



U.S. House Committee on Small Business

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Chairman Graves, Ranking Member Velazquez, and members of the Committee. Thank you for the opportunity to testify at this hearing on “Building on the Wireless Revolution: Opportunities and Barriers for Small Firms.”

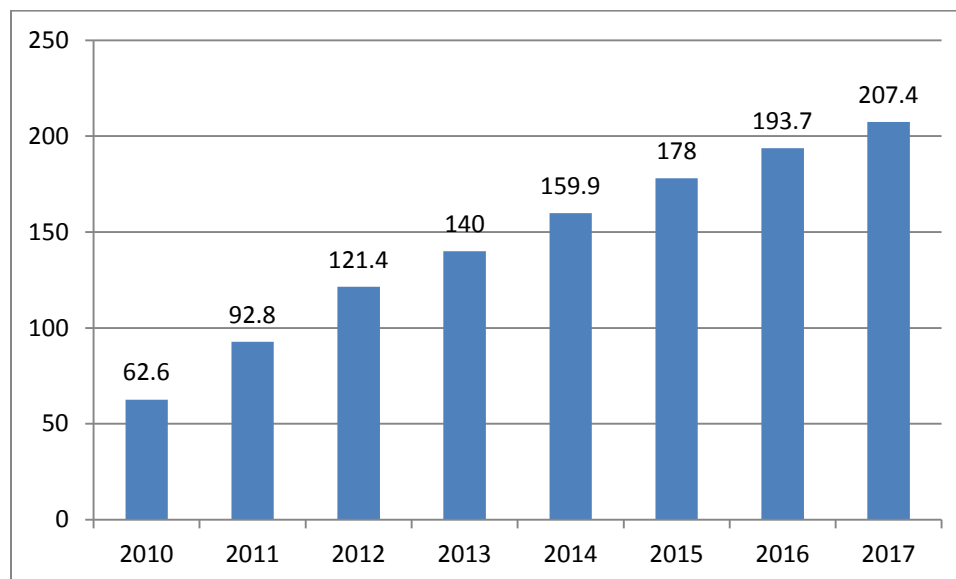
Since 2008, I have been Vice President and Director of Governance Studies at the Brookings Institution. I am the author of 18 books, including *Digital Government: Technology and Public Sector Performance* (Princeton University Press, 2005), *Digital Medicine: Health Care in the Internet Era* (Brookings Institution Press, 2009) and *Digital Schools: How Technology Can Transform Education* (Brookings Institution Press, 2012). I direct the Brookings Center for Technology Innovation.

As the statement below demonstrates, wireless communications is growing dramatically and is vital for economic development. There are tremendous opportunities for small businesses if we can overcome the obstacles that currently exist. We need a balanced spectrum policy that includes licensed and unlicensed spectrum, greater efficiency in the use of current spectrum, incentive auctions that reallocate underutilized bandwidths to high priority areas, and universal access to high-speed broadband.

The Growth of Mobile Technology

Mobile usage is rising rapidly in the United States. According to an eMarketer Statista analysis, the number of U.S. smartphone users has risen dramatically since 2010. The total increased from 62.6 million in 2010 to 140 million in 2013 (see Figure 1). By 2017, it is likely to rise to 207.4 million smartphone users.¹

Figure 1 Number of U.S. Smartphone Users in Millions



Source: eMarketer Statista report, “Number of Smartphone Users in the U.S. from 2010-2017”, with link at <http://www.statista.com/statistics/201182/forecast-of-smartphone-users-in-the-us/>

The Role of Mobile Technology in Economic Development, Education, and Health Care

Mobile technology is an important driver of job creation and economic growth. An analysis by economists Harald Gruber and Pantelis Koutroumpis, for example, found that national growth improves significantly based on mobile usage. Looking at 192 nations from 1990 to 2007, they found increasing returns in terms of productivity and growth linked to the use of mobile devices. For high income nations, mobile technology added 0.20 percent annually to Gross Domestic Product, while in low income countries, it contributed 0.11 percent.² They also looked at mobile infrastructure investment and found that it paid off in economic growth. Nations that invested saw annual GDP gains of 0.39 percent in high income places and 0.19 percent among low income places.³

A Deloitte analysis of the United States meanwhile “estimated \$25-53 billion investment in 4G mobile wireless technology in the US is projected, using standard GDP multipliers for the industry, to create \$73-151 billion in GDP growth and between 371,000 and 771,000 new jobs.”⁴ This and other studies around the world corroborate the contention that investment in mobile broadband enhances economic growth.

