The Business of Dynamic Spectrum

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PCAST Report

REALIZING THE FULL POTENTIAL OF GOVERNMENT-HELD SPECTRUM TO SPUR ECONOMIC GROWTH

- **Clearing and Reallocation of Federal Spectrum is Not Sustainable**
- **More Efficient Use of Federal Spectrum will be Obtained through Sharing**

THIS IS NOT A NEW STORY……

WHAT IS DIFFERENT THIS TIME ?

What Has Changed in Spectrum Usage ?

FDERAL SPECTRUM USAGE IS ALSO INCREASING

- Over 100 different uses of 1755 MHz band
- AWS auction relocated users to 1755 band in 2006

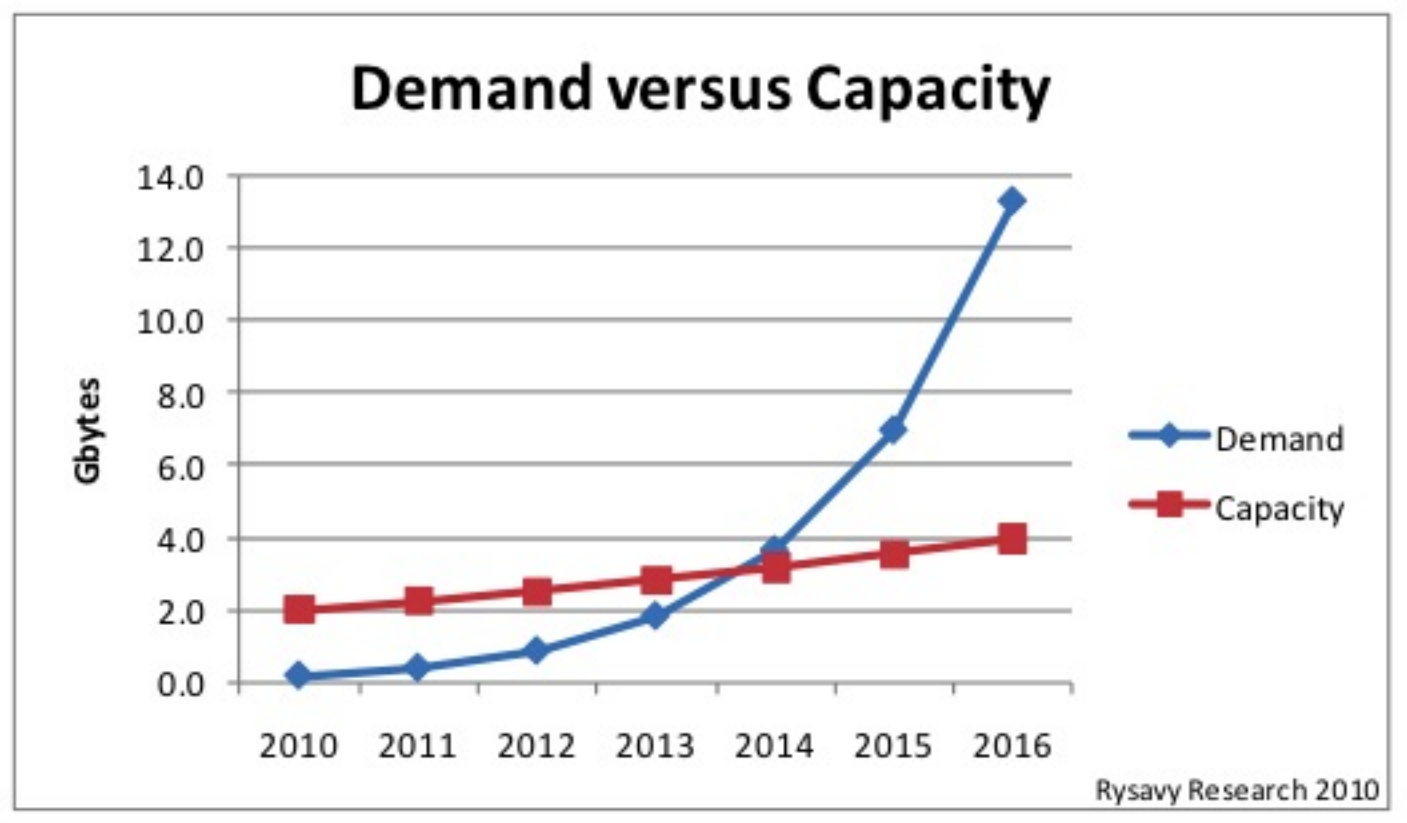
