To The Quality Of The Crane And They Took Many Years To Develop."

CASE DISCUSSION
Crawler Cranes

- The Commission Determined That Manitowoc Took Appropriate **Steps To Preserve The Confidentiality Of Its Secrets**, Such As:
  - Having Employees Sign Confidentiality Agreements
  - Marking Documents With Sensitive Information As “Confidential”
  - Securing Access To Manitowoc’s Computer System
  - Limited Outside Dissemination Only To Certain Customers

CASE DISCUSSION
Crawler Cranes

- The Commission Found That **Misappropriation Of Trade Secrets Injured Manitowoc** In Many Ways. For Example:
  - "Sany's Misappropriation Caused Injury To Manitowoc's Domestic Industry Because Manitowoc's Welding Procedures Guided Sany In Its Development Of The SCC8500 Crane"
  - "Sany's Use Of Trade Secret No. 14 Injured Manitowoc's Domestic Industry For 400-600 Ton Crawler Cranes Because Sany Was Able To Target Its Pricing At The Manitowoc 16000 Crane" (Lowering Manitowoc's Profit Margins)

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