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Senate Commerce Committee  
Subcommittee on Communications, Technology, Innovation, and the Internet  
Hearing, “There’s an App for That: Trends in Mobile Technologies”

May 15, 2018

Testimony of

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Chairman Wicker, Ranking Member Schatz, and members of the Subcommittee, thank you for the opportunity to testify today on the app economy and mobile technology trends. My name is Sarah Oh, and I am a Research Fellow at the Technology Policy Institute, a non-profit, non-partisan think tank that studies the economics of innovation and technological change.

The app economy is an important source of economic growth. As an economist, my primary concern is growth – in new business formation, jobs, research and development, and economic opportunity. Mobile connectivity and apps create new markets and make existing markets more efficient, thereby promoting growth. However, some app innovation has raised questions related to privacy, connectivity, and artificial intelligence. The right policy responses require clearly identifying the problems we wish to solve and thinking carefully about the costs and benefits of any proposals.

In short, we need to be careful about how to reduce or remedy bad effects of this new economy without discouraging the innovation that drives economic growth and makes us all better off.

## **Apps and the Cloud**

Even though apps are an integral part of our lives now, we should remember that the app economy is new. The very first iPhone model, which was released just over ten years ago, didn't even have third-party apps. The rate of growth of mobile technology and new business models has been staggering. People watch live sports, binge watch their favorite shows, order dinner, rent a house, hail a car, update their fantasy sports leagues, get the latest news, all at the press of a button.

Yet, as easy as it is for us to click our app buttons, apps call on a massive and deeply complex infrastructure to deliver goods and services. Acres of server farms, forests of cell towers, cubicles of coders, classrooms of math students, and labs dedicated to research and development all work behind the scenes to deliver the apps that are simple and easy to use.

Apps built on cloud services deliver real-time data to billions of users not just here in our country but around the world. American companies reach a global market through platforms that deliver video, music, email, along with sophisticated business software, like mapping systems and vector graphics.

Apps continue to make life easier and faster as they incorporate artificial intelligence, using deep learning to recommend nearby restaurants, suggest replies to emails, and transcribe and interpret natural language so we can work our devices by voice command.

These tools are useful for policy research, too. At TPI, we use cloud services for big data analysis. I'm amazed by how much computing power we can access today. Our team of researchers can access world-class servers and only pay for the minutes that we use. Our big data projects would have been impossible just a few years ago without these advances.

## **Policy Concerns**

But these advances come with new challenges. How do we balance privacy concerns with the data requirements necessary for continued advancement in AI? What types of Internet infrastructure investments are necessary to support the continued growth of the app economy? How do we continue to make valuable spectrum available? Finally, does the growth of apps and

the mobile economy raise concerns about the digital divide? What is the role of policy in addressing any of these issues?

### ***Privacy Regulation***

Data drives the economy, and there's no turning back. It's almost cliché to say that data is the currency of the digital economy. Firms must safeguard the data they collect and store. The economist's question is whether firms may under-invest in data protection relative to some socially optimal level of investment. A firm will base its investment in data security on the degree to which the firm would be harmed by a data breach. Depending on the amount of harm a company expects, this may be sufficient incentive. But if harm from a data breach affects those outside the firm—consumers, for example—in a way that does not affect the firm, then that would suggest the presence of a negative externality and a reason to consider government intervention. But even if harms exist, regulators must carefully estimate the costs and benefits of such intervention.

For instance, after a regulation is passed, firms will immediately adjust to behave strategically around the rules. Firms will use regulation to benefit themselves and hurt competitors. Thus, legislation can have unintended consequences that Congress cannot predict. New laws can disadvantage new entrants over incumbent firms, or vice versa. Large firms can afford to pay for lawyers and compliance officers that small firms cannot afford.

The European GDPR will provide an important data point for scholars to measure the effects of privacy legislation on innovation and economic growth. While companies may be dreading May 25, when the GDPR goes into effect, scholars are waiting in anticipation to study the costs and benefits of the new rule.