RESULT IS HIGHER COST TO CLEAR

- NTIA estimated $18B and 10 years to clear 1755 MHz band
- Greater than projected auction revenue

COMMERCIAL WIRELESS DATA EXPLOSION FINALLY HAPPENED

- Hard to remember 3G success was in question before iPhone
- Smartphone penetration passed 50% in 2012 – Nielsen
- Wireless data grew 123% in 2011 – CTIA

Spectrum Cliff



What Has Changed in Usage Patterns ?

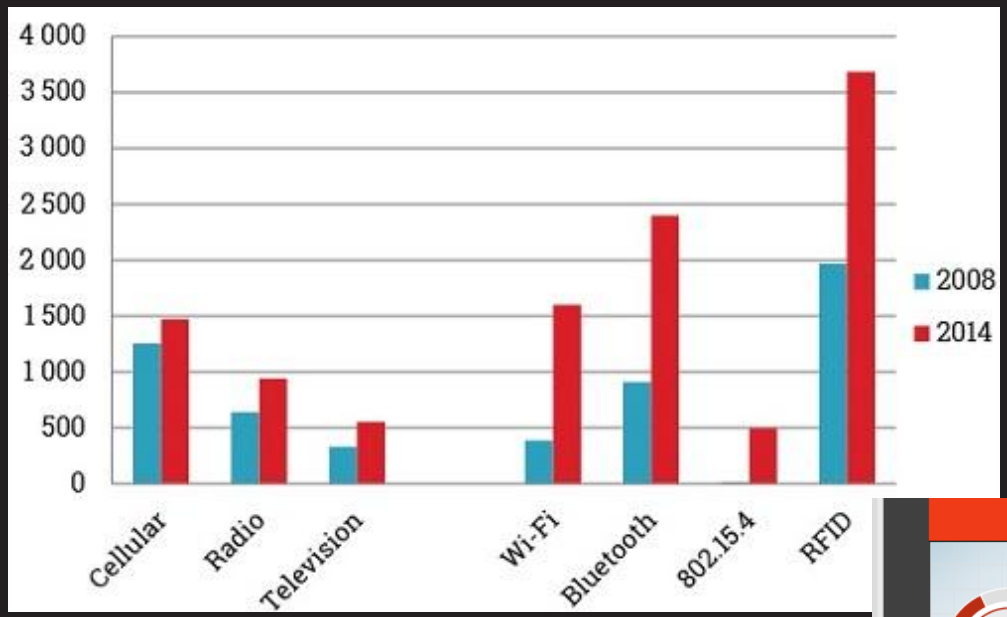
WiFi OFFLOAD

- 63% of smartphone and tablet wireless data carried over Wifi
  - Juniper Research
- 30% of AT&T wireless data traffic on WiFi
  - TMF Associates

