

WHERE THE JOBS ARE: THERE'S AN APP FOR
THAT

HEARING
BEFORE THE
SUBCOMMITTEE ON COMMERCE, MANUFACTURING,
AND TRADE
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES

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WHERE THE JOBS ARE: THERE'S AN APP FOR THAT

WEDNESDAY, SEPTEMBER 12, 2012

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COMMERCE, MANUFACTURING, AND
TRADE,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 9:50 a.m., in room 2322 of the Rayburn House Office Building, Hon. Bono Mack (chairman of the subcommittee) presiding.

Members present: Representatives Bono Mack, Blackburn, Stearns, Bass, Harper, Cassidy, Guthrie, Kinzinger, Upton (ex officio), Markey, and Waxman (ex officio).

Staff present: Paige Anderson, Commerce, Manufacturing, and Trade Coordinator; Charlotte Baker, Press Secretary; Matt Bravo, Professional Staff Member; Kirby Howard, Legislative Clerk; Brian McCullough, Senior Professional Staff Member, Commerce, Manufacturing, and Trade; Gib Mullan, Chief Counsel, Commerce, Manufacturing, and Trade; Andrew Powaleny, Deputy Press Secretary; Shannon Weinberg Taylor, Counsel, Commerce, Manufacturing, and Trade; Michelle Ash, Democratic Chief Counsel; Felipe Mendoza, Democratic Senior Counsel; and Will Wallace, Democratic Policy Analyst.

OPENING STATEMENT OF HON. MARY BONO MACK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mrs. BONO MACK. Good morning.

One of the most promising areas of the U.S. economy involves the development, marketing and sale of mobile and online applications, commonly known as apps. Today we are going to take a close look at how the apps economy is shaping our future as individuals as well as a nation, and the Chair now recognizes herself for an opening statement.

When it comes to mobile application software, I'm reminded of the hit song by country star Loretta Lynn: "We've come a long way, baby." From the 1970s "cave age" concept of conducting banking or paying your utility bill by telephone, mobile apps have exploded in number and in sophistication. Today, there are apps to lose weight, quit smoking, examine your stock portfolio, review restaurants, watch videos, check up-to-date scores of your favorite sports team, witness breaking-news events worldwide, post on Facebook, Tweet to the world in 140-character bursts, and on and on.

According to a recent New York Times article, there were nearly 8,000 mobile apps in 2008. Today, there are more than 1.3 million, and they are multiplying rapidly. Consider this: it is estimated that nearly 100 movies and about 250 books get released worldwide every week. That compares to nearly 15,000 apps.

The health industry is a good example of this astonishing growth. The Baltimore Sun recently reported that there are now more than 40,000 mobile health apps contributing to an \$800 million global business. And experts say we are only beginning to scratch the surface of a brand-new industry.

Apps, of course, are software programs, small in size, that users load onto their mobile devices or use layered on top of a platform such as Facebook. But times have changed in a hurry, thanks to increasingly more powerful mobile devices and higher quality networks. Today, apps are purchased typically through an app store associated with a particular platform. The main platforms in today's app economy are Apple iOS, Google Android, RIM Blackberry, Microsoft Windows, Amazon Kindle and Facebook.

Approximately one-third of all apps are created by individuals or businesses with fewer than five employees. But both blue chip companies and traditional brick-and-mortar stores now have an app presence as well, developed either in-house or outsourced to a contractor. App developers range in size from one-person shops to large developers such as Zynga, with nearly 3,000 employees.

The revenues generated by apps include the purchase of the app, in-app purchases like game credits, in-app advertising, and app-enabled commerce, such as the purchase of goods and services through an app. As a result, a new term, the "apps economy", encompassing all such commercial activity, has now become a part of mainstream America.

Apple first launched the iPhone in 2007 and followed with the introduction of its App Store in 2008, which opened with 500 available apps. Four years later, Apple says its stores offer an astonishing 600,000 apps. And according to its Web site, Google's Play store offers a similar number.

Today, an estimated 90 million U.S. consumers spend approximately 60 minutes per day accessing the Internet on their smartphones, while another 24 million U.S. consumers spend 75 minutes a day accessing the Internet on their tablets, much of this access being gained through the use of mobile apps.

And if you think all of that sounds pretty impressive, well, consider this. Last Christmas, on December 24 and December 25, consumers downloaded a staggering 392 million apps. So as smartphone and tablet ownership continue to rapidly expand, current projections indicate the app economy will soon become a \$100-billion-a-year business.

In addition to the explosive growth of the apps economy in the United States, the outlook for apps as an export looks bright as well. More than 20 percent of all apps downloaded in China last year were created by U.S. developers.

Clearly, this tremendous innovation offers high hopes for our economy. According to a study commissioned by TechNet about a year ago, there were over 44,000 app-related positions open in the United States at the time. And here's another interesting finding

of that survey: researchers found that app jobs, while located in predictable places like New York and Silicon Valley, are actually dispersed throughout the country with an estimated two-thirds of all app-related employment falling outside of New York or California.

So with that as a background, I am very anxious to hear from today's panel. What have been the keys to the explosive growth and job creation in the mobile app economy? Are there Federal policies that present a roadblock to the sector's growth and ability to create jobs? Are there policies the Federal Government should consider to foster further growth and job creation? And what is the outlook for both the immediate and long-term future?

And while we are on the subject of roadblocks, we should remember how critically important wireless spectrum is in driving innovation in the mobile app sector. Mobile is the fastest area of broadband connectivity, and Congress must continue to explore ways to free up additional spectrum. I commend Chairman Walden for the important work he has already done on this issue, and I look forward to his spectrum hearing tomorrow.

As for today's hearing, it could not be more appropriately entitled: "Where the Jobs Are: There's an App for that." Because increasingly through American innovation and ingenuity we are rapidly becoming a world where there is literally an app for everything.

[The prepared statement of Mrs. Bono Mack follows:]

Statement of Chairman Mary Bono Mack
Subcommittee on Commerce, Manufacturing, and Trade
“Where the Jobs Are: There’s an App for That”
September 12, 2012

When it comes to mobile application software, I’m reminded of the hit song by country star Loretta Lynn: “We’ve come a long way baby.”

From the 1970’s “cave age” concept of conducting banking, or paying your utility bill by telephone, mobile apps have exploded in number and sophistication.

Today, there are apps to lose weight...quit smoking...examine your stock portfolio...review restaurants...watch videos...check up-to-date scores of your favorite sports team...witness breaking-news events worldwide...post on Facebook...Tweet to the world in 140-character bursts...and on and on.

According to a recent New York Times article, there were about 8,000 mobile apps in 2008. Today, there are more than 1.3 million, and they’re multiplying rapidly.

Consider this: It’s estimated that nearly 100 movies and about 250 books get released worldwide every week. That compares to nearly 15,000 mobile apps.

The health industry is a good example of this astonishing growth. The Baltimore Sun reported recently that there are now more than 40,000 mobile health apps contributing to an \$800 million global business. And experts say, we’re only beginning to “scratch the surface” of a nascent industry.

Apps, of course, are software programs – small in size – that users load onto their mobile devices or use layered on top of a platform such as Facebook. Once, you could only use an app on a desktop computer.

But times have changed in a hurry, thanks to increasingly more powerful mobile devices and higher quality networks.

Today, apps are purchased typically through an appstore associated with a particular platform. The main platforms in today’s app economy are Apple iOS, Google Android, RIM Blackberry, Microsoft Windows, Amazon Kindle, and Facebook.

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So, as smartphone and tablet ownership continue to rapidly expand, current projections indicate the app economy will soon become a \$100 billion-a-year business.

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And here’s another interesting finding of that survey: Researchers found that app jobs – while located in predictable places like New York and Silicon Valley – are actually dispersed throughout the country with an estimated two thirds of all app-related employment falling outside of New York and California.

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What have been the keys to the explosive growth and job creation in the mobile app economy?

Are there Federal policies that present a roadblock to the sector’s growth and ability to create jobs?

Are there policies the Federal government should consider to foster further growth and job creation?

And what’s the outlook for both the immediate and long-term future?

Today’s hearing could not be more appropriately entitled: “**Where the jobs are: There’s an App for That.**”

Because increasingly – through American innovation and ingenuity – we’re rapidly becoming a world where there’s literally “An App for Everything.”

And with that, I now recognize my good friend and colleague – our Subcommittee’s Ranking Member, Mr. Butterfield of North Carolina – for his opening statement.

Mrs. BONO MACK. And with that, I now recognize my good friend and my colleague from Los Angeles, Beverly Hills area—what is your name? Mr. Waxman—just kidding—for 5 minutes.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you, Madam Chair. There is an app to give you my name and the description of the cities that I represent. I want to thank you for holding this hearing.

As we in Congress look for ways to accelerate job growth, it is essential to highlight growth industries and examine what makes them successful contributors to the national economic recovery.

Although they barely existed 5 years ago, mobile apps have emerged as a particularly innovative part of the information technology sector in the United States and they now play a major role in American life. More than half of Americans with cell phones own a smartphone, giving them the advanced capabilities necessary to download and utilize some of the several hundred thousand apps that exist for work, education, organization, e-commerce and entertainment. These apps produce many benefits, like making us more productive by being able to edit documents on the run, keeping us in contact with friends and family through social media, or even allowing us to carry around a whole library of good books on a single device. Mobile apps also can have life-saving functions, particularly in the area of health IT, where there exist apps that help individuals check their blood pressure and/or their glucose levels.

One notable benefit of the booming mobile apps industry is its impact on employment. A February study commissioned by TechNet estimated that mobile app development supported 460,000 jobs nationwide, including computer and mathematical jobs in tech companies, non-tech jobs in the same companies, and jobs created outside the tech industry through spillover effects.

These jobs have been critical to our home State of California, which has over 20 percent of the total jobs estimated by the TechNet study. I am pleased to see that mobile apps jobs are quite geographically dispersed, with benefits for many States and regions.

With smartphone adoption expected to keep rising both here and abroad, U.S. app developers have the opportunity to continue to grow, and continued growth in the mobile app sector should lead to more jobs.

This hearing can help us understand what is needed to ensure this continued growth. But one step is essential: we must continue to emphasize technical and foreign-language education so that existing and future companies in this sector have the personnel needed to be successful.

A recent study concludes that emerging markets like Brazil, Russia, India and China will drive demand for the next 10 million apps. Our app developers need to be able to develop products for these markets. At the same time, it is important to remember that although the app economy is a bright spot, our goal as policy-makers must be enduring prosperity across all economic sectors. We must promote growth that restores middle-class security and

improves economic mobility for the poor. While we in Congress work to control the Federal deficit, we also must continue to make targeted investments in education, innovation and infrastructure that can benefit all sectors of the economy.

On a day when Apple is announcing its new iPhone and Samsung is getting the benefit of the spillover from its legal victory and more people are looking to see what is going to be available for Christmas shopping, it is appropriate that today is the day we are holding this hearing, and I thank you, Madam Chair, for convening the hearing. Thank you so much.

Mrs. BONO MACK. Thank you, Mr. Waxman, and I will look for the “Where’s Waxman” app later today in the App Store.

The Chair now recognizes—

Mr. WAXMAN. It is close to “Where is Waldo.”

Mrs. BONO MACK. I set you up good for that one.

The Chair recognizes Mr. Upton for 5 minutes.

OPENING STATEMENT OF HON. FRED UPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. UPTON. Well, thank you.

You know, there are not a lot of bright spots perhaps in our overall economy, but one of the brightest is the birth and the growth of the app marketplace. It is one of the most exciting areas of technology with tremendous growth in recent years, growth that experts agree we can continue to see.

It is hard to imagine life before the iPhone appeared 5 years ago, or the iPad which debuted just 2 years ago. Now these devices and the apps we use are an essential part of our lives for sure. The Apple store launched with only 500 apps in 2008 but now offers over 600,000, while the Android store offers over 600,000 apps as well. That is growth of 240,000 percent, and folks continue to buy these apps in staggering numbers. According to one industry group, there were more than 11 billion downloads of mobile apps in 2010 with projections that downloads are going to grow to nearly 77 billion worth \$35 billion by 2014.

What is more exciting than the explosive proliferation of these apps are the jobs that are being created. Everyone from large companies to small businesses, to the stay-at-home mom are developing these apps and generating income. Furthermore, the wealth being generated by apps isn’t locked into one or two particular geographic areas. The highest concentrations of app developers are in California and New York, but there is an app developer in nearly every town in between with approximately two-thirds of app-related employment falling outside of those two regions. So if you have the talent and you have a computer, you can develop an app and compete in the marketplace.

Without a doubt, this is an area of exceptional promise, but it is not without fragility. Innovation and job creation can be as easily stifled by regulations in this field as any other, if not more so. So it is in that vein that I look forward to hearing from our witnesses today. Are there any policies you would like Congress to consider? Are there any policies currently in place or under consideration that are stumbling blocks to further growth and innovation? How can we as policymakers maintain an environment that fosters the

innovation, creativity, growth and economic success that this sector currently enjoys?

So I look forward to your testimony, and I yield the balance of my time to Marsha Blackburn.

[The prepared statement of Mr. Upton follows:]

**Statement of Chairman Fred Upton
Subcommittee on Commerce, Manufacturing, and Trade
Hearing on “Where the Jobs Are: There’s an App for That”
September 12, 2012**

There are too few bright spots creating jobs in our economy right now, but surely one of the brightest is the birth and growth of the app marketplace. This is one of the most exciting areas of technology, with tremendous growth in recent years – growth that experts agree we can expect to continue.

It’s hard to imagine life before the iPhone appeared five years ago, or the iPad which debuted just two years ago. Now, these devices – and the apps we use – are an essential part of our daily lives. The Apple store launched with only 500 apps in 2008 but now offers over 600,000, while the Android store (Google Play) offers over 600,000 apps as well. That’s growth of 240,000 percent, and folks continue buying these apps in staggering numbers. According to one industry group, there were nearly 11 billion downloads of mobile apps in 2010 with projections that downloads will grow to nearly 77 billion worth \$35 billion by 2014.

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Furthermore, the wealth being generated by apps isn’t locked into one or two particular geographic areas. The highest concentrations of app developers are in California and New York, but there is an app developer in nearly every town in between with approximately two-thirds of app-related employment falling outside

of these two regions. If you have the talent and you have a computer, you can develop an app and compete in the marketplace.

Without doubt this is an area of exceptional promise, but it is not without fragility. Innovation and job creation can be as easily stifled by regulations in this field as any other – if not more so. It is in that vein that I look forward to hearing from our witnesses today. Are there any policies you would like Congress to consider? Are there any policies currently in place or under consideration that are stumbling blocks to further growth and innovation? How can we as policymakers best maintain an environment that fosters the innovation, creativity, growth, and economic success that this sector currently enjoys?

I thank the witnesses for their time today, and look forward to their testimony. I yield one minute to my colleague Mrs. Blackburn and then one minute to Mr. Stearns.

OPENING STATEMENT OF HON. MARSHA BLACKBURN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TENNESSEE

Mrs. BLACKBURN. I thank the chairman for that, and Madam Chairman, I thank you for the hearing today. I think this is absolutely so timely and is an area where there is agreement, and I am pleased that we are putting some focus on this.

I think that from what you have heard today, you all know and we know that the growth of the apps economy, if you will, is truly dependent on free enterprise, the private sector. It is looking for that individual initiative for how you solve a problem, whether it is the Where's Waxman? app or the What's New for Christmas app that he may want to pull down and see what he can find for Christmas. The thing is, this entire economy was not born at the altar of big government. It was borne out by individuals that have a great idea and are looking for a way to pull that through to the marketplace.

Now, what we do have to realize that in order to have a productive apps economy, we have got to have spectrum and be able to launch these applications whether they are for consumer shopping or for consumer health or safety, any number of things. This entire marketplace is young, it is revolutionary, it is disruptive to traditional business processes, and I think it is very exciting.

So thank you all for being with us. Madam Chairman, thank you for turning our attention to the issue. Yield back.

Mrs. BONO MACK. I thank the gentlelady, and the Chair now turns our attention to the panel. We have one panel of witnesses joining us for today's hearing. Included on the panel are Peter Farago, Vice President of Marketing at Flurry, Inc.; Stephanie Hay, Co-Founder of Fast Customer, and Resident Mentor, 500 Startups; Rey Ramsey, President and CEO of TechNet; and Morgan Reed, Executive Director of the Association for Competitive Technology.