With new advances in mobile learning and mobile health care, it is crucial to have high-speed networks that promote connectivity and communications. In the education area, for example, wired classrooms, handheld devices, and electronic instruction let pupils learn at their own pace. Personalization makes education more adaptive and timely from the student standpoint and increases the odds of pupil engagement and mastery of important concepts.⁵

We are seeing the growing use of wireless devices in health care. Medical treatment now draws upon remote monitoring devices, electronic medical records, social networking sites, video

conferencing, and Internet-based recordkeeping systems. Using remote monitoring devices, people can measure their own weight, blood pressure, pulse, and sugar levels, and send test results electronically to health care providers. They can get personalized feedback via email and reminders when they gain weight, have an uptick in their cholesterol levels, don't take their medicine, or have high blood pressure.⁶

Around 80 percent of American doctors use a mobile device in their medical practice. According to research by Andrea Downing Peck, doctors rely upon their smart phones to “search for drug and treatment reference materials, learn about new research, diagnose diseases, and educate patients.” Ready access to information makes them more efficient and effective in their operations.⁷

Research by the Boston Consulting Group and Telenor Group found that “mHealth can reduce the costs of medical care among the elderly by 25 percent [and] double access to physicians by those living in rural areas.”⁸ According to those researchers, it has made a huge difference in medical service delivery and helped to bring health care to underserved areas.

Current Barriers

Mobile technology is vital for small businesses because it helps entrepreneurs launch companies, build businesses, and provide jobs. Wireless broadband allows them to stay connected even while they are on the go. They can reach bank officers, suppliers, and customers as they travel around the area. This helps them remain in close contact with key people and build the required personal relationships.⁹

But there are a number of obstacles that make it difficult for small businesses to take advantage of the mobile revolution. These problems include financing, regulation, spectrum availability, infrastructure, and access. Below, I review these challenges in greater detail.

Financing

It is hard for small businesses to attract sufficient financial capital. The Startup Act addressed some of these issues through an easing of paperwork requirements and regulatory oversight. But in the aftermath of the Great Recession, large financial institutions often don't want to lend money to new businesses. They worry about lending risk, business models, and long-term sustainability. These fears make them reluctant to take risks with emerging companies, and this creates obstacles in terms of new firms getting off the ground.

Regulation

It is a struggle for many small firms to deal with government regulations. They don't have large staffs to process the required paperwork and make sure they are compliant with federal rules. Mobile industry companies have to deal with a large number of agencies, such as the Federal Communications Commission, which regulates telecommunications, the Securities and Exchange Commission, which oversees finance and business operations, the Federal Trade Commission, which examines market completion issues, and the Food and Drug Administration,

which regulates medical devices. Facing detailed record-keeping and oversight, it often is difficult for small firms to gain a foothold in the industry.

Spectrum

Spectrum policy has significant implications for small businesses. If one looks at spectrum policy, it historically has been allocated on a band-by-band basis for particular services. That means that certain frequencies have been reserved for aviation, television broadcasting, paging services, medical devices, cellular, and the like.¹⁰ Overtime, a hodge-podge of decisions has led to inefficiencies. Rapidly-growing areas are running out of available spectrum, while others experience demand that is far below the available spectrum capacity.

As shown in Figure 1, demand has risen tremendously in the wireless area and is out-stripping the available supply. According to the FCC, we need a minimum of 300 MHz for mobile technology over the next five years in order to accommodate growing cellphone usage, handheld devices, smartphones, tablets, and mobile broadband.¹¹ It is vital to gain access to spectrum in order to facilitate job creation, economic development, and long-term innovation.