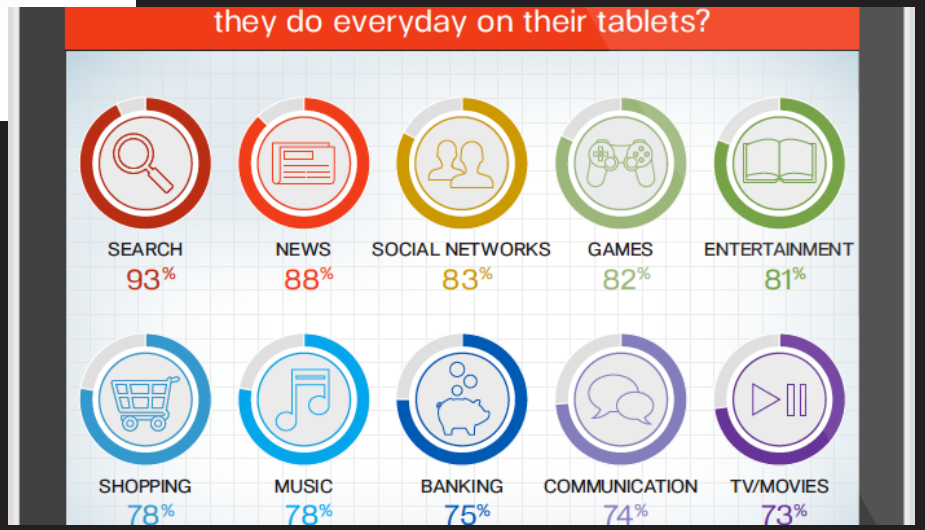
EMERGENCE OF NEW APPLICATIONS

- M2M, Whispernet, Netflix, etc.
- Need a best effort wireless network, not best served by an *evolved* network that is designed for both voice and data
- These applications need different pricing and business models