Each of our witnesses has prepared an opening statement. They will be placed in the record. Each of them will have 5 minutes to summarize their statement in their remarks.

So good morning, and thank you all very much for coming and for being here. To help you keep track of time, if you are not familiar with it already, there should be a timing clock on the table. When the light turns yellow, you will have 1 minute to come to a conclusion—or behind us. Thank you for pointing that out. So all you have to do is make sure that you push the “on” button on your microphone before you start to make sure the audience at home can hear you as well.

So with that, Mr. Farago, you are recognized for 5 minutes.

STATEMENTS OF PETER FARAGO, VICE PRESIDENT, MARKETING, FLURRY, INC.; STEPHANIE HAY, CO-FOUNDER, FAST CUSTOMER, AND RESIDENT MENTOR, 500 STARTUPS; REY RAMSEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, TECHNET; AND MORGAN REED, EXECUTIVE DIRECTOR, ASSOCIATION FOR COMPETITIVE TECHNOLOGY

STATEMENT OF PETER FARAGO

Mr. FARAGO. Thank you, and good morning.

Chairwoman Bono Mack, Ranking Member Butterfield and distinguished members of the subcommittee, thank you for the opportunity to appear before you this morning. My name is Peter Farago and I am the head of marketing for Flurry, a high-tech startup based in Silicon Valley, specifically San Francisco.

In 2007, when I joined the company, I was its eighth employee. We now have over 100 employees in multiple offices. Flurry helps mobile developers build, measure, advertise and monetize their applications in the new app economy. One way to think of us is that we don't make the apps that everyone uses; we help make the apps that everyone uses better.

Flurry has over 75,000 customers, most of which are entrepreneurs and startups. Because of that broad customer base and the over 200,000 apps using our services, Flurry has unique insight into the state of the current app economy as well as where it is headed.

While my written report provides numerous trends and insights about the app economy, I would like to highlight three of them. First, we are moving faster than any industry ever before; second, there are real opportunities for job growth; and third, the United States has significant opportunities to increase exports.

The new app economy represents the greatest, fastest adoption of any new consumer technology in the history of mankind. Smart devices are being adopted 10 times faster than the PC revolution of the 1980s, two times faster than the Internet boom of the 1990s, and three times faster than the most recent social network phenomenon. This rate of adoption outpaces that of all other notable technologies any of us can think of including electricity, radio, television, VCRs, microwaves, cell phones, dishwashers and even stoves. And Flurry estimates that the world is only about a quarter of the way into the adoption cycle of this new consumer technology.

Our study found that 60 percent of app startups have the majority of their employees in the United States, and a recent Kaufman study concluded that the main driver of all new jobs comes from startups in their first year. There is unprecedented opportunity for America to capitalize on exploding international markets. The United States has 315 million active wireless devices of which 170 million are smart devices. However, the last year, while the United States has added 30 million smart devices, China has added 100 million. From our study, 70 percent of all companies surveyed already generate some revenue outside the United States and 94 percent strongly agree that the app economy will be increasingly international.

So how do we turn these trends into opportunities? To capitalize on these trends, Flurry believes the ecosystem needs robust infra-

structure, access to an educated technology workforce, and maintained low barriers to entry. Of these, I would like to highlight access to talent.

At Flurry, we literally cannot find the talent we need fast enough to fill all the open positions we have. While we have 100 employees now, we have 50 open positions. Additionally, our survey shows that our customers share our pain. Only 24 percent of respondents believe that their company can recruit enough skilled software developers. Eighty-four percent of respondents strongly agree that their company's success is dependent on software development talent. Unless we solve this problem, America will not be positioned to fully capitalize on this unique moment in time.

We in the tech industry as well as policymakers need to work hard to find creative solutions to fully realize the potential we have before us. This should include partnering to ensure better university education, better professional retraining, continuing education and easing the ability to bring and keep international talent in the United States. At Flurry, we look forward to continuing to play our role in making applications even better, help our customers grow their businesses, and provide the consumer with the best possible experience.

I thank you for your time, and I look forward to your questions.
[The prepared statement of Mr. Farago follows:]



Testimony

of Peter Farago
Vice President, Marketing
Flurry, Inc.

before the
Committee on Energy and Commerce
Subcommittee on Commerce, Manufacturing and Trade

on

Where the Jobs Are: There's an App for That
September 12, 2012

Chairwoman Bono Mack, Ranking Member Butterfield, and Members of the Subcommittee, thank you for the opportunity to appear before you. My name is Peter Farago, and I am the head of marketing for Flurry, a high-tech start-up based in Silicon Valley. I am here today to speak about the mobile app industry and its impact on the economy.

This report includes the following sections:

- I. Flurry, a Silicon Valley Start-Up
- II. What is the App Economy?
- III. The Golden Era of Mobile Computing: The Fastest Adopted Technology in History
- IV. Consumers Embrace the New App Economy
- V. Start-Ups Drive the New App Economy
- VI. The App Economy Impacts the U.S. and Global Economy

I. Flurry, a Silicon Valley Start-Up

Flurry is a Silicon Valley start-up that helps mobile application makers build, measure, advertise and monetize their applications. Flurry customers consist of 75,000 mobile application developers (e.g., Apple iOS, Google Android, Microsoft Windows Phone, etc.) and advertisers (brands, marketers, advertising agencies).

The Flurry customer base is comprised of a range of companies with varying resources, sophistication and scale. On the one end, we have "small businesses" that typically have under a dozen employees, mainly software programmers. In the middle, we have the new, emerging winners of the new app economy, who are navigating how to effectively scale their businesses. And on the other end, we have many of the world's largest companies (from online, media, consumer packaged goods, manufacturing, communications, and more) who are trying to make sense of the app economy and the opportunities it presents.

Flurry's deep relationship with its large customer base has given it a unique vantage point on the emerging smartphone and app economy, and the company has often been viewed by industry analysts and market researchers as a credible source of insights into this new emerging economy.

II. What is the App Economy?

The app economy is comprised of players that help make, distribute and monetize software that runs on mobile computing devices, known as applications, or "apps." For the app economy to function, we need devices, operating systems, digital stores, network connectivity and software.

In the consumer's hand is the mobile device (e.g., a smartphone or tablet). On a device is an operating system, which allows the user to interface with and use the device. On top of that we have software, which allows the user to perform specialized tasks with that device, like play games or make a restaurant reservation. This software is developed by "content creators." Software distribution to consumers occurs in digital stores (e.g., the iTunes App Store), owned by "platform providers" (e.g., Apple). Connecting devices in a way that enables talking, messaging, downloading software and

sending data are network operators such as Verizon or the Internet, where WiFi is possible. For this report, we simplify the app economy, focusing on platform providers and content creators.

Platform Providers

The two major platform providers in the app economy are Apple and Google. Microsoft and Amazon also offer platforms. A “platform” is a market where consumers can acquire software. Apple offers the most complete platform as hardware maker (i.e., Original Equipment Manufacturer, “OEM”), operating system provider (i.e., Apple iOS) and digital store operator (i.e., Apple iTunes App Store). Google serves as an operating system provider (i.e., Android) and manages a digital store (i.e., Google Play, formerly called the Android Market). Google recently completed the acquisition of Motorola and is now considered a device maker. Google continues to support its initial OS distribution strategy by working with OEMs including Samsung, HTC and LG. Both Apple and Google additionally create their own content (e.g., Google Maps) as well as manage advertising businesses: Admob in the case of Google and iAd in the case of Apple. When platform providers create software for their own platform, we refer to this as first-party content.

Content Creators

The key component of the app economy is the software created for use by consumers and companies, the majority of which is created by third-party content creators. Content creators are typically made up of teams of developers and designers who build and distribute what they think people and/or companies will find useful, practical and/or entertaining. This is a particularly vibrant, innovative and entrepreneurial part of the app economy.

The Virtuous Cycle

There is a favorable relationship between platform providers (specifically, the makers of hardware to which software can be downloaded) and content creators that economists refer to as a “virtuous cycle.” Starting such a cycle is an expensive, enormous “chicken-or-egg” effort, which is rarely achieved sustainably and at scale within the technology industry. It’s a symbiotic relationship where increased sales of hardware help the sales of software and services, which in turn helps further drive hardware sales, and so on. It typically starts with the installed base of hardware (smartphones and tablets), though early, unique content can help significantly “prime the pump.” The larger the device install base, the more the content creator will likely support the platform. When the consumer perceives that a lot of additional, value-added content is available on the platform, it makes the

platform more desirable, resulting in more sold devices. This creates manufacturing economies of scale for the hardware maker, which increases profits and enables price reductions. Apple and Google, with their respective smartphone and tablet initiatives, have created the most successful virtuous cycle in the history of technology.

Why is this Virtuous Cycle so Special?

The smart device (smartphones and tablets) virtuous cycle is characterized by rapidly achieved scale, continued hyper-growth and breadth and scale of content. Moreover, we are still early in the cycle of hardware adoption. The new breed of smartphones and tablets are versatile multi-purpose devices that can become radios, gaming devices, TVs, newspapers, magazines, tip calculators, travel reservation terminals, photo editing and sharing appliances, and more, all with the launch of an application. This is in addition to web browsing, messaging, email and other first-party applications that ship with these devices. Single-purpose devices like Garmin GPS devices for driving directions or Xbox 360 consoles for playing video games achieve smaller install bases over time and thus have shorter total lives.

Instant Distribution Everywhere

Enabled by digital distribution across the unprecedented growing base of iOS and Android smart devices, global software distribution has never been so frictionless. After building an application, a development team can distribute its app on Android instantaneously and, after review by Apple, can be in the App Store within a week. With international growth accelerating, there has never been a better time, in the history of technology, to be a software developer. In an age of digital distribution, goods and services can be delivered seamlessly to always-on, connected mobile computers. It's a worldwide 24/7/365 marketplace, the likes of which the world has never seen.

Consumers Who Can and Do Spend

Another key characteristic of the economy is both the consumer's ability and willingness to pay. Unlike the Internet, where consumers inherently believe services should be free, carriers (e.g., AT&T, Verizon, etc.) spent years training consumers that the cost of content in their app stores required payment. As Apple, Google and Amazon began to control storefronts, they kept this same approach. For Apple and Amazon's respective app stores, consumers must have either a credit card or gift card associated with the device. For Google Play, the primary app store for Android, Google continues to drive increased

penetration of Google Wallet, its payment solution. The net result is that the new app economy is made up of consumers who spend money, dramatically increasing the value of this market for businesses.

III. The Golden Era of Mobile Computing

The Fastest Adopted Consumer Technology in History

Led by Apple and Google, a new breed of smartphones and tablets has changed the landscape for technology innovation, dramatically impacting the economy. Within just five years, platform providers have amassed an install base of nearly 650 million actively used powerful and portable, networked computers. These super-devices extend far beyond the power of what the industry initially called “smartphones” with powerful on-board processors, broadband connectivity and nearly endless storage thanks to innovations in cloud technology. These are the ultimate multi-purpose devices. Consumers are using them in droves, developers are building applications for them en masse and consumer consumption patterns are changing dramatically. The result is that nearly every sector of the economy is being affected. Flurry estimates that the world is only about a quarter of the way into the adoption cycle of smartphones and tablets. Connected televisions, on which both Apple and Google are working, have not yet been introduced into the mix.

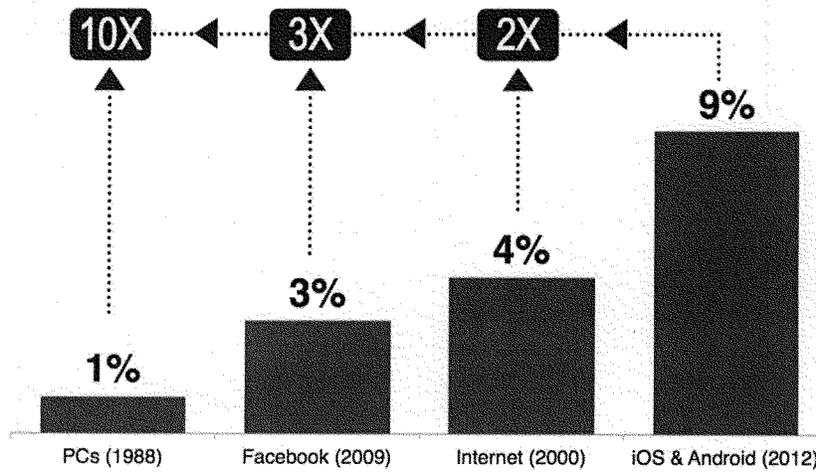


The rate of iOS and Android device adoption has surpassed that of any consumer technology in history. Compared to recent technologies, smart device adoption is being adopted 10X faster than that

of the 80s PC revolution, 2X faster than that of 90s Internet Boom and 3X faster than that of recent social network adoption. Five years into the smart device growth curve, expansion of this new technology is rapidly expanding beyond early adopter markets such as North America, Western Europe and Japan, creating a true worldwide market. This rate of adoption additionally outpaces that of all other notable technologies including electricity, radio, television, VCRs, microwaves, cellphones, dishwashers and more.¹ Overall, Flurry estimates that there were over 650 million iOS and Android devices in active use during the month of July 2012, more devices in use more quickly than any other technology ever created.

Figure 1

WW Penetration of New Technologies, 5 Years After Introduction



Sources: US Census Bureau, CIA World Factbook, Flurry

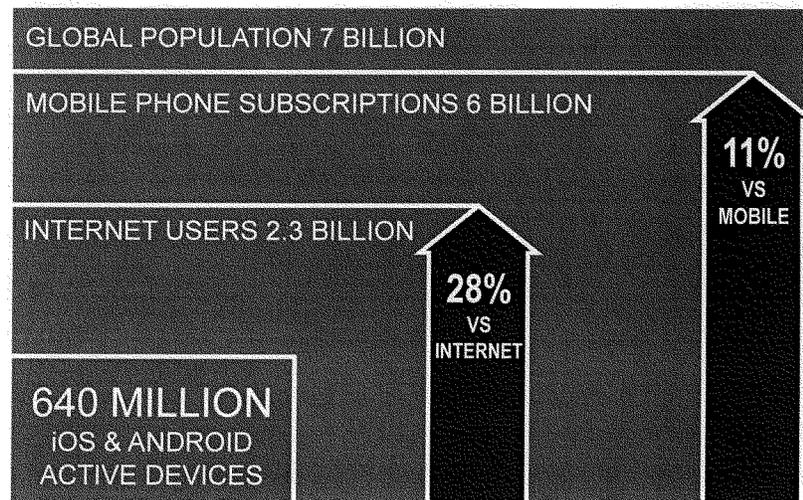
Please note that we normalize population in the chart above. That is, we use the population from each year in which we calculate penetration.

¹ New York Time, Consumption Spreads Faster Today, 2008
<http://www.nytimes.com/imagepages/2008/02/10/opinion/10op.graphic.ready.html>

iOS and Android Already at Critical Mass

Not only is iOS and Android smart device penetration rapidly gaining on the most established consumer technologies, but also it has reached meaningful critical mass. In just five years, the active user base of iOS and Android devices is more than a quarter of Internet subscriptions, despite the fact that the Internet is nearly a 20-year-old industry. For further reference, the iOS and Android install base is already two-thirds that of Facebook, which currently has 955 million monthly active users.² Worth noting is that Facebook is a free service, while each smart device costs hundreds of dollars to purchase and operate. Given that hardware prices will continue to come down, and many emerging economies have leap-frogged over expensive fixed wire installations, we expect the growth of smart devices to accelerate. Below, we show iOS and Android active user bases vs. Internet, total mobile subscriptions and the world's population.