Infrastructure and Access

There are issues for small business in regard to mobile infrastructure. Firms require high-speed networks that connect them with consumers and businesses. Right now, we need faster networks with more universal connectivity. Based on Pew Research Center polls, around 30 percent of Americans do not have home Internet access.¹² There are many reasons why people have not adopted broadband service. A survey undertaken by the Federal Communications Commission, for example, reveals that 36 percent cite the overall cost of the service, 22 percent say they are uncomfortable with the Internet, and 19 percent find digital content not compelling enough to warrant usage.¹³

Needed Policy Actions

Broadband utilization and mobile technology innovation are growing rapidly, but there remain several actions that would further business opportunities and long-term economic development. Below, I review specific actions that will help small businesses take advantage of wireless technology.¹⁴

Access to Financial Capital

In order to help small firms get off the ground, we must make it easier for them to attract financial capital. One reform that would be helpful in this regard is a research credit for new firms that earn less than \$5 million. This investment would bolster capital acquisition and help these companies bring innovative products or services to the marketplace. Small investments of targeted tax credits can yield significant economic benefits.

More Flexible Rules

We need to think about more flexible rules in regard to the mobile sector. There is tremendous vibrancy and dynamism in this sector and federal agencies should be careful that they encourage innovation at the same time they protect the health and well-being of consumers. The Food and Drug Administration, for example, took useful steps in this regard through its 2013 guidance on mobile medical devices.¹⁵ It reviewed a variety of apps and products, and outlined which ones should be subject to regulation, which ones should not, and which ones would be subject to “enforcement discretion”, meaning that they are not likely to pose significant risks to consumers. This kind of thoughtful oversight helps medical app and device manufacturers plan for the future and understand what regulatory environment they are likely to face in the future.

Incentive Auctions to Reallocate Scarce Spectrum

One of our big challenges is the mismatch between spectrum supply and demand in particular bandwidths. A market-based mechanism for reallocating scarce resources is spectrum auctions.¹⁶ Used successfully in the past, members of Congress should allow companies that no longer need spectrum to sell them to other businesses willing to pay.

This approach would have several benefits. It would provide a way for companies to sell unused resources. It gives access to spectrum for cell and mobile providers so they better can serve consumers and businesses. Auctions also bring in needed resources to the federal government to finance the national budget.

The Federal Communications Commission currently is working on its specifications for an upcoming auction. Legislators should make sure that small businesses have a fair shot at competing for unused spectrum and that entrepreneurs from diverse walks of life have an opportunity to bid on spectrum.

Fees for Unused Spectrum

A number of public or private organizations has unused spectrum. This includes the military forces, broadcast television, and government agencies. They sit on spectrum thinking that someday they may use it. Rather than not making use of a valuable resource, they should pay fees for holding that spectrum. Having fees for unused spectrum would provide clearer incentives for organizations to employ the spectrum or understand the value to others if they don't make use of it. It is a way to bring market valuations into the spectrum rights regime.

Unlicensed Applications in the 5 GHz bandwidth

A number of innovative small business services make use of unlicensed Wi-Fi. Consumers can access a wide range of digital services at coffee shops, in airports, and through business establishments around the country. According to the Cisco Visual Networking Index, 55 percent of all Internet Protocol traffic will run over Wi-Fi networks by 2017.¹⁷ A number of Internet service providers are moving their service delivery to Wi-Fi hotspots. These are provided either by consumers themselves or made available through phone carriers. Improving availability to

unlicensed spectrum through the 5 GHz band will alleviate some of the current congestion. However, next-generation Wi-Fi (so-called Gigabit Wi-Fi) will need unlicensed spectrum in the 5 GHz band.

Better Use of 3.5 GHz Bandwidth

There currently is under-utilized bandwidth in the 3.5 GHz area. It is possible to turn this low-power segment into a Citizens Broadband Service.¹⁸ Right now, it is deployed for navel radar utilization, but could be used for civilian purposes in geographic areas where the Navy does not operate. This spectrum repurposing would allow people to take advantage of these networks.

More Efficient Use of Existing Spectrum

We need to determine ways to make more efficient use of existing spectrum. Advances in cognitive radio applications help to make more efficient use of current resources. Scientists are working on ways that allow multiple, non-interfering uses of various bandwidths. This is helping to create greater efficiency in the spectrum rights system.

In a Brookings paper, Robert Matheson and Adele Morris propose technical solutions designed to improve the efficiency of spectrum utilization. They argue that it is possible to improve bandwidth utilization through a series of technical improvements. For example, they suggest that licensees should be able to “buy, sell, aggregate, and subdivide their LERs (licensed electrospace right) at will.”¹⁹ A “flexible rights regime” offers greater efficiency, they say, than the current “command and control” approach.