Device Trends

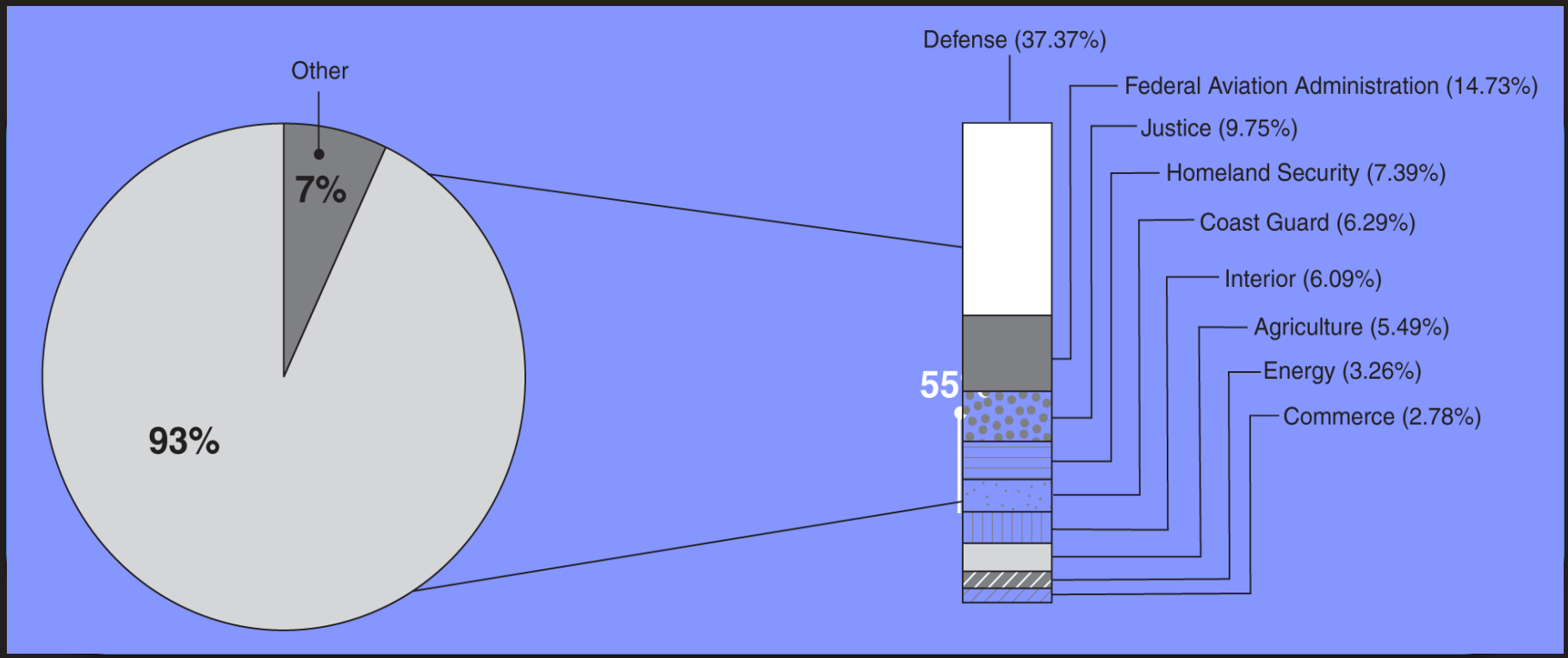


Source: Microsoft



Source: topmobiletrends.com

Federal Spectrum Use



Source: GAO. (2011). Spectrum Management: NTIA Planning and Processes Need Strengthening to Promote the Efficient Use of Spectrum by Federal Agencies.www.gao.gov/new.items/d11352.pdf.

Main Barrier is the *"Trust Gap"*

INCUMBENT CONCERNS

- Potential interference, both real and *political*

NEW ENTRANT CONCERNS

- Potential new entrants are concerned that shared spectrum won't offer enough spectrum access to support a commercial business

HISTORY HAS NOT HELPED

- Garage door openers / Military radios
- Nextel / Public Safety
- Lightsquared / GPS

The Argument Against Spectrum Sharing

INCUMBENT CARRIER ARGUMENT

"PCAST's report "invests a lot of faith" in spectrum-sharing technologies, few of which have been proven on a broad scale in the marketplace."

– AT&T

IT IS A SELF FULFILLING ARGUMENT

- Investors won't fund technology that has no market under current rules
- Can't deploy at scale if rules don't create the market place
- Large scale technology investment starts *after* rules are made

Government Spectrum Challenges

- Looking ahead, U.S. military systems need to seamlessly operate in a world of increasing intentional and unintentional spectrum congestion.
  - http://m.usni.org/magazines/proceedings/2012-12/imminent-domain
- Allocations limit use of spectrum in CONUS training and operation and the ability to operate forward effectively in foreign and/or hostile environments.
- DoD faces increasing pressure to abdicate existing spectrum
- Non-DoD uses of spectrum increasing
  - FBI, homeland security, pubic safety….

Commercial Challenge

Can I really run a viable commercial business if my access to spectrum is not guaranteed ?

- WiFi has shown there is a device business for shared spectrum
- Yet to prove there is a viable, scalable, wide-area service provider business based on shared spectrum