Figure 2

WW iOS & Android Active Install Base vs. Internet, Mobile and Global Populations

Sources: US Census Bureau, International Telecommunication Union, Flurry

² Facebook statistics <http://newsroom.fb.com/content/default.aspx?NewsAreaId=22>

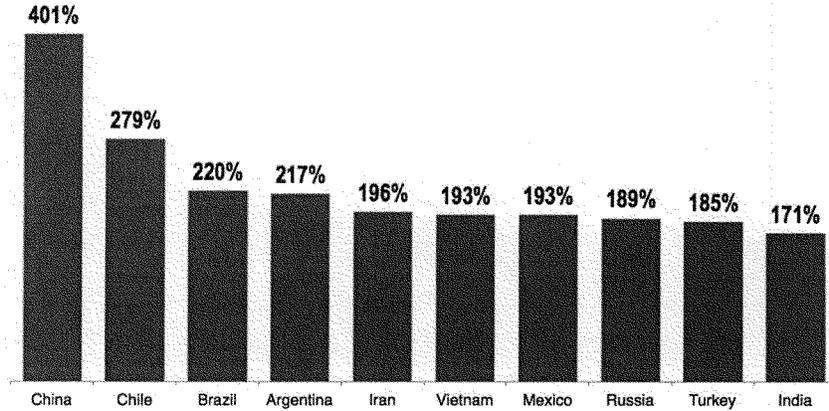
A Worldwide Phenomenon

iOS and Android adoption is spreading internationally, with the international market now making up a larger proportion of the total base, especially as the United States reaches saturation. Flurry estimates that the U.S. has an install base of 170 million monthly users of iOS and Android smart devices, followed by China with 130 million and then the UK with 30 million.

While the U.S. continues to lead the world in iOS and Android install base size, China is rapidly closing the gap. Year-over-year, Flurry calculates that net active devices in the U.S. grew by approximately 30 million, while China saw more than 100 million new active devices enter the market. At this rate, China's active install base could overtake the U.S. as early as the 2012 holiday season.

Figure 3

Top Countries by Active iOS & Android Devices (percent)



Source: Flurry

The chart above shows the fastest growing iOS and Android markets between July 2011 and July 2012. China leads the world with an astounding 401% year-over-year growth, demonstrating the power of the country's vast population coupled with its rapidly growing middle class. Notably, all four BRIC

countries (Brazil, Russia, India and China) are represented in the top 10-ten growth countries for smart devices, reinforcing their new stage of advanced economic development.

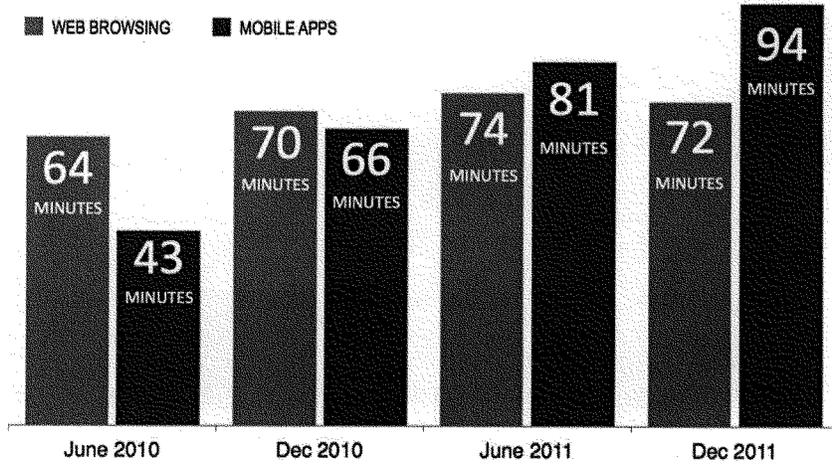
As early adopter markets such as North America and Western Europe mature, Flurry expects continued rapid international expansion. Because America leads with the largest install base, combined with its affluence, its economy is already prospering from the golden age of mobile computing. Looking forward, we expect U.S. exports to climb as the app economy becomes increasingly international.

IV. Consumers Embrace the New App Economy

The era of mobile computing, catalyzed by Apple and Google, is driving one of the largest shifts in consumer behavior over the last forty years. Flurry estimates cumulative app downloads across the iTunes App Store and Google Play has now surpassed 60 billion. Already, time spent per day by active users in mobile apps surpasses that of Internet users.

Figure 4

Time Spent per Active Consumer Using Smartphone & Tablet Apps, United States



Sources: comScore, Alexa, Flurry

V. Start-Ups Drive the New App Economy

The App Economy Across the United States

The iTunes App Store and Google Play now offer more than 600,000 apps each. With low barriers to entry for developers in terms of production and distribution costs, the majority of these apps have been created by start-ups. In the United States, these companies are distributed across nearly every state. In a survey conducted for this testimony, Flurry found that the 159 U.S. companies that responded were spread across 33 states.

Figure 5

Distribution of U.S. Based Companies from Flurry Survey

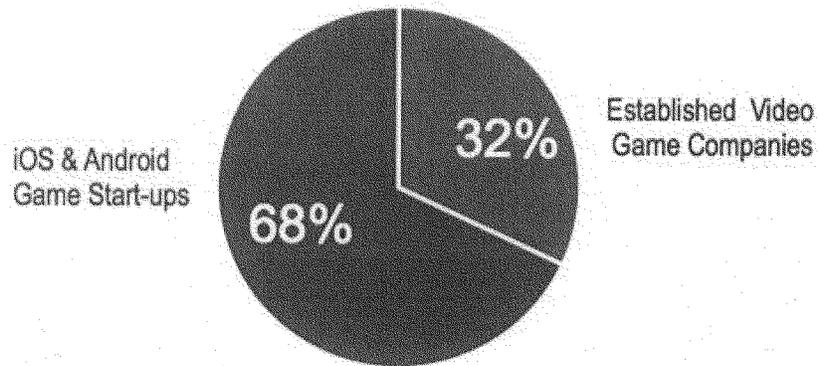
| State | Respondents | % |
|-----------|-------------|-------------|
| CA | 34 | 21% |
| NY | 19 | 12% |
| TX | 10 | 6% |
| PA | 8 | 5% |
| WA | 8 | 5% |
| NJ | 7 | 4% |
| FL | 6 | 4% |
| CO | 5 | 3% |
| MN | 5 | 3% |
| VA | 5 | 3% |
| GA | 4 | 3% |
| IL | 4 | 3% |
| IN | 4 | 3% |
| MA | 4 | 3% |
| MI | 4 | 3% |
| NH | 4 | 3% |
| UT | 4 | 3% |
| NC | 3 | 2% |
| OH | 3 | 2% |
| OR | 3 | 2% |
| AZ | 2 | 1% |
| NM | 2 | 1% |
| CT | 1 | 1% |
| IA | 1 | 1% |
| ID | 1 | 1% |
| KS | 1 | 1% |
| KY | 1 | 1% |
| MD | 1 | 1% |
| MO | 1 | 1% |
| ND | 1 | 1% |
| NV | 1 | 1% |
| VT | 1 | 1% |
| WI | 1 | 1% |
| 33 | 159 | 100% |

Start-Ups Thrive in the App Economy

In an analysis of the gaming category, the largest category on iOS and Android, Flurry found that start-ups who began on iOS and Android (vs. console or Web) outperformed gaming companies, despite established companies' brand power and resources. Games for mobile devices are often designed and monetize dramatically differently, requiring a different kind of business operation and model. They require innovation at much faster rates.

Figure 6

App Sessions, iOS & Android Game Start-Ups versus Established Game Companies



Source: Flurry

Start-Ups Create Jobs

Figure 7

Job Creation and Loss by Firm Age³
Average per year, per year-group, 1992 – 2006



Sources: Business Dynamics Statistics, Tim Kane

Recent Kauffman research found that start-ups, as a group, are net job creators during their first year. All other firms combined, one year or older, are net job destroyers. Below is an excerpt from the report.

“Startups create an average of 3 million new jobs annually. All other ages of firms, including companies in their first full years of existence up to firms established two centuries ago, are net job destroyers, losing 1 million jobs net combined per year.” “...in terms of the life cycle of job growth, policymakers should appreciate the astoundingly large effect of job creation in the first year of a firm’s life. In other words, the BDS indicates that effective policy to promote employment growth must include a central consideration for startup firms.”

³ *The Importance of Startups in Job Creation and Job Destruction*, The Kauffman Foundation, July 2010

VI. The App Economy Impacts the U.S. and Global Economy

Industry analysts view the app economy as a stimulator for the overall economy. Earlier this week, The New York Times reported that Michael Feroli, the chief United States economist at JPMorgan Chase “estimated that the upcoming release of what is expected to be the iPhone 5 could add one-quarter to one-half of a percentage point to the annualized growth rate of America’s gross domestic product next quarter.” Mobile app economy start-ups will no doubt contribute mightily to this growth rate.

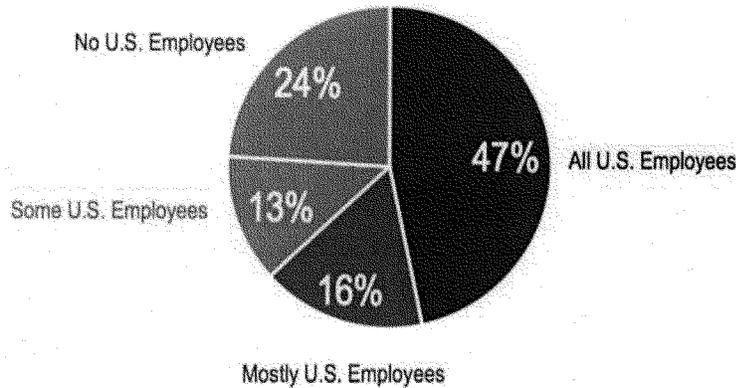
App Economy Impact on Jobs

Many of Flurry’s customers are start-ups in the mobile app economy. From a customer survey fielded by Flurry earlier this week, 63% indicated that most-to-all of their employees resided in the U.S.

Education is a key to continued job growth. Of the 269 companies, 71 percent agreed “Very Much” or “Completely” with the statement “My company needs more employees with technical training.” Companies emphasized, however, that colleges and universities only “Somewhat,” or “Not at All,” provide adequate technical training for graduates to contribute to today’s app economy. Only 24 percent of respondents agreed “Completely” or “Very Much” with the statement “My company can recruit enough skilled software developers,” despite the fact that 84 percent of respondents agreed “Very Much” or “Completely” that their company’s success depends on software development talent.

Figure 8

Flurry Customers Surveyed: Proportion of U.S. Employees



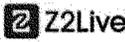
Source: Flurry Customer Survey, September 2012, n = 269

Case Study in App Economy Job Creation

The app economy is positively impacting companies both directly participating in the industry as well as those with services enhanced by the app economy. Z2Live and Flurry are examples of companies that directly participate in the app economy. Flurry provides services to iOS, Android and Windows Phone developers and Z2Live builds and distributes iOS games. Box offers cloud-sharing of any file type from any device including smartphones and tablets. All three companies focus on hiring a highly skilled technology and business workforce, many with advanced degrees. Combined, they have hired over 700 highly-skilled workers since January 2011.

Figure 9

New Jobs Created Related to New App Economy

| Company | Location | Business | Hired Since Jan 2011 |
|---|---------------------------|---------------------------------------|----------------------|
|  box | Los Altos, California | Cloud File Sharing (including mobile) | +500 |
|  Z2Live | Seattle, Washington | iOS Game Developer | +125 |
|  FLURRY | San Francisco, California | App Developer Services | +80 |

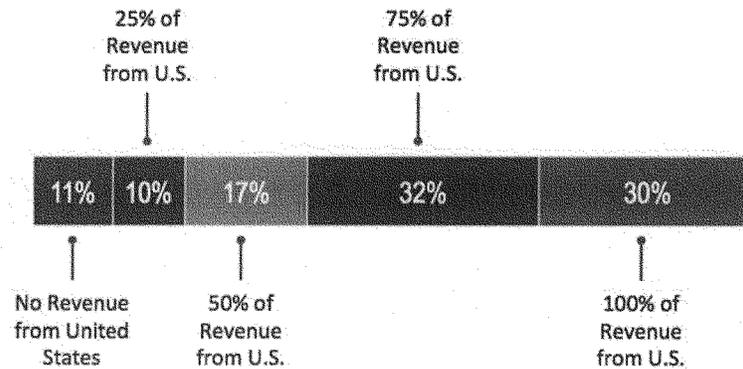
Sources: Box, Z2Live and Flurry

App Economy Impact on Stimulating the U.S. Economy

Figure 10

Company Concentration of Revenue from United States

The app economy is generating revenue in the United States, with 79% of companies surveyed by Flurry making half or more of their revenue from the U.S. This stimulates the U.S. economy.



Sources: Flurry Survey, September 2012, n = 314

Impact of the App Economy on Exports

In addition, 70% of all companies surveyed are generating some revenue outside the U.S. Further, when we asked respondents how much they believed "The app economy will become increasingly international," 94% either agreed "Very Much" or "Completely" which indicates a nearly certain expectation that this market will grow abroad. We expect U.S. exports to climb as the app economy continues to expand internationally.

Conclusion

We believe the app economy is poised to continue its rapid growth in the years to come, both at home and abroad. With Flurry's help, our customers are engaging users in new and exciting ways—with cutting-edge content on cutting-edge devices. Just as PCs transformed the economy in 1980s, the internet changed commerce and the dissemination of information in 1990s, and social networking is revolutionizing today the means by which people communicate, so too will apps change our economy and our lives in a fundamental and exciting way. The app economy—led by American entrepreneurs, engineers, and developers—is leading the charge of this decade's economic transformation.

Mrs. BONO MACK. Thank you very much.
Ms. Hay, you are recognized for 5 minutes.

STATEMENT OF STEPHANIE HAY

Ms. HAY. Thank you. Thank you for having me here. Good morning.

My name is Stephanie Hay and I have been an enthusiastic leader in the tech community since moving to Alexandria from Ohio nearly 10 years ago. In 2003, while working in communications at George Mason University, I began building Web sites and creating templates to simplify how 30 departments managed their content online. Imagine being able to publish content on the Internet instantaneously from anywhere. The speed and flexibility had me hooked. I left Mason for World Championship Sports Network where I got my first taste of startup life which included 2 a.m. working sessions from my couch, coordinating with remote teams in Manhattan and Los Angeles, changing priorities fast.

In 2010, after several years in project management at agencies, I started my own consultancy. I also became more involved locally, taking board positions at the Art Directors Club, speaking at DC Tech and RefreshDC, and co-organizing the DC Lean Startup Circle, which today includes 1,200 entrepreneurs.

In short, tech is my livelihood job and I have created jobs because of it too. For example, in 2010 alone, my first year in business, I hired five people as subcontractors. I co-launched Workspace Design Magazine. This monthly online publication is about the evolution of work and it now employs three people. I also founded NovaCowork, a group of nearly 150 entrepreneurs who meet each Wednesday at Iota Cafe in Clarendon where companies have been launched, jobs created and partnerships are formed. You are welcome to attend.

In fact, the startup I co-founded in 2011, Fast Customer, came from one of those meet-ups. Paul Singh, Aaron Dragushan and I built a mobile app that with a single tap connects you directly with a human in customer service at more than 3,000 companies. We are using mobile technology to change customer service calls for the better, and we have hired eight people to help us.

When we decided to raise money, 500 Startups, an accelerator and fund in Silicon Valley, led our seed round. I am now a resident mentor there as well, coaching startups on everything from positioning to pitching. I mention 500 Startups because it is deploying smaller sums of cash faster and it is actively working to involve more women, two characteristics that are atypical within the traditional venture capital world. Plus nearly a third of its portfolio includes women-led startups, three of the six partners at 500 are women, and they launched a campaign in July to bring more women into the angel investing community through coaching and educational programs.

These organizations like 500 Startups are committed to taking on this challenge of supporting female founders with useful apps and that I can be a part of influencing that future is invigorating. Plus with more women like Facebook Sheryl Sandberg and Yahoo's new CEO Marissa Mayer leading the way, I further my own re-

solve to catapult other smart women into decision-making positions within tech.

Of course, I am here today because I believe you can help too. Earlier this year, I spoke with Jennifer Boss, a tech-savvy woman whose job with the DC Mayor's office is to identify new innovations fit for public-sector applications. Fast Customer is a DC-founded company that already connects callers to agencies such as the IRS, which generates thousands of calls annually. Surely we could not only help agencies better connect with their people but politicians with their constituents. Again, the possibilities are endless. However, we, like Instagram, which just sold for \$1 billion, operate without a dedicated enterprise sales staff so after a few promising conversations about how we could modify Fast Customer for real-world pilots in the public sector, we were then placed into the standard procurement process required of any vendor who wants to do business with the government. This was startling because they had approached us yet we and they were hampered by procurement rules that couldn't accommodate new products like ours. We couldn't demo an out-of-the-box product with clear public-sector features because it didn't exist so we were forced to end discussions.