Infrastructure Improvements

New applications in education, health care, high-definition television, and video conferencing require high-speed mobile broadband. We need to improve data-sharing networks and promote wireless connections that take advantage of these new developments. Although nearly all of the investment for infrastructure improvement will come from the private sector, the FCC should make sure its rules facilitate innovation.

We need to encourage local communities to streamline the approval process for building new cell towers and laying fiber optic lines. Right now, communities have different rules and processes and this makes it expensive for private companies to expand digital infrastructure in a timely and affordable manner.²⁰

Higher Home Broadband Adoption Among Underserved Populations

For underserved populations, there are a variety of actions that would increase home broadband adoption. For example, digital literacy programs would train people on online applications that may be useful to them. Improved market competition also would help drive down consumer cost barriers that currently limit use. And outreach programs could help bridge the digital divide based on age, race, gender, income, and education. With these proposed actions, consumers and small businesses would have better opportunities to gain the benefits of the mobile economy.

Notes

¹ eMarketer Statista report, “Number of Smartphone Users in the U.S. from 2010-2017”, see link at <http://www.statista.com/statistics/201182/forecast-of-smartphone-users-in-the-us/>.

² Harald Gruber and Pantelis Koutroumpis, “Mobile Telecommunications and the Impact on Economic Development.” *Economic Policy*, Volume 67, July 2011, pp. 387-26.

³ Harald Gruber, and Pantelis Koutroumpis. "Mobile Telecommunications and the Impact on Economic Development." *Economic Policy* Volume 67, July 2011, pp. 387-426.

⁴ Deloitte, “The impact of 4G technology on commercial interactions, economic growth, and U.S. competitiveness”, August, 2011.
http://www.deloitte.com/assets/DcomUnitedStates/Local%20Assets/Documents/TMT_us_tmt/us_tmt_impactof4g_081911.pdf.

⁵ Ruth Moody and Michael Bobic, “Teaching the Net Generation without Leaving the Rest of Us Behind: How Technology in the Classroom Influences Student Composition”, *Politics & Policy*, Volume 39, no. 2, 2011, pp. 169-194.

⁶ Darrell M. West, “Improving Health Care through Mobile Medical Devices and Sensors,” Brookings Institution Center for Technology Innovation, October, 2013.

⁷ Andrea Downing Peck, “App-solutely fabulous”, *Medical Economics*, suppl, Nov 25, 2011, pp. S11-S14.

⁸ Boston Consulting Group and Telenor Group, “Socio-Economic Impact of mHealth”, February 28, 2012.

⁹ Darrell M. West, Allan Friedman, and Walter Valdivia, “Smart Policy: Building an Innovation-Based Economy”, Washington, D.C.: Brookings Institution Center for Technology Innovation, 2013.

¹⁰ See the Federal Communications Commission’s “Spectrum Dashboard” at <http://reboot.fcc.gov/spectrumdashboard>.

¹¹ Federal Communications Commission, *Connecting America: National Broadband Plan*, 2010, p. 75.

¹² Pew Research Center, “Home Internet Access,” May, 2013.

¹³ Federal Communications Commission, *Connecting America: National Broadband Plan*, 2010, p. 168.

¹⁴ Additional proposals can be found at Darrell M. West, “Technology and the Innovation Economy”, Washington, D.C.: Brookings Institution Center for Technology Innovation, October 19, 2011.

¹⁵ Darrell M. West, “Improving Health Care through Mobile Medical Devices and Sensors,” Brookings Institution Center for Technology Innovation, October, 2013.

¹⁶ Jeffrey Rosen, “The Future of Spectrum”, Washington, D.C.: Brookings Institution Issues in Technology Innovation, August, 2011.

¹⁷ Cisco Visual Networking Index, “Forecast and Methodology, 2012-2017,” May 29, 2013.

¹⁸ Michael Calabrese, “Solving the ‘Spectrum Crunch’: Unlicensed Spectrum on a High-Fiber Diet,” Time Warner Cable Research Program on Digital Communications, Fall, 2013, p. 15.

¹⁹ Robert Matheson and Adele Morris, “The Technical Basis for Spectrum Rights: Policies to Enhance Market Efficiency”, Washington, D.C.: Brookings Institution, March 3, 2011.

²⁰ Darrell M. West, Allan Friedman, and Walter Valdivia, “Smart Policy: Building an Innovation-Based Economy”, Washington, D.C.: Brookings Institution Center for Technology Innovation, 2013.