Lessons from the Past

North America used to dominate the commercial wireless infrastructure business

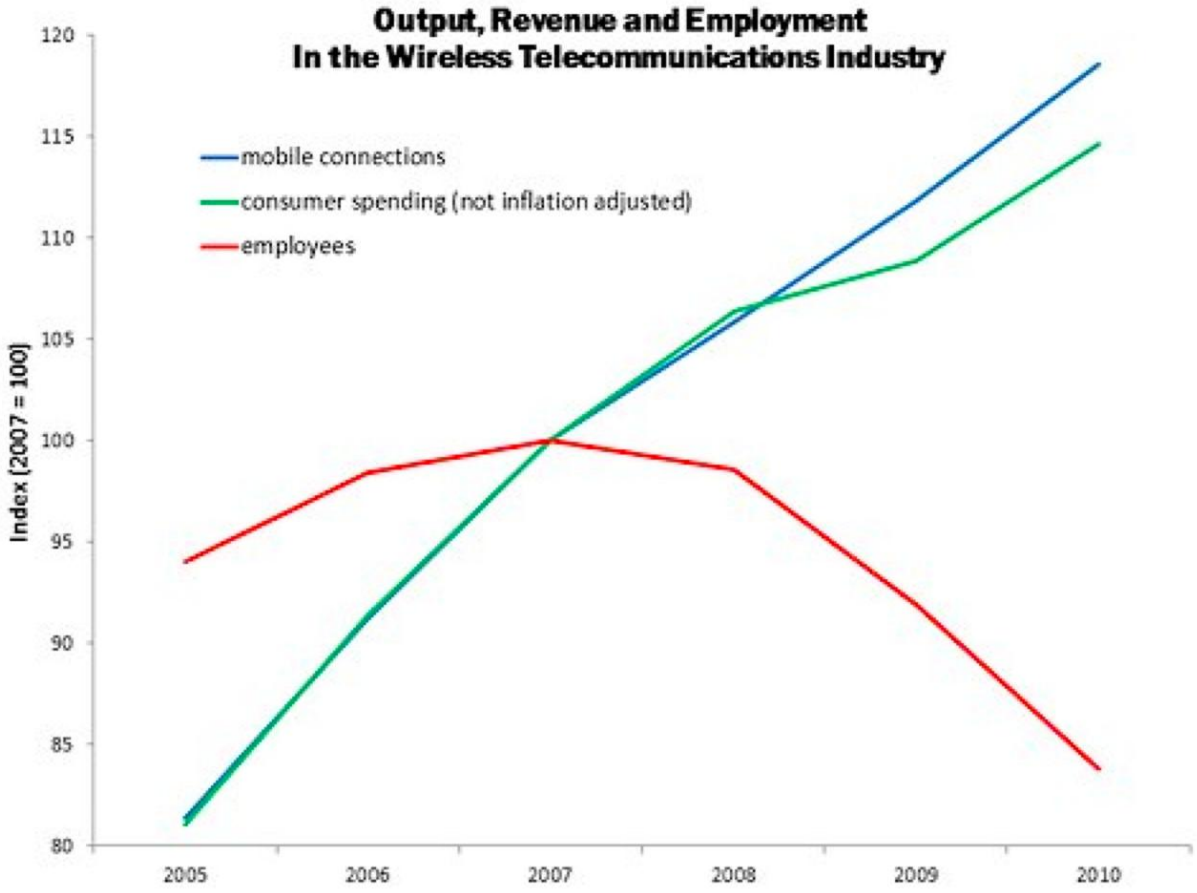
- Motorola, Nortel, Lucent

Today is it foreign dominated

- NSN, Ericsson, Huawei, ZTE, Samsung

This shift started with Europe embracing a shared, nextgen digital cellular standard: GSM

- Multiple governments and industries participated
  - Including fierce competitors!



Source: Bureau of Economic Analysis[i]

[i] http://economix.blogs.nytimes.com/2011/10/12/growing-businesses-cut-payrolls-too/

Robotics Consortium Example

- US Government realized that most innovative Robotics technology was in small companies and non-traditional suppliers, and there was a need for collaboration across companies and expertise to solve the government's problems.
- In May 2008, Industry formed the Robotics Consortium
- Government contracted with the consortium to solve the urgent challenges. Benefits to industry include rapid, streamlined contracting.
- http://www.roboticstechc.org

Spectrum Consortium

Government and industry share a common challenge: satisfying vastly increasing demand for spectrum.

Multiple efforts are addressing this fundamental issue as it hampers U.S. innovation and economic growth; and hinders U.S. military operations both domestically and overseas.

The envisioned collaboration focuses on four major activities:

- ***maturing technologies*** that assist in improved spectrum awareness, sharing, and use
- ***experimentation*** to better inform the optimal allocation of those technologies for both public and private objectives
- ***demonstration*** of new technologies to increase trust among spectrum stakeholders
- ***policy development*** to ensure technologies don't outpace the appropriate guidance for their best use

Opportunity to Dialogue

Vanu, Inc. will host a reception March 31, 2014, 6-8 pm in the Atrium of the National Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230

Representatives from DoD, NTIA, NSF will be attend.

Advance information can be obtained by interested government participants by contacting Mrs. Ellen M. Purdy at ellen.m.purdy.civ@mail.mil.

Interested private entities should contact: spectrum_consortium@vanu.com.