The contrasting reality is that we already were in talks with telecom giants in the public sector including Verizon, Comcast and Telstra. These companies recognized that innovation and agile process in which we mobile startups work, which meant we could continue building, learning and iterating at the speed of mobile, the speed of our world today. That we might expand internationally before we could meet rigid expectations in our own backyard is discouraging but we believe there are massive opportunities to be realized if government removes barriers that hinder our tech companies and brilliant people from engaging with the public sector.

What can we do together to find compromise and more quickly bring tech innovations into our government? Thank you.

[The prepared statement of Ms. Hay follows:]

TESTIMONY of Stephanie Hay
Entrepreneur

Before the

Committee on Energy and Commerce
Subcommittee on Commerce, Manufacturing, and Trade

On

Where the Jobs Are: There's an App for That

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Mrs. BONO MACK. Thank you very much, Ms. Hay.
Mr. Ramsey, you are recognized for 5 minutes.

STATEMENT OF REY RAMSEY

Mr. RAMSEY. Thank you very much. Madam Chairwoman and the committee, I applaud you for having this session and it is very important.

My name is Rey Ramsey. I am the CEO of TechNet. I appreciate you all mentioning the study that we put out last year. That study has sparked a lot of conversation looking at the amount of jobs. I mean, the headline from that study is that almost 500,000 jobs have been created since 2007. And so what I want to do is, since my testimony has already been submitted, I just want to talk to you about a few things that I think are really important and highlight those issues.

We have gotten to this place, which is a pretty good place for the country to have this number of jobs and growing. We have gotten here because it has been a wonderful confluence of several things happening. One, you have the technology itself, much of which has been proudly invented in the United States. You also have this consumer demand for ease of transaction where consumers in so many different ways are saying make this easy for me and meet me where I am, this sort of mobile sensitivity. We now have 50 percent of all the phones are smartphones. That is up from 17 percent just a few years ago, so explosive growth. And so with this confluence and with entrepreneurs like Ms. Hay and others that are out there inventing and looking for economic activity, we have got several great benefits: jobs at the top of the list, economic activity. But when you look at all the advantages, you step back and you say there are two things from a policy perspective we need to focus on. One is, how do we continue to maximize what is happening, how do we continue to take advantage of this, are there things that policymakers can do. And then with your other set of eyes, take a look at, are there any threats to this, and you say to yourself, what do we need to do to mitigate potential threats, and I just want to comment on a few things.

One is, and I think the way to look at this from my perspective is from a policy perspective, there are two things. One would be focus on the necessary infrastructure to keep this going and then the second issue I would say is an issue of access. So I just reduce it to that. If I am in an elevator with you, I would say it is infrastructure and it is access.

Under infrastructure—and you have heard part of it—and it all revolves around capital. You have human capital, which you heard earlier, which is the workforce issue. One of the things that will impede the growth even in the apps economy—because people tend to think of the apps economy as only the little guys, the small companies. Well, they have a need for workforce but so do large companies as well. So we are in a human-capital crunch being able to get the kind of workforce that we need and that is a string policies all the way from our school systems all the way through to college, how many engineers, how many systems programmers and even some of our targeted training programs. So I think it creates an opportunity to take a look at that human-capital ecosystem and say

how is it working for this, how are we utilizing community colleges, are there training programs that could be targeted. Look at existing agencies and ask ourselves whether it is the SBA and others, have they caught up with the apps economy and then ask the fundamental question: if there is an entrepreneur out there and she is sitting at home and she is thinking I can get into this too, and that is one of the beauties of this, where could she go in our communities or in our society to get in the game, and that gets to the access issue.

There are segments of the population that could join this job explosion, create additional income for their homes and for their families if they knew about what existed or if we had programs that were targeted to get to them. We still need to see more women participating in this workforce and in these opportunities, so that is just a question of outreach.

Back to the issue of infrastructure, without getting into all the details, Congresswoman Blackburn started off by saying “spectrum.” That is crucial. Broadband, crucial. We still have too many rural areas of the country where people aren’t able to take advantage because they don’t have the broadband connections, the issue of broadband adoption. So there are some infrastructure issues that from a policy perspective we need to make sure are in place along with workforce issues. There are some other issues like previously and other sorts of things. Just making sure that when we look at any of these policies that we look at them through the prism of will this continue this movement toward job creation and economic activity or will there be unintended consequences.

The last thing I will say is, what is exciting about this app economy is that it is not only having great benefits in the commercial sector, it is having terrific benefits from a social innovation perspective where it is helping with health care, issues like diabetes and people’s drug regimens and other things like that. So it is a double win for society.

Thank you very much.

[The prepared statement of Mr. Ramsey follows:]

The House Energy & Commerce Committee
Subcommittee on Commerce, Manufacturing, and Trade

“Where the Jobs Are: There’s an App for That”

Testimony submitted by Rey Ramsey

President & CEO at TechNet

September 12, 2012

Executive Summary

This statement discusses research sponsored by TechNet that developed an **estimate** for the number of jobs that have been created by the mobile apps that people download to their smart phones or tablet computers. The study, entitled **“Where the Jobs Are: The App Economy,”** finds that:

- At the end of 2011, the App Economy was responsible for approximately 466,000 jobs.
- Some 311,000 jobs are directly supported by mobile apps, with another 155,000 brought about by buying power created by workers developing mobile applications.
- Apps employment is distributed widely throughout the United States. Apps jobs cluster in places one would expect – New York, San Francisco, and the San Jose area – but are also found in places such as Chicago, Atlanta, and Philadelphia. The relative ease with which to participate in this sector means apps developers do not necessarily have to work in traditional tech hubs.
- Apps job growth has taken place in the context of extremely fast adoption of smart phones & tablet computers in the United States. As of early 2012, nearly half (46%) of Americans have a smart phone, up from just 17% in 2009. This adoption rate easily exceeds that for home broadband adoption. Some 19% of Americans have a tablet device as of early 2012; this is double the number that had a tablet in late 2010.

With future improvements in the functionality of mobile devices and the growing ubiquity and speed of broadband networks, the prospects are bright for innovation, entrepreneurship, and job creation in the Apps Economy.

Testimony

Madame Chairman, it is a pleasure to appear before your committee this morning to discuss how “mobile apps” generate jobs in our economy. My name is Rey Ramsey and I am the President & CEO at TechNet, which is the policy and political network of CEOs that promotes the growth of technology and the innovation economy. TechNet applauds the leadership role that this Committee plays in helping to foster innovation in the United States and appreciates the opportunity to discuss this important topic.

I will focus on three things today:

1. How mobile applications that ride on the smart phone platform contribute to job creation in the United States;
2. How the breathtakingly fast adoption of smart phones & other mobile devices in the United States has helped drive the creation of the app economy; and
3. Finally, how we can work together to continue driving economic growth in this exciting new sector.

Job creation

The past few years we have seen an incredible rise in the number of people using smart phones and tablet computers. Smart phone users cut across the population – they represent every age, social and economic category. Why? Everyone can benefit from them. These devices are multifaceted tools for communicating with others, sharing content, and getting information via specialized software programs – or apps – that let users have a wider range of online experiences.

On an economic level, each app represents jobs— for programmers, for user interface designers, for marketers, for managers, for support staff. This total number of jobs at ‘pure’ app firms such as Zynga, a San Francisco-based maker of Facebook game apps that went public in December 2011. App Economy employment also includes app-related jobs at large companies such as Electronic Arts, Amazon, and AT&T, as well as app ‘infrastructure’ jobs at core firms such as Google, Apple, Facebook and Microsoft. Earlier this year TechNet decided to assess the impact of apps’ development on the job market.

To do this, TechNet contracted with Dr. Michael Mandel of South Mountain Economics to develop an estimate of the number of jobs associated with the Apps Economy. The result was TechNet’s February 2012 report, “**Where the Jobs Are: The App Economy**,” submitted for the record. Understanding the impact of apps on the job market is no easy task. This is a new and evolving sector of the economy, which means it, is difficult for government statistics to keep pace. There is today simply no entry that says “apps jobs” in Labor Department numbers.

To overcome this hurdle, the TechNet report did several things:

- First, we used “The Conference Board Help-Wanted Online” database to get a current (as of the end of 2011) snapshot of want ads for jobs advertising for apps development. That database showed that 4.7% of ads for tech jobs were for apps development.
- We then estimated, using standard assumptions about how the number of want-ads relates to overall employment, how many people were **directly** employed in developing apps.
- And then used conservative employment multipliers to estimate how many jobs are **indirectly** supported by apps development (whether they are support functions in a developer’s company or nearby jobs created by new spending from apps developers).

The results were striking. At the end of 2011, the App Economy was responsible for approximately 466,000 jobs in the United States – up from zero in 2007. The figure for direct App Economy employment (311,000) is slightly greater than the number of jobs in the software publishing industry and just less than half the number of jobs in custom computer programming.

The other surprising dimension we found is geography. Apps jobs are distributed throughout the United States. The New York City region leads the way in apps jobs, with 9.2% of these jobs there, followed by the San Francisco area (8.5%) and the San Jose area with 6.3%. But we also see places perhaps less associated with the tech economy having sizeable apps jobs figures. For instance, Chicago has 3.5% of apps jobs, Atlanta 3.3% of apps jobs, and Philadelphia has 1.9% of apps jobs.

The barriers to entry to developing apps are fairly low; if you have a computer, broadband connection, and the right skills and software, and you can start coding. This means that an apps developer need not necessarily be tethered to a specific region in order to participate in this sector.

But the benefits to the economy and society are not limited to apps jobs. Almost a million apps have been created for the iPhone, iPad and Android alone, greatly augmenting the usefulness of mobile devices. Want to play games, help your kid with her homework, track your workouts, or learn a new language? There's an app for that.

The Apple store has 20,000 education apps alone. These apps can help teacher keep current with advances in their field or employ multi-media to make dry subjects more exciting. Chemistry teachers are using apps not just to memorize the periodic table but understand it. For a kid with a learning disability – we're finding that these apps can be a game-changer.

At TechNet we see the potential of apps to help a diverse population. TechNet's sister non-profit, ConvergeUS, is working with the Military Family Association to create an

app that helps military families with the unique challenges that they face. Things like finding a doctor in a new town or helping track their kids' progress in a new school. The possibilities are limited only by our imagination.

Otherwise – the app economy is not just creating jobs nationwide – it's helping our nation's diverse population live better lives. It's an economy worth preserving and promoting. All stakeholders – from consumers to entrepreneurs to policy makers must work together to cultivate an environment in which this innovation can flourish.

Smart phone & Tablet Adoption in the United States

The apps economy is built on a foundation of smart phones and tablets. As these devices have become more popular so have apps – and vice versa. According to the Pew Research Center's Internet & American Life Project, Americans have been embracing smart phones at a truly rapid pace.

- In 2009, 17% of adult Americans had a smart phone
- In 2011, 35% of adult Americans had a smart phone.
- In 2012, 46% of adult Americans had a smart phone at home.

Let's put those numbers in context. By historical standards, Americans adopted broadband at home at a very fast pace. It took roughly 9 years for broadband to reach 50% of American households. For the personal computer, it took 18 years to reach 50% adoption and for the cell phone it took 15 years.

Smart phones are a breed apart. It was just five years ago that the iPhone was introduced. Since then, nearly 50% of all Americans have gotten a smart phone. To frame the comparison differently, it took two years for home broadband adoption to grow from 37% to 47%. Smart phones travelled that same path in just 10 months time. On a global scale, sales of smart phones increased by 63% from 2010 to 2011, from 298 million units to 486 million.

Tablet computers add another dimension to mobile connectivity. By early 2012, according to Pew, 19% of Americans had a tablet computer (such as an iPad), up from 10% in the fall of 2011.

Smart phones, tablet computers – and the apps that enhance their usefulness – are part of the collection of information and communication technologies that fall under the label of general-purpose technologies. These technologies (such as personal computers or broadband networks) engage consumers, but that also serve as platforms for innovators to create new products, services, and jobs. They allow creativity to be transformed into social and economic value for everyone.

As mobile devices become more powerful and broadband networks become faster and more ubiquitous, this process will accelerate, with benefits to the economy in terms of job creation, investment, and entrepreneurship.

But phone sales alone will not drive job creation in the app economy. Apps will only flourish in the right environment. To sustain and grow this economic activity, Congress should focus on the broader issues of infrastructure and access. We need a national infrastructure that promotes access to spectrum, broadband adoption, working capital, and human capital. And we need to ensure that everyone – from academia to minority communities to vets – have easy access to apps.

Creating the right environment for such innovation is the challenge before us. TechNet's members span the innovation spectrum. We represent everyone from the CEOs in the Fortune 10 to the young entrepreneurs who just moved out of the garage. Large or small, publicly traded or in the first round of angel investment, tech industry leaders agree that success in this sector relies on a delicate balance of federal investments in basic scientific research, access to the right talent, and the freedom to innovate.

In recent years, federal, state, and local governments have considered multiple proposals relevant to the tech industry, such as combating online piracy, improving cyber security, and expanding access to high-speed wireline and wireline Internet services and networks. These are complicated, technical issues – and the wrong approach could have unintended consequences. As the Apps Economy report shows, the potential for job growth is tremendous.

As Congress continues to explore these other issues, it is essential that we all work together to get it right. We applaud the Chairman's methodical approach in exploring these issues and look forward to working with all of you as you continue to explore these matters.

Mrs. BONO MACK. Thank you, Mr. Ramsey.

And Mr. Reed, welcome back to the subcommittee. It is nice to have you back. You are recognized for 5 minutes.

STATEMENT OF MORGAN REED

Mr. REED. Thank you, and I have to say before I even get to my time which is that don't steal all our people for your big companies. Us small folks still need employees. We have to be able to compete.

Chairman Bono Mack, Ranking Member Butterfield, distinguished members of the committee, my name is Morgan Reed and I am the Executive Director of the Association for Competitive Technology, a trade association representing over 5,000 app makers from around the world. Our members are on the forefront of the most exciting tech sectors to emerge in a generation. You may have already heard these numbers but they bear repeating. We are a \$20 billion industry today that didn't exist 4 years ago, and analysts expect us to hit \$100 billion by 2015.

Now, we all know about the rise of smartphones, and I have already seen several of you checking your email, and we know about reading maps and looking at sharing photos and managing everyday activities through wireless devices. But what we are seeing now is an apps economy that is moving beyond games and consumer tools to become a critical part of enterprise, health and financial services.

In order to provide the committee with new insights, we conducted a study we called Apps Across America in preparation for the hearing, and I thank several of you for quoting us on some of the numbers that we have gotten out of here, but to focus on a couple, we all know that small businesses are the engine of job creation occupying over 70 percent of the top-selling apps, and we found this is even more pronounced in highly innovative activities where large revenue sources are available. This is a phenomenon happening outside of Silicon Valley, and with all due respect to California, I love the fact that we have got developers in Louisiana, in Mississippi, in Michigan, and I like the fact that we are seeing the spread move around.

In your briefing folder, you will find a set of baseball cards that we created to underscore this point. There is one for every district represented, and I couldn't find any of that horrible gum we all had as kids, but I tried. You know, Marsha Blackburn was here, and I want to focus on the way that these folks are looking at it. You know, from her district, we have a true MVP. They have had over 30 million downloads on apps that they have created. This company in her district, Mercury Intermedia, huge success. This is a MVP, a perennial all-star. In New Hampshire, we have Police Pad. Zco is building an enterprise app that puts iPads in police cars and replaces all of those laptops that you see in cars—better battery life, more efficient, all sorts of new sensors, great tool. These guys are definitely an all-star. In Bono Mack's district, we have got a rookie card, and with Apps 111, this is a company that I am looking forward to becoming more successful. And just like any rookie card, I don't just want the card to become successful, I want the business to become successful. I would love for members to be able to trade that card. I remember when they started. Now they are

100,000 people or there are 50,000 people. So when you look at this deck of cards in front of you, this is your MVPs, this is your starting lineup of your small business community today.

Now, we all now about Apple's innovation and the ubiquity of Android but, you know, it is worth mentioning that it is not just those two. BlackBerry is the go-to platform for security-focused customers and earns more frankly for our developers per app than any other platform, and of course, just last week Microsoft and Nokia kind of upped the game, unveiling the Lumia 920, which featured wireless charging, which I am so happy for, and of course had near field communications so that you can actually purchase goods and services directly from your phone without having to pull out your credit card at all. And of course, today after this hearing, we will see what Apple does to up the game again. They have got Passbook on there that allows mobile payments to pay for coffee at Starbucks, but what I love is it features an app that allows you to check in at the airport directly built into a secure feature on the phone.

