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Competition Data and Antitrust – a Corporate Perspective
Invent
~$36B invested in Cumulative R&D over the past 30 years
Advancing technology through innovation and foresight

Digitized wireless communications

Foresight
Demand created for higher quality voice

Invented
Digitized wireless communications

Increased voice quality

Foresight
Add data to the network

Invented
Increased voice quality

Data added with 3G technology

Foresight
Using phone as computing device

Invented
Data added with 3G technology

First 1GHz mobile processor

Invented
First 1GHz mobile processor

Qualcomm Snapdragon is a product of Qualcomm Technologies, Inc.
Advancing technology through invention and foresight

- Foresight: 1000x increase in video on mobile
- Invented: LTE Broadcast
- Foresight: Enhance experience of video on mobile
- Invented: Brought 4K into mobile devices
- Foresight: Billions of connected devices
- Invented: Technologies that enable IoE
Diverse patent portfolio
Covering all aspects of mobile devices

- Apps processor
- GPU
- NFC
- Position location

- OS/user interface
- Wireless charging
- Camera
- Security

- Sensors
- Semiconductor
- WWAN
- Video codecs

- RF and antenna
- Display
- Audio processing
- Connectivity (Wi-Fi)
Investment in technology standards years in advance

5G
- 2010: EV-DO Rev B
- 2009: HSPA + Rel 7
- 2006: 5G technology

4G
- 2007: HSDPA Rel 6 & EV-DO Rev A
- 2006: LTE Rel 8
- 2002: OFDM

3G
- 2009: 3G High Speed Data
- 2007: EV-DO Rel 0
- 2002: EV-DO Demo

2G+
- 2001: WCDMA Rel 99
- 2000: CDMA 2000 1X
- 1995: CDMA IS-95A
- 1998: EV-DV
- 1997: EV-DO

1985
- Qualcomm R&D Conception of Cellular CDMA
- 1988: Qualcomm R&D Conception of Cellular CDMA
Consistently growing innovation, large portfolio in China

32% Compound annual growth rate

Current worldwide Qualcomm patent portfolio (pending and granted)

Source: Qualcomm Incorporated data
Innovation in mobile technology driving trillions of dollars of impact

- $1.8 trillion invested in past 5 years
  - R&D and infrastructure investments from 2009-2013

- $3.3 trillion in revenue
  - Revenues of the global mobile value chain in 2014

- 11 million jobs
  - Jobs in the global mobile value chain

- Another $4 trillion investment coming
  - Additional R&D and infrastructure investments needed by 2020

IP frameworks and standard setting are two fundamental enablers of mobile’s growth.

Chinese consumers value their mobile device at ~40% of their income, well above US, Germany, Korea, and Brazil.

Mobile valued at 20~40% of their income by consumers in emerging economies:
- Brazil: 43%
- India: 45%
- China: 30%

Mobile valued at ~11% of their income by consumers in developed economies:
- US: 11%
- Germany: 12%
- Korea: 13%
- Brazil: 20%

Source: Conjoint analysis, BCG Consumer Impact Survey (USA: n=1003, Germany: n=1014, Korea: n=1002, Brazil: n=1000, China n=1070, India: n=2640)
Mobile contributed to more than $1.2 trillion to GDP in 2013 in USD B (as % of country GDP)
IP and antitrust: Technology standards under scrutiny

Concerns raised by FTC, DOJ, and most recently NDRC, about potential “consumer harm” due to IPR related to standards

For example, see:
- DOJ (2012) remarks “Six “small” proposals for Standard Setting Organizations (SSOs) before launch”
- Kuhn, Scott-Morton, Shelanski (2013), “SSOs can help solve the Essential Patents licensing problem”
Example 1: “Patent hold-up”

- With no alternative to a technology standard, patent owners can potentially “hold-up” the standard’s implementers, deriving supra-competitive rents and harming competition and consumers.

For example:

“Hold-up may have especially severe consequences for innovation and competition in the context of standardized technology.” (FTC (2011) report)

“Patent holders may seek to take advantage of that market power by engaging in one form of patent hold-up, such as excluding a competitor from a market or obtaining an unjustifiably higher price for its invention. Consumers could be harmed as well by (increased consumer prices).” (DOJ (2012) remarks to ITU-T)
Example 2: “Royalty Stacking”

- Royalties paid by product manufacturers to many different patent owners can add to prohibitively high as a percentage of the product’s value, diminishing their margins & commercialization incentives.

For example:

“Time and time again, we have seen this sort of royalty-stacking problem arise. One great example is 3G telecom in Europe. The standard-setting organization (SSO) put out a call for essential patents, asking which they must license to make the 3G wireless protocol work and the price at which the patent owners would license their rights. 3G telecom received affirmative responses totaling over 6000 essential patents and the cumulative royalty rate turned out to be 130%. This is not a formula for a successful product.” (Lemley (2002))
Theory versus evidence: Lower costs and improved performance of mobile

Consumer cost of data per megabyte relative to data consumption versus data speed

$/megabyte

Sources: Cisco Visual Networking Index, ITU, IE Market Research, Motorola, Deutsche Bank, Qualcomm
Theory versus evidence: Lower consumer prices of products as patent owners increase

![Graph showing the relationship between the number of essential patent holders and average selling prices. The graph indicates a decrease in average selling prices as the number of essential patent holders increases.](source: Gelatovic and Gupta (2015), “Royalty Stacking and Standard Essential Patents: Theory and Evidence from the Mobile Wireless Industry, Hoover IP2 Working Paper)
Theory versus evidence: High market entry, more consumer products as patent owners increase

Theory versus evidence: Higher market entry and lower concentration

![Graph showing the relationship between number of phone manufacturers and average sales per phone manufacturer over time.]

Need for future research

Filling the gap between theory and evidence

• What explains the disconnect between these policy concerns about competitive harm and the reality of a healthy, thriving industry?

• While one can always argue that the “but for” world would be better in some way, competition concerns demand consideration of objective criteria

• What policies should China and other emerging innovation economies embrace for promoting IP and standards
Thank you

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