### ***Broadband Infrastructure***

The app economy requires continued investment in broadband. Government actions can slow or accelerate this investment. This Subcommittee is knowledgeable about deployment and adoption challenges in broadband, along with the economics of last-mile connections, rural and urban buildout, and the digital divide. For the app economy to continue to flourish, continuing to invest in and expand the underlying delivery infrastructure is critical.

Firms who build 5G wireless networks will have to work with local governments to place small cells on city streets and buildings. As many as 80,000 municipalities are involved in land use and zoning decisions for small cells, pole attachments, and new aerial and buried fiber lines. These governments can hold up or speed up efforts by the private sector to increase connectivity everywhere. Local governments often have legitimate concerns—it is their citizens who use those roads and live in those neighborhoods, after all—but hold up can cause frustrating delays to broadband deployment, especially when gridlock can occur in so many different jurisdictions.

### *Universal Service Fund*

The app economy also depends on more people getting online. More people online means more people who benefit from the app economy and more incentive, via a bigger potential market, for developers to build new apps. Adoption of broadband, and not just deployment, is an important policy concern for this Subcommittee. The digital divide between users who are online and those who aren't is a puzzle for scholars and an active area of empirical study.

The Universal Service Fund (USF) includes a collection of programs intended to subsidize connectivity for the unconnected and unserved. This Subcommittee should continue to urge the Federal Communications Commission to get the most bang for our buck from the Fund.

The USF collects \$10 billion per year from telecom revenues and redistributes the funds, nearly \$2.6 billion to schools and libraries, \$4.7 billion to infrastructure, \$1.3 billion for broadband to 10 million low-income households, and \$300 million to rural health programs. The USF pays telecom bills and funds new infrastructure, but USF has real opportunity costs – every dollar spent on USF is a dollar a consumer could have used for something else. These funds are collected through a 19 percent contribution fee from consumer phone bills, including those of low-income Americans.

Billions of these dollars flow to private vendors every month, and it's frustrating to continue to read report after report demonstrating the ineffectiveness of the program and its general lack of attention to cost-effectiveness. I urge this Subcommittee to stay vigilant to monitor and track USF funds so that we can get services to actual people, and not just vendors.

## *Spectrum*

Mobile technology requires radio spectrum, much of which is used – inefficiently – by the government. To be sure, the government has a legitimate need for dedicated spectrum, but it is not required to use it so poorly. If economic growth is a national objective, then federal agencies should get moving and replace old equipment. Unused spectrum time is lost forever.

The Spectrum Relocation Fund (SRF) has given agencies the opportunity to clear spectrum and replace old radio systems. I hope to see more joint efforts by agencies working together to upgrade their equipment. For example, the FAA, DOD, DHS, and NOAA are currently working together to replace radar equipment and auction spectrum to the private sector by 2024. Those agencies are using funds from the SRF, authorized by the Spectrum Pipeline Act of 2015, to clear 30 MHz of federal spectrum for non-federal use.

Mobile phones and connected devices will continue to use plenty of spectrum at low, mid, and high-band frequencies. We need to ensure a steady supply of licensed and unlicensed spectrum for innovators and investors for these devices.

## *Artificial Intelligence*

We at TPI recently hosted an academic conference on the policy implications of AI. Scholars discussed AI's limitations and potential. Research papers addressed use cases of AI in various fields like medicine, central banking, and traffic routing. We discussed whether AI is a general-purpose technology (answer: "we're not sure") and how much human judgment still matters (answer: "it does, a lot").

One of our findings was that informed policy discussion on AI happens through peer review. Are researchers reviewing each other's work? Are experts talking to each other and documenting potential harms of their new inventions? Research communities need to inform policymakers and the general public with robust research, analysis, and education on the policy implications of AI.

## **Conclusion**

In technology policy, old things are often new again. Policy concerns about privacy, connectivity, and algorithms have been raised for many years. We need to continue to study what

computers can and can't do, how to measure harm, and whether rules are truly able to remedy these harms. Most importantly, we should recognize that we have more questions than we have answers, and that it will take careful thought and conversations like the one we are having today before we have good answers. Thank you for inviting me to testify today. I look forward to answering your questions.