So what is next? Mobile health care apps are going to change the way doctors interact with patients. Companies like AirStrip have built an app that allows doctors to monitor fetal heart rates in women in labor directly on their iPad. Enterprise will use phones and tablets at every level. Aegis Software has built an app that allows them to monitor an entire factory floor directly from the iPad.

And I brought this. This is July's Fortune magazine cover, and it has declared the death of cash. Well, you would say, how is that possible? But PayPal, Intuit and Square have turned a mobile phone or an iPad into a point of sale and a cash register. See those little things on the top? Swipe your card and away you go. That is your cash register.

You know, in the movie Princess Bride, the protagonist famously responded to the word "inconceivable" with the retort "You keep using that word. I do not think it means what you think it means." But for the future of the apps economy, "inconceivable" is the most appropriate word. Industry and government cannot yet conceive of the ways that apps will become part of our lives. From basic consumer uses to health, travel, education and even talking to one another, our app economy built by small businesses seeing and meeting a specific need has endless and inconceivable possibilities. We hope to keep creating never before conceived of products and we hope the government can be a partner where needed, take advantage of products where they help service the public, and take a light-touch approach everywhere else.

Thank you for your interest, and I look forward to your questions.

[The prepared statement of Mr. Reed follows:]



Testimony

of Morgan Reed

Executive Director

The Association for Competitive Technology

before the

Committee on Energy and Commerce

Subcommittee on Commerce, Manufacturing, and Trade

on

Where the Jobs Are: Moving the Economy with Mobile Apps

September 12, 2012

Chairman Bono Mack, Ranking Member Butterfield, and distinguished members of the Committee: My name is Morgan Reed, and I thank you for holding this important hearing examining innovations in the online space and the implications for public policy.

I am the executive director of the Association for Competitive Technology (ACT). ACT is an international advocacy and education organization for people who write software programs—referred to as application developers. We represent over 5,000 small and mid-size IT firms throughout the world and advocate for public policies that help our members leverage their intellectual assets to raise capital, create jobs, and innovate.

While I am here today on behalf of our members, I am also here representing myself—I am a developer as well. Having worked on projects ranging from Linux networking tools to client/server protocols, I still keep my iOS license up to date, even if I no longer have the cutting edge skills of my younger days.

My goal today is to explain the evolving nature of the mobile application industry, the business challenges we face, and the public policy issues that we encounter.

Specifically, app developers have three key messages for the members of the Committee:

1. **The app ecosystem is an unqualified success story led by U.S.-based small businesses with significant geographic diversity.**
2. **Apps are moving beyond the obvious consumer entry point and are expanding into mobile health, enterprise, and other networked devices.**
3. **Our public policy challenges include inadequate bandwidth and spectrum, intellectual property (IP) protection abroad, regulatory clarity for new markets including health, and proper consumer data privacy protection.**

The App Ecosystem and Job Creation

I spend a significant portion of my time speaking to non-developer audiences who want to know about the state of the mobile apps economy. Unlike other industries, I find that I have to update my numbers for every speech, not just once or twice a year. Just two years ago, total industry revenues were \$3.8 billion and expected to rise to \$8.3 billion.ⁱ However, by the end of last year we already reached \$20 billion and are now projected to reach \$100 billion by 2015.ⁱⁱ This is a meteoric rise for an app economy that didn't even exist four years ago.

The explosive growth of smartphones and tablets is enabling the success of the app economy. Sales of these devices continue to outpace all predictions and are providing a huge boost to our economy. Total smartphone sales in 2011 reached 472 million units and accounted for 31 percent of all mobile device sales, up 58 percent from 2010. In the United States and Europe, smartphones sales have overtaken feature phones and the gap is widening.

Smartphones derive considerable value from the apps that run on them. Consumers are attracted to phones based on the functionality these programs provide. Telephone companies

and handset makers have devised entire ad campaigns highlighting apps run on their platforms. "There's an app for that" is probably one of the most recognizable ads in the technology space.

It should come as no surprise that the growth of the app industry has been a dramatic success story, even in the face of our enduring economic slowdown. While both Blackberry and Microsoft had early app stores, the app market received a huge boost in 2008 when Apple launched the App Store which tied to its iPhone and allowed independent developers to sell applications. Since then BlackBerry users have downloaded over 3 billion apps from more than 28,000 developers, Android downloads have hit 20 billion, paying \$550 million to developers, and over 30 billion apps have been downloaded for Apple's iOS, earning developers over \$5 billion dollars.

This success has had a dramatic impact on job creation. ACT's study in 2011 estimated that the current mobile apps economy has created, saved, or supplemented more than 600,000 jobs nationwide across iOS, Android, Windows Phone 7, and Blackberry platforms. Another study by TechNet showed nearly 500,000 jobs created by the app economy on the major platforms alone.

ACT July 2012 Study of Top 800 Apps: Findings and Analysis

ACT has recently completed a new analysis of the current mobile app ecosystem, this time examining apps not only by revenue, but also by type. We looked at the top 800 apps across the Productivity, Education, Business, and Entertainment categories.

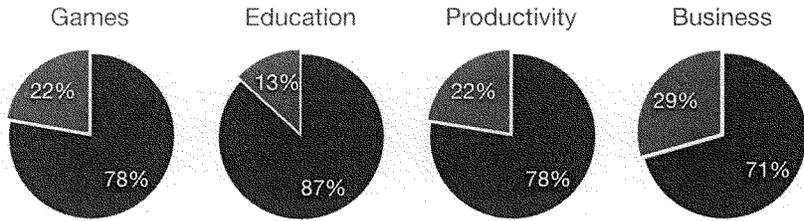
The results of our research showed three key results:

- 1. Seventy eight percent of the top U.S. app developers are small businesses, with companies based heaviest in California, but with significant regional diversity, especially in Business and Education applications.**
- 2. Games dominate the app store revenue charts and the vast majority of the highest revenue apps use in-app purchasing.**
- 3. While the presence of foreign app companies in the American market is growing, U.S. developers still make up a wide majority of apps and even command a 22 percent share of Chinese app market revenues.**

BIG VS. SMALL

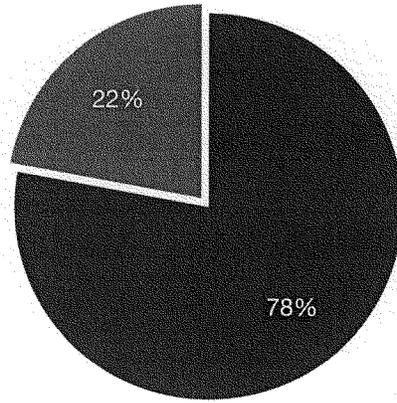
Size of App Developers by Category

Consistent with findings from earlier ACT research, we found that the vast majority of U.S. mobile app companies – 78% – are small businesses.



Average Across All Categories

- Small Business
- Large Business

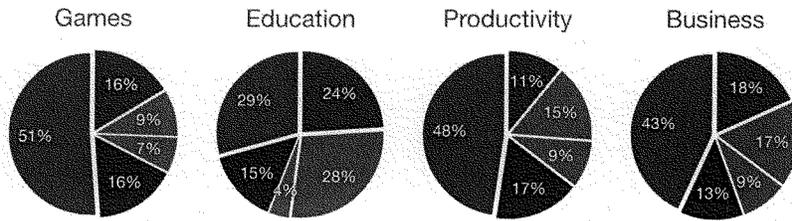


According to a 2011 study by the Small Business Administration Office of Advocacy, small business is where innovation and job creation are at their greatest and this is reflected in the types of apps that are succeeding.ⁱⁱⁱ Our research found that 87 percent of education apps and 78 percent of game apps were made by small business companies. Particularly notable in these innovative categories are education apps on tactile mobile devices that make education concepts accessible to the very young, and touchscreen game apps that are tremendously successful, appealing to all age ranges.

The business category had the highest number of apps distributed by large companies, due primarily to the number of apps developed by large businesses to connect mobile users with their existing services, such as PayPal, UPS, and FedEx. However, a poll of our members suggests that many of the “large business” apps were not built internally, but were built by small contract app development companies, like Zco, based in New Hampshire, or Vertigo from California.

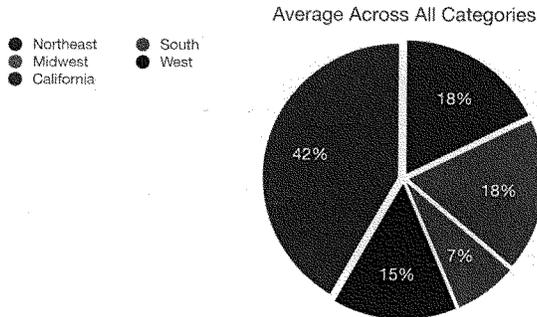
APPS ACROSS AMERICA

App Developers Span the Entire Country



The geographic diversity of app companies varies greatly among categories. Over half of the top game apps are produced internationally (52 percent) and among U.S. mobile game companies, 42 percent of the top apps were developed in California.

However, more geographic diversity can be seen in other categories. Sixty eight percent of the education games were made by U.S. app makers and at least 60 percent of those were made by companies located outside of California. Similar dominance of the U.S. market can be seen in business apps, where U.S. app companies made over two thirds of the top apps.



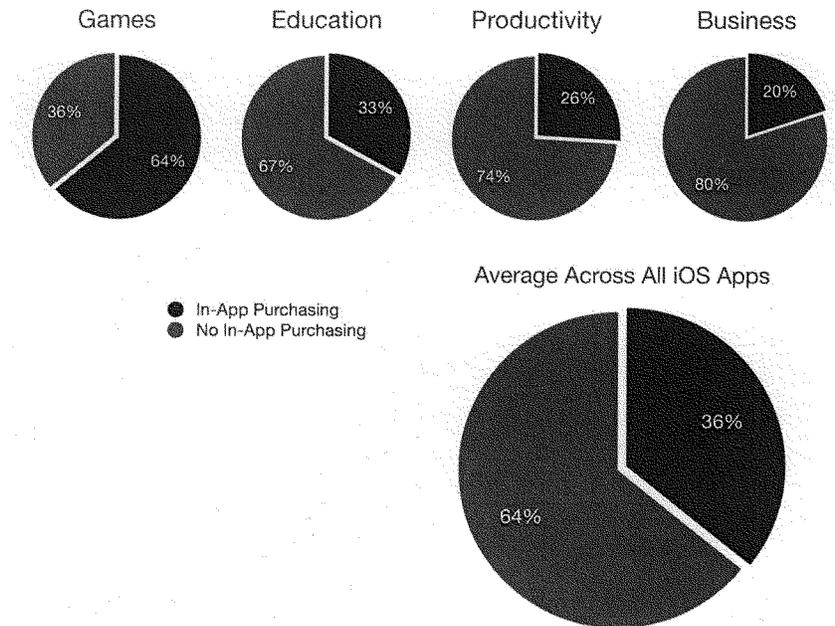
RISE OF IN-APP PURCHASING

Games Dominate, but Other Segments Find Uses

Almost all of the top-grossing mobile apps are games; they make up 84 percent of the top-grossing apps on both the iOS and Android platforms. This is an area where we are seeing the most dramatic changes in the mobile marketplace and much of it has to do with the growth of in-app purchasing. This business model allows users to make purchases within the app without having to return to the app store. Typically, these added expenses are for additional features or new game levels.

According to leading mobile app analytics company Flurry, in 2011 24 percent of revenue from mobile came from mobile advertising, 24 percent from app sales, and 52 percent from in-app purchases.

Research firm IHS predicts that in-app purchasing will generate \$5.6 billion in 2012, up from \$970 million in 2011.^{iv}



New Opportunities to Grow

While current research has focused on consumer facing mobile apps, there's another wave of innovation on the horizon. Mobile apps will have a significant impact at the enterprise level over the next 12 to 24 months, with nearly every major corporation and government agency publicly adopting tablet computers, instituting bring your own device (BYOD) policies, and developing internal application "stores" for use by employees and contractors.

This sea change will improve efficiencies and create new workflows inside of corporations, but it also provides real opportunities for developers to expand beyond the 99¢ price point or ad-supported models.

Educators are also exploring the benefits that app-powered tablet devices can have in the classroom. Just a few months ago, the state of Alabama passed legislation that would give every student a tablet to use for books and class work. This will provide every student access to advanced learning tools that touchscreen devices provide, while also reducing the weight of our children's backpacks. The dramatic success certain apps have in providing individualized teaching and assistance to special needs children cannot be understated.

We also see great potential for mobile apps to lower costs, improve health outcomes, and healthcare delivery. I'm honored to be on the advisory council for mHIMSS, the mobile initiative of the largest health IT membership association. Through ACT and organizations like mHIMSS, our members are working on improving healthcare through the use of mobile and wireless technologies.

Finally, the form factor you think of today is already obsolete. Apps provided through a managed or "curated" storefront will be part of every connected device in the future. You won't connect your phone to your car to use an app, your car will have apps all on its own.

Digging Deeper on Mobile Health

The opportunities for apps within healthcare are extraordinary. Wireless patient monitoring alone is expected to be \$20.9 billion business in U.S. by 2016, and the U.S. government has already committed \$38.7 billion to help doctors convert from paper to electronic health records.

But both remote monitoring and electronic health records start as analogs to how we do things in today's non-digital world. There is a new set of opportunities for mobile apps to help improve patient care by adding new kinds of treatment, and even as a prescribed part of a patient's treatment.

One company that is exploring this possibility is Happtique. Happtique is a startup created with a goal of developing an internal applications store for hospital systems that manages, monitors, and plans to certify health care apps. While it is a startup, it is a subsidiary of the Greater New York Hospital Association (GNYHA), an association comprising nearly 250 hospitals and continuing care facilities throughout New York New Jersey, Connecticut, and Rhode Island.

Happtique is now launching a trial program that would enable physicians to prescribe mHealth apps to patients. They believe (and the existing research supports) that increased physician-to-patient engagement will increase the likelihood that patients will take their medication and monitor their health conditions more closely (e.g., provide innovative physical therapy tools for musculoskeletal conditions, and allow fitness specialists to monitor the improvement of patient conditioning).

Happtique has built a trial prescribing catalog on both the iOS and Android platforms which will give doctors in the program the ability to prescribe an app, and have that app be part of a treatment that is understood by payers, providers, and patients.

If Happtique's model is successful, we fully expect that internal app stores will provide patients and doctors a new way to have access to valuable technology in a safe, tested way.

What is "Mobile" Anyway?

While we currently look to our phone or tablet when we discuss apps, we may be soon turning to our automobile. In March of 2011, Tesla announced that the much-hyped Model S electric sedan will support third-party apps and text-to-voice capabilities.

Tesla CEO Elon Musk said:

"We want people to develop car-specific applications [for the Model S]," he told the audience. "And text-to-speech technology can address some of the issues with driver distraction."

The Tesla S features a 17-inch touchscreen console, and car fans and investors have long suspected apps might be part of the Model S plan. However Musk's decision to make this touchscreen available to third-party developers is a major move forward for the developer community.

Microsoft's Xbox has become a huge hit with kids, but the facial and body recognition software that powers the Kinect has been harnessed by app developers to provide "touchless" operating room technology that allows doctors to manipulate and view X-rays and records without violating the sterile surgical environment.

Public Policy Challenges to Our Amazing Growth

For app makers, our public policy concerns fall into three basic categories: making sure we can get our applications to customers, that our property rights are respected, and that we have regulatory clarity for new markets (including health) and data privacy.

Getting the App to the Customer

While our apps are tethered to devices, the real value often comes from our devices being untethered to any specific location. With ubiquitous high-speed networks, IT workers can remotely monitor the health of their infrastructure; employees can participate in online business meetings; students and professors can take part in online discussions, all wirelessly. Content of all sorts, from work documents to entertainment, can now be stored and accessed from "the cloud" with availability anywhere there is a mobile signal.

But all of these applications require wireless bandwidth dependent on increasingly congested spectrum.

