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I. Introduction and Overview

Thank you for the honor of testifying about innovation and economic growth before your committee today. I will focus on the information sector, which includes the Internet and communications industries. I have three simple messages to share with you today:

- a. Global economic growth in the past generation has been more profound than any in prior history, and innovation in the information sector was at the core of that growth.
- b. The United States played a pivotal role in innovation in the information sector. Important factors included: increased protection of property rights; a lighter regulatory approach; and an emphasis on competition.
- c. Despite early receptivity to the Internet, governments in other countries today are threatening the further development of the information sector.

II. Qualifications

I am the president of Furchtgott-Roth Economic Enterprises. I am also a Senior Fellow at the Hudson Institute, where I founded the Center for the Economics of the Internet, and an adjunct professor of law at Brooklyn Law School.

I was a commissioner of the Federal Communications Commission (“FCC”) from November 1997 through May 2001. In that capacity, I participated in all decisions of the

Commission, and I delivered testimony before numerous congressional committees relating to the work of the FCC.

From 1995 to 1997, I was chief economist of the U.S. House of Representatives Committee on Commerce. One of my responsibilities was to serve as a principal staff member helping to draft the Telecommunications Act of 1996.

From June 2001 through March 2003, I was a visiting fellow at the American Enterprise Institute for Public Policy Research (“AEI”) in Washington, DC. There I wrote a book, *A Tough Act to Follow?: The Telecommunications Act of 1996 and the Separation of Powers*.

From 1988 to 1995, I served as a senior economist at Economists Incorporated. I previously was a research analyst at the Center for Naval Analyses. I also served as a research analyst at the Congressional Budget Office, and my first job in Washington was as a summer intern at the Senate Appropriations Committee.

My academic research concerns a variety of topics related to economics and regulation. I am the author or coauthor of four books on cable television, telecommunications, and international trade, and I have published many scholarly and popular articles.

I received a Ph.D. in economics from Stanford University and an S.B. in economics from the Massachusetts Institute of Technology. I wrote my dissertation on how to measure technological change.

A copy of my curriculum vitae is attached as Appendix A.

III. Global economic growth in the past generation has been more profound than any in prior history, and innovation in the information sector was at the core of that growth

For much of human history, most people lived lives that were--in the words of Thomas Hobbes--nasty, brutish, and short. And for all too many people, life was hopelessly impoverished. Hunger, starvation, and deprivations of all kinds were unexceptional.

The history of poverty is neither ancient nor is it today eradicated. According to the [World Bank](#), in 1981, more than 41% of the world's population lived in what can only be described as abject subsistent poverty.¹ Yet, by 2013, the World Bank found that fewer than 11% of the world's population lived in this form of poverty, and the rate is projected to fall further. While having hundreds of millions of people living at subsistence remains an unsolved challenge, over the past few decades, 30% of the world's population, billions of people, moved up the income scale, almost certainly the largest mass increase in income in history. What happened during those roughly 30 years, approximately one generation?

There are many explanations, from the fall of communism to the opening up of markets in China, India, Africa, and other parts of the world to developments of new medical technologies and new agricultural breakthrough.

All of these explanations and more are important to understanding the past generation, but I want to focus on one issue that I find to be central to recent economic development: the information sector. When the economic history of the past generation is

¹ The World Bank's poverty line was set at less than \$1.90 per day in 2011 purchasing power parity. This is far below our federal government's poverty line.

written, I believe it will be called the golden age of information and communications, and the United States was and remains at the center of that golden age.

In 1981, hardly anyone in the world, no matter how wealthy, had mobile wireless technology or access to the Internet. These technologies did not meaningfully exist. One could not purchase them at any price. Today, no matter how poor an individual, the vast majority of people in the world have access to mobile services, and purchase them at low and even no cost. Most people also have some form of direct access to the Internet or know someone who does.

I am not suggesting a single direct causal relationship between the emergence of new information technologies and the end of poverty. Improvements in information technology have, nonetheless, contributed to better education, improved business operations, enhanced agricultural production, better personal communications, and other factors all of which disproportionately favor low-income individuals. I am suggesting, however, that one of the greatest economic events in history, the emergence of much of the world's population from living at or near the subsistence level, has coincided with the development and global adoption of wireless services and the Internet. Today, once an individual has met basic needs of food, clothing, shelter, she tends to choose to purchase wireless services and Internet services, services that even the richest person in the world could not purchase a generation ago.

IV. The United States played a pivotal role in innovation in the information sector. Important factors included: increased protection of property rights; a lighter regulatory approach; and an emphasis on competition.

The extraordinary contribution of the United States over the past generation to fight global poverty and to enhance global welfare is not properly measured just in

dollars of foreign aid. Rather, it is better measured in the creativity of Americans and American businesses to develop new technologies and in the generosity of our government to make many of those technologies available to the world, free of charge. For example, in the 1990s the Clinton Administration opened up the Internet and Global Positioning Service (GPS) free of charge both to the United States to the world. They soon became two of the most widely adopted technologies in history. Even without the generosity of the American government, these technologies would have emerged eventually, but at higher cost and substantial delay.