Moreover, our developers have not stopped innovating, and neither have the devices on which we run. Improved mobile device resolution and increased wireless speeds will pose new challenges for app developers rooted in scarce spectrum. For example, Apple's newest iPad has a "Retina" display with a greatly improved graphics resolution capable of delivering high definition entertainment and gaming content to consumers. Apple's competitors can be expected to follow suit. These advancements will provide additional opportunities for app developers to create innovative apps that utilize these capabilities.

However, the very act of finding new, innovative ways to utilize improved screen resolutions creates serious bandwidth challenges. Carriers are rolling out LTE and other 4G wireless capabilities which improve the speed at which users can consume video and other data-intensive content, but the capabilities of tablets already put pressure on these networks. For example, apps created for the newest iPad must contain graphics with a much higher resolution than previous generations. This will result in larger graphic files, nearly doubling the overall size of many apps. In order to limit the wireless bandwidth consumed by purchasing apps from Apple's App Store, apps over 50MB in size can only be purchased through a WiFi connection, not through 3G or LTE networks. This is an increase from the 20MB limitation just a few months ago, and reflects the more data intensive requirements of the latest devices. But that's still not enough. Studies have shown that eliminating consumers' ability to buy apps over 3G or LTE networks depresses sales by 40%.

As faster 4G wireless networks are rolled out, the spectrum shortage will only get worse. It has been estimated that in 2011, the average 4G connection generated 28 times more traffic than the average non-4G connection. Mobile data traffic is further expected to increase 18-fold between 2011 and 2016.

Continued innovation will make spectrum use more efficient, but also increase demand for ever-more spectrum. While app developers have cheered the recent legislation authorizing spectrum incentive auctions and more unlicensed spectrum, new and existing spectrum must be administered in the most effective way possible, and secondary markets must be allowed to function, bringing new spectrum to customers right now.

International Opportunities Have New Risks

While piracy has historically posed a challenge for developers across the world, the emergence of mobile app stores has offered a partial reprieve. Apple, Microsoft, and Blackberry sell apps in curated stores. Phone users can only install apps through a store that reviews each piece of software before approving its admission. Although some developers chafe at the control these stores exert and the conditions required in the approval process, they largely appreciate that stores greatly cut down on the piracy rate.

Each app installation from a curated store—even free apps—involves a transaction record. This has cut down on pirated sales, relegating them to open platforms such as Android where they proliferate as free downloads. It is still possible to hack phones to provide access to alternative app stores where pirated apps can be found, but this involves technical expertise and voids the

terms of service. Since this action denies the user access to technical support, upgrades, and virus protection, most Americans opt not to pursue this illicit route.

In China, however, this has not been the case for multiple reasons. The incidence of hacked or “jailbroken” phones is high, with estimates as great as 60%. Combined with China’s traditionally lax enforcement of intellectual property rights, U.S. developers’ export opportunities could be limited at the very time they should be rising.

Healthcare Needs Disruptive Change, but Not at the Cost of Safety

App developers have seen enormous growth in the healthcare space, but confront significant barriers to entry created by regulatory rules that have not kept pace. HIPAA is a critical regulation for protecting the privacy of patients, but its implementation can create challenging barriers for the display and storage of a patient’s information, barriers which neither enhance care, nor privacy protection.

FDA regulations governing what app is and isn’t a medical device have been slow to materialize. We are cautiously optimistic that the FDA will publish its final guidance soon, and we expect it will take the “light touch” approach specified by Dr. Jeff Shuren, the FDA’s director of the Center for Devices and Radiological Health.

However the contours of the FDA’s definitions have significant consequences for businesses and innovation. Questions remain regarding what qualifies as a regulated mobile medical app and what apps the agency will not regulate. Similar questions exist regarding the scope of regulation for clinical decision support software. When developers cannot tell the precise contours of a regulation, it suppresses and delays innovation – innovation that can lead to thousands of jobs while also improving Americans’ healthcare.

We hope to work closely with the FDA and members of the committee to make sure that the FDA provides useful guidance, applicable in real world situations, about what is subject to, and exempt from, regulation.

We encourage the FDA to provide extensive examples and meaningful rules to define the scope of regulation. Additionally, we ask that the agency clarify the process steps (*e.g.* online documents, online submission). Clear rules that are easy to apply will encourage developers to create useful, innovative applications instead of sitting on the sidelines because of uncertainty around status and timeliness of FDA decisions.

The Future is Inconceivable

In the movie *The Princess Bride*, the protagonist famously responded to the word “inconceivable” with the retort “You keep using that word. I do not think it means what you think it means.” But for the future of the apps economy, “inconceivable” is the most appropriate word. Industry and government cannot yet conceive of the ways that apps will become part of our lives.

From basic consumer uses to health, travel, education, and even talking to one another, our app economy (built by small businesses seeing and meeting a specific need) has endless and inconceivable possibilities.

We hope to keep creating never before conceived of products, and we hope that government can be a partner where needed, take advantage of products where they help serve the public, and take a light touch approach everywhere else.

Thank you for your interest and I look forward to your questions.

ⁱ Clint Boulton, "Apple, Google Lead \$3.8B Mobile App Charge: IHS" eWeek.com (May 5, 2011) available at <http://www.eweek.com/c/a/Mobile-and-Wireless/Apple-Google-Lead-38B-Mobile-App-Charge-IHS-512817/>

ⁱⁱ "How Big is the US App-Economy? Estimates and Forecasts 2011-2015" Appnation and Rubinson Partners, Inc. (November 30 – December 1, 2011) available at <http://www.slideshare.net/joelrubinson/an3-us-app-economy20112015>

ⁱⁱⁱ "Small Business Economy 2011" Small Business Administration Office of Advocacy (2011), available at http://www.sba.gov/sites/default/files/SBE_2011_2.pdf.

^{iv} Jack Kent, "In-App Purchases Will Dominate the Smartphone App Business," IHS (January 17, 2012), available at <http://www.isuppli.com/Media-Research/News/Pages/In-App-Purchases-Will-Dominate-the-Smartphone-App-Business.aspx>; Molly Wood, "How to Make Money on Mobile, in Three Easy Steps," CNET (June 1, 2012), available at http://news.cnet.com/8301-31322_3-57445089-256/how-to-make-money-on-mobile-in-three-easy-steps/?tag=mncol;txt.

Mrs. BONO MACK. Thank you very much to the panel, and the Chair will now recognize herself for the 5 minutes for questions, and I will also point out to anybody standing that there are plenty of seats available. If they say “reserved” they were reserved for you, so welcome.

I just wanted to start with something kind of shameless, and that is showing everybody this amazing photograph of my grandson, Little Sonny, and the only reason I am doing this is, I was babysitting him a few nights ago and he decided to have a crying fit, so I did anything any good grandmother would do is, I went right to the App Store and downloaded a baby soother. It didn't really work, but my point was that we are becoming habituated. You have a problem; you go to the App Store and you find a solution to any problem you might have.

Now, not unique to babysitting, you know, guys should baby-sit their grandbabies too, but I am going to start with you, Ms. Hay. What is the key to getting more women involved in this area of tech?

Ms. HAY. I think it is outreach. I think most women I have met have almost always had another woman or a man mentor them, myself included, bringing them into the tech scene. There are a lot of women in tech groups in DC I know of. It is a matter of that sort of grassroots effort on the ground and at the same time making some programs that help to educate women on the opportunities that exist out there for them in tech. There is a general, I think, fear that women have that it is almost a badge of honor that men wear in Silicon Valley that they are going to be an entrepreneur, and if they fail, that is OK, and women generally tend to be more conservative. They take a more strategic approach to ensuring that they are building a business that is going to last and it is going to be fruitful. So I think, you know, balancing the programs that are available to them so that they can move a little more quickly and comfortably into the tech space I think would be a great step in the right direction.

Mrs. BONO MACK. All right. Thank you. Others have testified that apps jobs do not require being located in specific geographic locations and in fact are being created all across the United States. This is again to you, Ms. Hay. Do you see any future risk to the ability of app developers not located in the major cities producing apps because they are not part of a technology cluster?

Ms. HAY. I don't, no. In fact, Fast Customer, we have an entirely distributed team so I have a developer in Reston and then we have staff in Florida, Arizona, Hawaii and one right now walking around Cambodia somewhere. So for us to be successful, I think, in the mobile economy because of its speed requires a smart team, requires resources, doesn't require a specific geographic location, and it doesn't mean that we don't get together as we do in fact every quarter some amount of time to get together because, you know, getting together in person, great ideas can happen in a way that is more organic than what you can accomplish on line but that is also not a prerequisite to success.

Mrs. BONO MACK. Thank you.

Mr. Farago, a number of observers have compared the growth of the app field to the tech bubble of the 1990s. Would you agree with

that, and do we face a danger of a burst here, and if so, are there any steps the industry or policymakers should take to avoid that?

Mr. FARAGO. Yes, we talked about this a bit. We don't feel there is a direct comparison to the Internet era and that we don't face a bubble for several reasons. I would say first if you think about the amount of broadband-connected consumers at that time, there were about, I believe, 30 million. Now there is over 1 billion, so we have a totally different size market, to begin with. Secondly, you know, in that era, the real way to make money was to collect a bunch of eyeballs and then hope that advertising revenue would follow. In this era, advertising really hasn't kicked in as a revenue model and we are already seeing, you know, by our estimations, app developers last year made about \$5 billion worldwide directly to them, 80 percent of which was made from what we call premium sales selling an app, you pay \$2 before you get it, or in-app purchase or microtransaction, you buy add-on content afterward. This year we are forecasting developers directly will make about \$10 billion, double that again around 80 percent or plus. Advertising will take off and add a layer and so that will certainly help.

Also, if you compare the economic climates, you know, really, arguably, the app economy was built—you know, flowers have bloomed on top of the rubble of the largest worldwide financial collapse any of us can remember, and whereas, you know, it was pretty much the go-go time in the 1990s where there was a lot of venture capital flowing. So you have almost what has been proven to be a really recession-proof business model to begin with, or economy, really.

And finally, customers are able to pay and not just willing to pay, they have demonstrated they can. Every one of these devices has a credit card or gift card associated with it on average whereas, you know, back in the Internet days, you know, products, you know, all the services people assumed would be free and there wasn't that kind of payment-enabled market.

Mrs. BONO MACK. Thank you, and my time is expired so the Chair now recognizes Mr. Harper for 5 minutes.

Mr. HARPER. Thank you, Madam Chair, and thank you to each of you folks for taking time out of your busy schedule to be here, and Mr. Reed, thank you for pointing out the cards, particularly Mississippi State University athletics. I don't think you had time in your testimony to say anything about State beating Auburn 28–10 Saturday, but perhaps we can cover that. Perhaps we can find some statistics on the game on that app.

I also want to say, Ms. Hay, thank you for the work you are doing. I have a 20-year-old daughter. I have made it a point to make sure that she has opportunities to meet with successful women. It helps her in that regard and so thank you for that effort. I think that you may be getting a call from her some time in the future when she is visiting.

I do want to talk to you if I can for just a second, Mr. Farago, if I may. You said in your testimony, you mentioned the recent survey that was done by Flurry which found that 71 percent of the companies polled agreed with the statement that they needed more employees with technical training, and I wanted to bring to your attention the work that Mississippi State University has been

doing in the app field. Over the past several years, Dr. Rodney Pearson, who is a professor at Mississippi State in the Department of Management and Information Systems, I know he has worked diligently to develop courses in programming as well as business and entrepreneurial classes to prepare students for a job in the app sector or at least for an interest in the app field. Dr. Pearson and Mississippi State have been seen by many as a business and app incubator. So a few questions I have. One, is Mississippi State a special case or do you see many other universities offering similar courses at this time?

Mr. FARAGO. Well, you know, I don't have specific anecdotes about other universities but those kinds of innovative programs are exactly what we need. I think it is a supply-and-demand issue. I think that, you know, mostly when you grow up in the United States, you think about being a doctor or a lawyer, you know, maybe go to business but the technology field, growing the awareness of technology, encouraging those to get involved, K-12, making sure the foundation of fundamentals is there enables, I think, you know, great programs like the one Dr. Pearson is leading at Mississippi State to be possible. By the time that student comes to that university, they can and will be able to take advantage of, you know, what is a great, lucrative job field.

Mr. HARPER. How do you see this playing into the future growth of the app sector, this being offered in this university and perhaps others? Where do you see that taking the future, meeting those needs that you see in the app sector?

Mr. FARAGO. Yes, if I understand your question correctly, you know, I see it inside the United States as enabling a concept we call stake shoring. You know, it was mentioned that California and New York are the two main hubs for technology innovation and clustering of technology workforce talent. At the same time, I believe the median house costs about half a million dollars in each of those markets. You know, much like you have a match program for folks coming out of medical universities to go to all kinds of places around the United States to offer the same level of care, I think that the concept of stake shoring can really help, and as universities look to become more competitive in the education market, a lot of universities like Mississippi State can and should invest in the kinds of programs to attract that talent, and that will keep more talent in the local economy and allow that entrepreneurship to basically spread across the United States.

Mr. HARPER. How do we encourage other universities to be involved in this field and to move in that direction?

Mr. FARAGO. You know, I think there is probably a couple ways. I mean, I think education of educators is a good start. I mean, I think a hearing such as this one, sharing those statistics, the educational field from my experience is pretty connected as a cohort, as a group. I think that government could definitely help with maybe partnering with the private sector, for example, and there could be matching programs to create more endowments and, you know, education, you know, basically paying for a student's education. You could creatively after the fact help—you know, if you have a company that is investing in an area local to a university and they have a partnership with that university, for example, you

know, there could be some sort of increased modest taxation of that developer's salary to pay back, you know, what was a gift basically for the cost of education and so on. There are a number of ways I think those who have skin in the game, private sector and university, can get together and figure those things out.

Mr. HARPER. I want to thank each of you for being here. With that, I yield back, Madam Chair.

Mrs. BONO MACK. Thank you very much, and the Chair recognizes Dr. Cassidy for 5 minutes.

Mr. CASSIDY. I had a really nice conversation yesterday with a couple of app developers from my own State, and just a couple things that I would like your perspective on, not that there will be necessarily be an answer, but clearly we are coming to you for your perspective, which is key. One of the things we have had several hearings on is privacy. They kind of alerted me to the fact that is really an issue: who owns the data? If I put a picture up, do I own the picture or does the app developer or does the server? Who owns the data? So any thoughts on the privacy? Because, again, when I get a 50-page document and I click "I agree" at the very bottom, I have not read those 50 pages, I have just clicked "I agree" and I almost think that might be a strategy by the attorneys to get me to agree; they just overwhelm me. Once I actually read it, and it was so redundant, some of the pages were literally cut and pasted multiple times and we are thinking this is just a strategy to overwhelm me, and it frankly works all the time.

So that said, what are your thoughts as to who should own that data? How personalized should we allow it be? Because that is something that we have pursued in this committee, that discussion.

Mr. MORGAN. Well, I think it is kind of two questions in one. You have a question of who owns what, and that is an important question. We have always in this country had a kind of a pretty straightforward attitude towards information that I willingly provide. If you think of this way, if you had a 13-year-old daughter and she walks into Forever 21, or I guess I should say 16-year-old daughter walking into Forever 21 and they get her information and her email address to send her information, it had nothing to do with online, it didn't have anything to do with a mobile app, but Forever 21 now has information. They have the store that she bought at, what she purchased, her email address, and Forever 21 considers that part of their information, and again, she didn't read through a 50-page click memo or anything, she just signed up right there in the store. So we have had a pretty good tradition in this country of allowing folks to enter into those kinds of agreements freely because they benefit from it.

So you have that question of, you know, who owns the data and how do they collect it, but I think the other side is, what we are focusing on is, how do we do a good job of being transparent, which you pointed out wasn't done well in the example you cited. A 50-page document is not transparent. So what we are working with developers on, and in fact this Friday, I will be speaking to an audience of about 500 developers at Mo Def Tablet here on the East Coast and I will be talking about ways to increase transparency to build better trust. So on the trust aspect, we need to do a better job. We are working on it, and in fact, we are participating with

the White House as part of the NTIA multi-stakeholder process to find best practices and common ground between the entire stakeholder community to find ways to take a small device and present a 50-page chunk of information in a way that is absorbable, understandable and usable by consumers. And I think once we get there, we will be able to help your person who commented about 50 pages have a better sense of what is happening and be more comfortable with it.

Mr. RAMSEY. I would like to comment on that. Obviously, it is a complex issue and, you know, as my colleague here, Mr. Reed, said, you know, you have got the transparency issue and you have got the consent issue, and they are interwoven. What is important while we are trying to sort through how to get to a common understanding of consent and transparency is to keep a few things in mind that we need to do along the way. One is, we need to make sure that everybody understands what the business models are and how these business models rely on certain data. They are not mutually exclusive, but we need to understand that because there are unintended consequences. So all this growth that we are describing, whether it is small businesses or larger businesses, are all part of this ecosystem of mobility, and that is really what the issue is. I mean, we are having this conversation about apps but it is really all about the mobile revolution, and apps are a part of the mobile revolution.

The other issue would be, we have got to do more to have citizens understand, consumers understand not only what their rights are but what their responsibilities are and that they are leaving behind a digital footprint all the way from—

Mr. CASSIDY. So you are suggesting that indeed the developer or the server does own the data. If there is a digital footprint, you are suggesting that footprint is no longer mine?

Mr. RAMSEY. It is data that exists, and the question is where that data will reside, so I am not using the word “ownership.” It is about where the data resides.

Mr. CASSIDY. So that picture that she just showed us, could that be used by the person where she stores it as a Gerber baby commercial without her permission? Do you follow what I am saying? So is that picture of her grandchild—by the way, she is the best-looking grandmother I have ever seen. With that said, that picture of her grandchild, could that in turn—do her daughter and son-in-law or whatever, or does the person on whom it is stored get to sell it to Gerber as the next image?

Mr. RAMSEY. I can't comment on whether or not they are going to sell her—the Congresswoman owns her picture. The question is where that resides, and it resides in multiple places so it is not a question of who owns it, it is more about what the data is being used for and understanding for the Congresswoman in this example what does she know, which means, you know, in favor of her knowing what the basis of the bargain is, and that is the transparency that I am talking about, what her rights and responsibilities are. That is what I am trying to sort out. It is not about that another company would own the picture.

Mr. CASSIDY. I am still not sure that we know that the company could not use that picture, but I am way out of time, and I had another question but I will yield back.

Mrs. BONO MACK. We will do a second round after we go through everybody the first time, and thank you very much for the questions, and the Chair recognizes Mr. Kinzinger for 5 minutes.

Mr. KINZINGER. Well, thank you, Madam Chair, and I thank you all for coming out. I think this is a very important issue we are discussing.

You know, one of the concerns as we have seen apps develop, we obviously see and many of you have testified that it is really going to be generating GDP growth. It is kind of the next generation of where we are seeing a lot of jobs come in. I have a lot of cool apps on my phone that I use for a lot of various things, and you know, if you ever find yourself with the need for any kind of data or any kind of organizational tool, you will find it on your phone somewhere. Somebody has created it. So I think it is an outstanding obviously driver of the future.

First question to Ms. Hay. What are the chief barriers as you look at the environment out there? What would you say is the chief barrier for somebody who wants to develop an app to enter or to expand their business and what do you hear from some of these entrepreneurs as far as what are their frustrations, where are their concerns, what is their wish list for the future of this?

Ms. HAY. Well, I think it depends on the scope of the kind of project they want to work on, so in talking to some app developers who are prototyping a small idea to really solve a very niche problem, there are relatively few barriers. Being able to ask Google the right question to get the answers is really the barrier. But I think for the larger companies that are trying to solve more widespread educational, health care types of problems where there are embedded relationships with big guys like Google, Microsoft, I think the barrier to entry is having the skill set in the case I was talking about with Fast Customer, having the skill set to be able to have the—build the relationship, be able to survive long enough, a long enough financial runway to be able to develop those relationships over time and really be able to influence change. So I think that that barrier is a much more social, even economic one than technical for sure.

Mr. KINZINGER. I guess I will ask the rest of you maybe the same question to see if you are all in agreement or if any of you have an idea in mind of saying hey, here is how we make it easier without, you know, I guess the wild West of it. Mr. Ramsey, do you have any input on that question about any barriers that exist?

Mr. RAMSEY. Yes, Mr. Congressman, I think, you know, as was mentioned earlier, you think of the barriers sort of fall into their demographics, geographic demographics, demographics based on gender, demographics based on race, and so what we have to do from a policy perspective is make information more available so that there are women, minorities and others who but for not knowing what is available to them could be in business. And so one of the things is just making information available. If there are programs like the Congressman from Mississippi was saying at the college, we need from an access perspective to make sure that

women would know about that program. And so what I find, and I have done work in inner cities and other places where people just don't know about what is out there. And then I think the second thing is just making sure the basic infrastructure is in place so when we look at the broadband maps, you can't do this if you don't have the right access. You can't do this if spectrum is an issue, you know, in your area. So from a broad policy perspective, you have big infrastructure issues to make sure in place, and then from an access outreach, a big part of that is comfort and information, having people feel comfortable.

Mr. KINZINGER. So if you had your wish list, it would be marrying the ability to get to the Internet with the skill set to do what is important to present this app of course with the folks who may have the idea. So somebody that may not have access to spectrum may have a great idea and they have no idea how to get that out of their head into action.

Mr. RAMSEY. That is exactly right, and this just mirrors what happens in the offline world when someone is just sort of living their life, they view an opportunity and they go, oh, well, there is a need here, I am going to open up a laundromat, oh, there is a need here, I am going to—

Mr. KINZINGER. And how do I get there.

Mr. RAMSEY. And so it is how do you get there, and a lot of people are still learning that there is not the barrier to entry that there might have otherwise been and so this access to information is really important.

Mr. KINZINGER. And I just have 40 seconds left. I want to ask Mr. Reed and Mr. Farago if you guys have input on that as well.

Mr. REED. Well, I want to follow up with what Rey said, and I think there are some characteristics. I want to look a little further into the future. Spectrum is a huge part of it. If I can't get my app into an enterprise—and I want to remind you that I think the big areas—we are moving away from 99-cent apps into where we are talking about critical applications for business, for health, for financial services. So the problem is, if I don't have the infrastructure, I can't get in there. The second thing is, if I'm new in mobile health, I need to make sure that the FDA moves quickly and that they do a fast approval process. And finally, as I look down the roadmap, I need to make sure that when I get my app into the marketplace, that it doesn't get stolen. So we have all those issues, and those are places where the government can play a role.

Mr. KINZINGER. Mr. Farago, did you have anything to add? Just a handful of seconds.

Mr. FARAGO. Yes. I mean, I think the issues we see are probably more business-oriented. Smaller companies don't have the resources. That is why I think there is a lot of third-party service providers like ours who can basically put a small company on equal footing with a much larger company that has resources. So many of the services will basically augment the developer's activity. They can focus on creating great content.

But there is a significant problem on the larger side of the spectrum with big companies where they don't think mobile first. They are not as nimble and fast as companies. They are kind of suffering from what we call the innovator's dilemma, and they don't, you

know, sort of appreciate all the possibilities. So companies on average that do better in the mobile ecosystem are doing a better, smarter job of leveraging what is on the phone. Open Table restaurant reservation uses location to immediately give you a reservation, for example, in the area you are now, and it is companies who think like that who are doing better.

Mr. KINZINGER. Well, thank you, and I am over my time and I appreciate it and yield back.

Mrs. BONO MACK. Thank you. The Chair recognizes Mr. Guthrie for 5 minutes.

Mr. GUTHRIE. Thank you, Madam Chairwoman. Thank you for being here today. I was at another meeting on spectrum, so I am sorry I missed some of the testimony but something important to what you guys are talking about today as well. And I know in the written testimony, Mr. Ramsey, and I will open this to everybody, you used the term “freedom to innovate,” and so I guess my question would be, what restrictions are—we need to maintain the freedom to innovate or you are going to have less innovation is what you are saying, and what is actually—I mean, what restrictions are you concerned about, particularly? I think you just said the FDA process and medical apps. What things could government do intentionally or unintentionally—and I can start with Mr. Ramsey or any of you—to restrict your ability to innovate in the app world?

Mr. RAMSEY. Again, I think it is more of making sure barriers are not in place and so as both—

Mr. GUTHRIE. Such as?

Mr. RAMSEY. So if there is no broadband available, if there is not adoption in your community, if you run into spectrum where you can't get on, these types of barriers—and then over time if you can't acquire a workforce, and so it is more about making sure barriers aren't in place than it is about let us push something, you know, toward you, and the area of push would be making sure human capital is available, making sure there are training programs, making sure people know what is available at the community college, at the university, and those sorts of things, but a lot of this is making sure we remove barriers.

Mr. GUTHRIE. That is a good question, and I was going to ask Mr. Farago something along that line since we already got there. Are most people in the app world, are they engineer graduates from Stanford or in Silicon Valley? What do you find talent? Because this is something that, you know, most States want to have jobs that people can do to make living. Where do you find talent?

Mr. FARAGO. Yes, I mean, you know, I think from anywhere. The bar is pretty high at our company, you know, the core. You know, it is not—in the startup world, it is also about risk tolerance. I mean, there is a certain kind of person. I carry my school debt. You know, I didn't go to certain big companies because I really wanted to be an entrepreneur so I am eating my debt still. So, you know, there are enough people who are passionate in the startup space but probably the population is more on the business side. The technical side is where we struggle to fill enough of the open positions we need. They traditionally come from the best universities in the world. In the United States, you have MIT, Cal Tech, Cal, Carnegie Mellon. I am sure I am leaving out some fantastic universities—

Stanford. We have a lot of graduates from a lot of those places. And on average, I would say we are getting ours from probably the cream of the crop, the universities of the world, and a lot of people with advanced degrees. That is primarily who we end up hiring on average. That is a lot of where they are coming from.

Mr. GUTHRIE. So there is not, in your space, the technical degree? You are looking for degreed engineers from the best schools in the world?

Mr. FARAGO. That is true, but I should also say, you know, Flurry is a little bit of a unique business. We are a business-to-business company, and we build a lot of very highly scalable technical infrastructure which requires people who have a lot of what we call backend experience, infrastructure experience, and it is very different than someone conceiving of a very useful entertaining kind of consumer experience who can leverage all that infrastructure. So I would say, you know, we are atypical in that we are building a lot more scalable systems that we have to imagine tens of thousands of other companies leveraging seamlessly that we provide to them so we have a little bit of a different nut to crack.

Mr. GUTHRIE. Ms. Hay?

Ms. HAY. Thank you. I have two comments. Number one, around your first question, I think one of the fears in a lot of app developers is that they are going to be sued by the big guys who have a lot more money, big legal counsel, ready to when they are innovating just pounce on them immediately and squash that.

Mr. GUTHRIE. Are there examples of that? Has that happened?

Ms. HAY. Oh, yes, absolutely. So on anything, somebody might be on their way up and then someone they don't know exists comes along with a lot more money and says hey, that is infringing on this thing that we did 7 years ago and therefore now you are dead. So that is, I think, an issue that will continue to get more and should get more attention.

And the second part is, I think, when it comes to finding people, the computer science major that may have 10 years ago been all the rage is a dime a dozen. It is not about finding people, it is about—because most of these people, who are very talented technically, want to be entrepreneurs because of the app economy. So they are not trying to go get hired, they are trying to hire people. So now you have got a scenario where folks like Living Social are really capitalizing on this here locally because they were having a hard time finding developers in the specialized programming that they have so they created a program, a 3- to 4-month-long program called Hungry Academy and brought people in, many of whom were women who had no technical skills, had never actually built anything before and paid them to learn how to build on their program, and the early results just a couple weeks ago that they finished was that these people could walk right into their jobs and work on the program in a way that people who were hired and had to be onboarded could not.

Mr. GUTHRIE. So you are talking about people coming in, are they coming in with some degree or are they coming in like high school graduate?

Ms. HAY. Apprenticeship style.

Mr. GUTHRIE. But they are showing up with just the base skill?

Ms. HAY. Correct.

Mr. GUTHRIE. That is great.

Ms. HAY. They don't have a technical skill otherwise.

Mr. GUTHRIE. That is wonderful. That is absolutely wonderful. Thanks.

Mrs. BONO MACK. Thank you. The Chair recognizes Mr. Bass for 5 minutes.

Mr. BASS. Thank you, Madam Chairman. Apps are intellectual property. They are patented or copyrighted?

Mr. REED. Some. It depends. Trademarks, the full panoply of law applies. Some of their ideas are copyrighted. Some of it is copyright, some of it is patent, some of it is trademark.

Mr. BASS. So when Ms. Hay talks about getting slammed down, that is the basis of the problem, basically you're copying somebody?

Mr. REED. Well, I think it is actually worth noting that it is a double-edge sword. She is right. Sometimes the big companies come in and slam us down. But the other problem we have is when a big company bigfoots us, which is the reverse problem, which is, we do something truly innovative and then a large company essentially copies what the small guy has done but he has the marketing power and the wherewithal to really just own that space. And so on one hand we need to watch out for the guy who comes behind us but we also need to make sure that we have got covered our ability to go to the big guy and say hey, don't crowd us out, we want an opportunity to compete.

Mr. BASS. Is there any role for us in dealing with that issue?

Mr. REED. Yes, I will start and then I will hand it over to Rey, but we definitely have needs when it comes to improving the quality within the patent and trademark system. Patents can be useful but the quality is from time to time questionable, and with pendency at 2 years, you know, that was halfway through the beginning of the app economy and they are still working on patents.

Mr. GUTHRIE. Go ahead.

Mr. RAMSEY. Mr. Congressman, I would just say, you know, I don't want to turn this into a discussion of sort of the patent, you know, laws.

Mr. BASS. Because it is in the jurisdiction.

Mr. RAMSEY. Right, and it is also very complex, and I just want to again urge that we continue to look at the apps economy as part of a broader ecosystem that builds on mobility, that includes the entrepreneurs, big, small, codependent ecosystem where they exist on each other's platforms, each other's marketing ability, you know, etc. We have got about a dozen app stores. Those stores reside with so-called large companies who then work with big carriers. We are all part of this ecosystem and it is important to remember that. We at TechNet represent both small companies and entrepreneurs. We have many startups and we also have large companies, and we focus on policies that will create an ecosystem where they will both thrive, and that is important to the U.S. economy.

Mr. BASS. Is the app economy going to go like the economies of all industrial produces—engines, autos, computers and so forth—and become consolidated and commoditized?

Mr. RAMSEY. Yes, I think what—again, I don't have the crystal ball, Congressman, but what is happening when we look at the

apps economy right now is we are segregating off a number of different specific jobs and small businesses but what is happening is, over time there will be this ubiquity that all companies will basically be transacting in some mobile application way. So as this continues, it will be seamless so big companies that you think of will have apps, little companies have apps. It is just the way to reach the consumer. This is being driven by consumers saying meet me where I am and give me a service in a way that I want that service. So it creates opportunities for anyone in business. That is the way this is moving.

Mr. REED. Congressman Bass, it is worth noting that the largest app development shop on the East Coast is actually in your district. Zco is incredibly successful. Now, you haven't heard of it, but I promise you that apps that are used by Members of Congress here and that are probably on whatever smart device you have were actually made by Zco. So on one level, there is going to be consolidation, but on the other level, as Peter talked about earlier, the low barrier to entry means that the apps that you might see branded with a big name are actually written by a little guy, and I think that is important to remember as we do this consolidation, that low barrier means I can build it even while consolidation is happening.

Mr. BASS. We are going to have a spectrum hearing tomorrow in another subcommittee. To what extent is access to spectrum or insufficient spectrum a major factor in this industry?

Mr. RAMSEY. We are together. Mr. Reed and I are both going big. It is a big issue, and it would be one of those things that would circumvent this growth in this area if we don't solve that issue.

Mr. BASS. I don't have any further questions, Madam Chairman.

Mrs. BONO MACK. Thank you, Mr. Bass. The Chair is pleased to recognize Mr. Markey for 5 minutes.

Mr. MARKEY. Thank you, Madam Chair, very much.

I will just throw this in because, you know, apps very commonly access our sensitive information, our location, our phone books, photos, web browsing history, and apps often do this without prior notice and even when the app isn't actively being used, and this morning I introduced legislation, the Mobile Device Privacy Act, that requires app sellers to disclose if monitoring software is installed when a consumer downloads an app. Mr. Cassidy is concerned about this. This is a bipartisan concern. And the bill also requires consumers to affirmatively consent before the monitoring software begins collecting and transmitting information so they should know what is happening. Otherwise there really are significant societal issues that have to be discussed, have to be debated on this committee. We have to understand it. That is something where you don't need to have a degree in computer science. You are saying gathering all this information about a 13-year-old girl, you know, and to be used for what purpose, and what notice was given. So all of this absolutely has to be discussed. Those are just the values that are our grandparents passed down, you know, and keep getting passed down. This is not anything that is more complicated than that.

Mr. Reed, I worked with Kevin Martin, the Chairman of the FCC, to make sure that when we were doing the 700 megahertz

auction that we set aside a certain percent of it that could be bid for but only by a company that had an open architecture so that any app could get on board, and that wound up being the Android. So what role did that play in opening up the app market knowing now that there was no gateway whatsoever, that you had an aperture through which you sitting at home, you know, your own little company, your own little idea? Did that really propel this revolution, in your mind?

Mr. REED. I think that you have to look at the ecosystem in its entirety. While there is some interesting things that happened because of the 700 megahertz auction, I think what really—if you really look at it, what the change that occurred that really propelled us was the ability of our product to get in front of a consumer.

Mr. MARKEY. No, I know that. What I am saying is, if you were just a smaller person, you didn't know how to negotiate with Apple and you just wanted to get your app out there, didn't that make it simpler for you to do so and increase by maybe 100,000 the numbers of them that could get out there almost immediately without having a gateway.

Mr. REED. I guess the reason that I would touch on that is, I think that it is worth noting for this committee a really important part about how the platforms play a role because the problem you are describing is—we didn't have a problem getting our app out. There was the Internet. I could put anything out anywhere. It was finding a way to actually get it in front of people. So I understand your point but I—

Mr. MARKEY. Do you understand what I am saying, Ms. Hay? Mr. Ramsey, could you comment on that?

Mr. RAMSEY. Yes, Congressman. I would say unequivocally that the principles of openness were important and continue to be important for this sector and moving forward, and that was one of the key elements. As you well know, there have been other issues connected to the notion of openness that continue to be important.

Mr. MARKEY. And I appreciate that. That is my concept. Open architecture is important and the iPhone was a closed architecture. So that is just the bottom line. It gets more open as they see competition, they see all these apps going over to the other devices. Do you agree with that, Mr. Farago?

Mr. FARAGO. I mean, as far as I understand the question, you know, I agree that it's easier than it has ever been for small entrepreneur—

Mr. MARKEY. That was the goal of moving over to 700 megahertz.

Mr. FARAGO. No, no, it has been great. It has reduced barrier to entry and I would say if you compare it to the manufacturing world where you have to pay for manufacturing and distribution, you have to have a professional sales force that negotiates with Best Buy or whomever and—

Mr. MARKEY. How many jobs do you think the 700 megahertz created? How many jobs, do you think?

Mr. REED. I think it is too hard to parse that.

Mr. MARKEY. Is it, like, 25 jobs? Give us a magnitude, an order of magnitude. What do you think it did? This is a committee hear-

ing on jobs and you are here testifying saying, you know, you want to create more jobs. So what did the 700 megahertz do in terms of creating more jobs so we have some basis for knowing what our goals should be or what the objective should be.

Mr. REED. I am happy to take that question back, and we will sit down with smart people and come up with some numbers.

Mr. MARKEY. I think that is important. I think we should answer that question because obviously that was the goal that was presented to me by your counterparts 5 years ago in terms of moving over that spectrum and making sure it was open for an architecture that would invite hundreds of thousands of people who otherwise might never have been able to get through the maze of working in corporate America.

Mr. Ramsey?

Mr. RAMSEY. Yes, I would say, Congressman, again, there hasn't been a study of that, which I think it would be worthwhile looking at, but I would add, in keeping with that, that every time the FCC does an auction, it has a job implication connected to it and so it is crucial and so that was crucial spectrum to get out as well as some of the next in line spectrum as well.

Mr. MARKEY. All I am saying is, it might have created 50 or 100,000 jobs because of the openness of that architecture, and it is scattered in 50 States and 435 Congressional districts because it is obviously—

Ms. HAY. I can say that people have moved from iOS development to Android development because of the innovation that is possible on that open architecture.

Mr. MARKEY. And I appreciate you telling us that, and that is really what this is all about. It is about job creation, and we have always operated in a bipartisan basis here, you know, in order to accomplish that goal, thinking it through and trying to be smart as we go forward, and Mr. Cassidy and I and I think others also have privacy concerns as we get into this world deeper and deeper as well.

I thank you, Madam Chair.

Mrs. BONO MACK. I thank the gentleman, and I also look forward to seeing the text of your bill and working with you, and remind the gentleman that years ago I introduced an anti-spyware effort which was very much along the same lines of what you are talking about.

Mr. MARKEY. No, I do. I appreciate that.

Mrs. BONO MACK. So I look forward to seeing your bill and working on it. The Chair recognizes myself for 5 minutes for a second round of questioning.

But just to follow on Mr. Markey's line of questioning, I am an Apple person. It took a long time for me to convert from PC to Apple. I mean, once I got to Apple, I couldn't go back. But I have chosen to be an Apple person and I have chosen to use iTunes, and a lot of my friends are Droid people. I mean, we had that choice. But to sort of counter what Mr. Markey is saying, I knew that there was sort of a walled garden approach in the App Store for Apple yet I figured that they knew what they were doing, that they were protecting both the growth of their platform, that my apps somehow had the stamp of approval from Apple and I felt I wasn't

shopping in the wild, wild West of the open source. So I chose that, and that was my choice, my decision, and like everybody else, I guess we all play Words with Friends on different platforms but I think it is important to note that people make a choice and I had that opportunity.

But I just want to turn a little bit to spectrum. Clearly, that is very important to all of us. I was wondering if anybody wants to comment on the thinking of whether we need more licensed or unlicensed spectrum and should it be in big blocks and what should guide our thinking tomorrow? Do you have some questions and thoughts you'd like to see tomorrow for our hearing?

Mr. RAMSEY. Madam Chairwoman, just a couple of quick things and maybe I will stop in now for this hearing tomorrow on spectrum. But I think it is clear that we need both licensed and unlicensed. They both play a role in this ecosystem and the FCC's proposals around incentive auctions, in my opinion, is an innovative way of taking a look at how we can better aggregate larger blocks of spectrum and more efficiently get it out there into the marketplace. Obviously that requires some give and take with other folks.

And I just want to go back to what Mr. Markey had brought up because it is too easy to commingle the words "open" and I don't think—I can't speak for the Congressman because he just walked out, you know, or myself when I was talking about openness. The principles of openness were not to say that Apple wasn't open because they are adhering to net neutrality principles and so I think all these platforms give consumers choice like the choice that you have exercised. So I don't want sort of the old fight of net neutrality and openness to be commingled with the terminology. The principles of openness have continued to be adhered to by all these platforms we are describing whether it is Facebook and Google and Apple, so they have all been doing I think a very good job in that regard.

Mrs. BONO MACK. Mr. Reed, would you care to comment on spectrum?

Mr. REED. I will be really short and echo what he said and say I want more and I want it now, and unlicensed and licensed are things that we need to work on. Licensed is really important because, bluntly put, I need guys in hardhats digging trenches, pulling fiber and putting up towers, and so ultimately that means that I need companies that are willing to spend the money to build the infrastructure that I will be on top of, so get me there and get me there now because that is what we are going to need.

Mrs. BONO MACK. Would either of you like to comment on competitiveness with Europe and what Europe is doing, and if we might lose sort of this race in this area? I guess a number of European and Asian countries are being substantial amounts of spectrum to market for commercial use. If we fail to keep pace, will we lose our leadership role in this area?

Mr. RAMSEY. Madam Chairwoman, I would say there are a couple of things we have to look at. One is obviously government itself has a lot of spectrum and we have got to look at how efficiently that is being organized, how much the government needs so we can get that online. Then we have got the issue of making sure we can acquire inefficiently used spectrum that broadcasters are utilizing

or not utilizing, and that is where the auctions come into play, so we have got to get that back on online. And then lastly, we will not—even with the most efficient allocation of spectrum from the government, let us say the government does everything perfect, with this explosive growth in the use of these devices, which are all using greater and greater amounts of spectrum, innovation and technology itself is going to be one of the ways we are going to get through this. Spectrum sharing, other sorts of forms of technology like that are going to help us get through this problem. So we are going to—this is where the private sector will continue to be important. The very companies—and this is why I was emphasizing early—that do not have this distinction between big and small, these so-called small are going to be relying on some of these other companies to continue to create innovation around spectrum that is going to enable them to flourish. So at the end of the day, we are all in this together. So better allocation from the Federal Government, the use of technology to get that out, taking spectrum that is not being used smartly by the broadcasters, the all-of-the-above approach will keep America competitive with that.

Mrs. BONO MACK. Thank you.

Dr. Cassidy, you are recognized for 5 minutes.

Mr. CASSIDY. Again, Madam Chair just spoke of how I would choose to use Apple if I choose to use Apple. Another thought I had though is that clearly Apple can censor what is placed upon their App Store. There were some social conservatives put something up there, boom, Apple took it off. It disagreed with their philosophy. On the flip side, I gather they don't allow pornography. And so there is a certain censorship that takes place. Now, you could argue this is a private company but at some point if their market share becomes so great, then does it begin to have a responsibility beyond that of a private company? And so I toss that again because you guys think about this, and I am just—

Ms. HAY. Apple has very detailed guidelines for what it accepts in the store. It is a 1- to 2-week-long review process for most of us developers. So if we find out that something we have done inadvertently is violating some terms and conditions, which they consistently update as well, then it is back to the drawing board, it is changing whatever the offending feature is. So, you know, doing business in the App Store with Apple is a more detailed process versus Android where you are able to sort of explore whatever the operating system is put it up there and people can then choose to download it in the wild, wild West.

Mr. CASSIDY. Now, do you see a concern, though, because, again, I forget it was but some social conservative group put something up and it was struck down. It offended somebody. Now, they may take everything that is Republican theoretically or everything that is Democrat. Now, they say of course that wouldn't happen, but again, there is one group at least that felt like it happened to them, and do they become a quasi-public entity?

Mr. REED. Well, I think it is important to note that Android in fact is rising to the level of having the largest market share, and they have a true wild, wild West. In fact, some of the apps that are on there are problematic for us and we have talked to other folks about how do we deal with apps that might be doing some-

thing illegal or how do we get apps that are on the completely wide open atmosphere in a place that we can deal with them. I think, though, the reverse side is, I am going to be very coldly logical about this from my own perspective. My folks make more money on the curated store model because of what the chairman said, and that is, they find the trust relationship at the curated store whether it be Apple or the Xbox platform—

Mr. CASSIDY. But that is not really my concern.

Mr. REED. Right, but I mean, we—so from our own perspective, I like it. I like the curated store because small—

Mr. CASSIDY. But I am not arguing curated versus non-curated. What is the obligation in terms of allowing free speech for something which again has maybe not dominant market share but 49 percent or something like that, pretty substantial?

Mr. REED. Actually, at this point in time, Apple—the Android has actually a larger market share globally.

Mr. CASSIDY. But I am saying, if it is 40 percent, I mean, it is still substantial.

Mr. REED. I think we are so far away from Apple being a public entity that I am not quite sure. I think a private industry has the right to keep pornography or other material off their—

Mr. CASSIDY. And what about socially conservative views?

Mr. REED. So far, I think that is something that if there was a major issue around that, that is something that I am sure Congress would bring to the attention and I am sure the Democrats would do likewise if their apps were kept off the platform as well, and I think let us take that on a case by case. When it happens, let us address it. But overall, I do think I want to preserve the right for private industry to make decisions about what they put in front of my kids and in front of adults.

Mr. CASSIDY. Mr. Farago?

Mr. FARAGO. Yes, I mean, I don't have a lot to add to what has already been said. I think the way we view it or I view it as Apple and Amazon and Google are running stores like a retailer. This just happens to have a digitally distributed product on a virtual store shelf. So if I go into Macy's or Bloomingdale's or Safeway grocery stores on the West Coast, I expect that there has been a buyer, there has been a review—

Mr. CASSIDY. It is only a little bit of a difference, if I may I interrupt, because it isn't as if you can go to one Apple Store versus another Apple Store. There is only one Apple Store. And so the paradigm is a little bit different than Dillard's versus Macy's versus Sachs.

Mr. FARAGO. I might respectfully point out, if I use an Xbox home console, Xbox Live Arcade, which is their digital platform is run by them, and if I am a Microsoft Xbox user, that is the only store from which I can purchase goods.

Mr. CASSIDY. A little less pervasive. The pervasiveness is the issue.

Mr. FARAGO. Well, I think that, you know, a store if it is successful and has a lot of customers coming into its large like Walmart sized or even bigger, you know, I still think they are fundamentally a private entity running a store and they have a right to decide which goods get on the shelf.

Mr. CASSIDY. I am out of time. I agree. Yield back. Thank you.
Mrs. BONO MACK. Thank you, Doctor.

Mr. Bass, you are recognized. No further questions?

All right. Well, I am just going to ask one brief question of the panel in lieu of a third round, if I might, and nobody really touched on cloud technologies and its importance, and I would just like to open up briefly if we can keep this last round to 2 minutes or so if anybody wants to talk about—I think Mr. Farago, you specifically talked about, what you said, the nearly endless storage cloud technology offers and how it contributes to the handheld devices now being super devices. How important is the cloud to the app world and how important is security of the cloud to ensure consumer confidence. So the last question of the day.

Mr. FARAGO. At a high level they are both fundamentally, I mean, deeply important. They are critical. You know, this device has limited storage. I mean, they are really supercomputers in your pocket now, but what makes—one of the many things that make this kind of experience special for consumers is that not only is there a lot of data that one—you know, your picture for example, of your grandchild could probably be accessed from several different devices. It lives somewhere for you, and that is a real convenience for customers. That requires storage. If you can't fit enough things in your house, then you may go get a public storage locker somewhere locally. And so it is just a place to hold more things universally for consumers and then they like to access those.

The other piece obviously in between the device and the cloud is the sort of the highway, the bandwidth and spectrum we have been talking about that is also critically important. Security of that data is highly important and consumers need to have trust that Apple with iCloud and many other cloud services. Box is a very popular company for enterprise now, Drop Box, places where you can place something and then get it later or place something for someone else to get, a file or a picture or whatever. You know, you want to believe that your property, a picture of your grandchild, is safe and secure, so it is critically important.

Mrs. BONO MACK. Thank you. Anybody care to chime in?

Ms. HAY. Yes. I think the cloud has been monumental to the app marketplace. The safety that comes from being able to use Amazon web services versus trying to come up with some sort of encrypted way of handling credit card numbers as an independent app developer or business owner, I mean, there is just no comparison. So now as an independent or small business owner, I am able to leverage cloud services like this, particularly in e-commerce, I think, that are safe, that conform to all the guidelines that are required of protecting that sort of data, and at the same time costing very little so I am able to actually launch more products, I am actually able to innovate more. So I think the cloud has been absolutely monumental in the economy here.

Mrs. BONO MACK. All right.

Mr. REED. I think the only part I would add to bring it back to policy for a moment is, we need your help, and I know this isn't the committee of jurisdiction that deals with it but we need all Members of Congress to help us on some of the antiquated laws that govern our electronic privacy in the cloud because unfortu-

nately they go back to the era where things stored in the cloud were less valuable than stuff stored on your desktop, and the problem that it creates for us from a business perspective is when I go to a risk-averse company and I say buy my small-business-created product because you can trust the cloud storage that we are using at Amazon AWS or anyone else, their answer is, yes, but what is our legal responsibilities, is it the 6th Circuit Court, is it ECBA, and they don't buy our product, not because our product wasn't awesome, it was because our product—they couldn't have the legal risk that exists right now around some of our privacy protection laws. So we ask all Members of Congress to help us as an industry with ECBA reform and making sure that we have clear, concise ways to speak to risk-averse lawyers about why the cloud is a safe, logical place to store their data.

Mrs. BONO MACK. Thank you very much. That is going to conclude our hearing for the day, so I want to thank the entire panel for being with us today. You have been very gracious. We look forward to working with all of you moving forward.

At this point I am going to remind members that they have 10 business days to submit questions for the record. I ask the witnesses to please respond promptly to any questions they may receive.

And with that, thank you again very much and the hearing is now adjourned.

[Whereupon, at 11:19 a.m., the subcommittee was adjourned.]