New information technologies contributed not just to global economic welfare but to American economic growth as well. [By my calculations](#), the information sector in the United States disproportionately contributed to economic growth in the United States, accounting for 19% of GDP growth from 1997-2002 and 9% of GDP growth from 2002-2007, substantially greater than its less-than-4% share of GDP.

Of course, much of the benefit of innovation in the information sector is not fully captured in GDP calculations because of the rapid and substantial changes in the nature of information services.

The five largest corporations by market capitalization in the United States are all in the information sector: Amazon, Apple, Google, Facebook, and Microsoft. They are also among the largest corporations in the world. These are all innovative companies, and together with smaller companies in the information sector, all have contributed to innovation and economic growth in America. None of these major companies existed in 1981. Scores of other publicly traded companies compete in the information sector, most founded since 1981. Countless private companies and startups compete in this sector. Ask

a twenty-something in America or anywhere around the world where he or she wants to work, and the answer likely is private company in the information sector. These new companies have provided the world with new technologies and have captured the imagination of the next generation.

Why did these companies develop in the past generation and not before? And why did they develop in the United States and not elsewhere? Some might point to extraordinary entrepreneurs and technologists such as Bill Gates, Jeff Bezos, Steve Jobs, Sergey Brin, Larry Page, and Mark Zuckerberg. Others might emphasize critical technologies developed before 1980 that enabled the further development of the information sector. No doubt, these and other factors are important.

But great entrepreneurs are born in every generation in every country. What made the information sector in the United States over the past generation different? Consider what Amazon, Apple, Google, Facebook, and Microsoft and scores of smaller companies have in common. They were all founded in America, and they all benefitted from three conditions that changed in the information sector in America in the past thirty years: clearer property rights in the information sector; a lighter regulatory touch; and more competition. Each of these factors was important to the development of the information sector in the United States over the past generation.

A. Clearer property rights

Property rights are at the core of most well-functioning economic systems. They certainly are at the core of improvements in the information sector. We can see them in clearer property rights for licensed spectrum, unlicensed spectrum, and intellectual property for software.

Licensed spectrum -- Before 1981, wireless spectrum was largely under the control of the federal government. Broadcasters had broadcast licenses under frequent threat of non-renewal. Other forms of commercial licenses were few in number and relatively undeveloped. Beginning in the 1980s and continuing through today, the Federal Communications Commission (FCC) provided greater clarity for licensed spectrum, adopting property rights concepts consistent with those advanced in the 1959 by future Nobel Laureate [Ronald Coase](#).

In 1993, Congress granted the FCC authority to auction spectrum licenses eventually leading to more than 100 spectrum auctions over the past 25 years. The economic value of these auctions is not in the receipts raised but in the rationalization of use and ownership of spectrum licenses leading them to be put to have higher-valued uses. As I have [reported](#), spectrum licenses in the United States have obtained much clearer property rights, but still further to go to obtain full property rights, and clearer property rights would significantly contribute to innovation and economic growth.

As slow as were the development of property rights in licensed spectrum in the United States, they were more rapid than in other countries. With few exceptions, licensed spectrum was put to use in the United States before it was in other countries. The value of licensed spectrum with property rights is substantial.

Unlicensed spectrum -- The concept of unlicensed spectrum did not exist in 1981. In the late 1980s, the FCC adopted rules relaxing the review of new low-energy equipment and new applications. The adoption of unlicensed rules unleashed a wave of new technologies ranging from Bluetooth to WiFi. Unlicensed technologies are used in most consumer electronic devices. Unlicensed spectrum today carries more data than

licensed spectrum. Unlicensed spectrum has [substantial elements of property rights](#) and has contributed to innovation, economic growth, and consumer welfare. Other countries have largely followed America's lead in unlicensed spectrum

Intellectual property – In 1981, for most purposes, packaged software did not exist. Software was largely proprietary and developed on an *ad hoc* basis. The software industry became a critical component of the information sector, and the development in the 1980s and 1990s of the software industry depended critically on intellectual property laws. The software industry developed largely in the United States in part because of [strong intellectual property laws](#).

B. A lighter regulatory touch

Before 1981, the development of a robust information sector was hardly the primary purpose of federal regulators. The regulatory process was used, wittingly or not, to delay new technologies. For example, the first application for a cellular technology was in the 1950s. It was delayed for near 30 years before finally being accepted. The estimates of the consumer welfare loss from the delay are [substantial](#).

Beginning in the 1980s and 1990s, the federal government led by Congress saw the importance of having government not impede new technologies. Perhaps most famously, politicians of practically all political affiliations in the mid and late 1990s embraced the slogans “Do Not Tax the Internet” and “Do Not Regulate the Internet.” There was a clear understanding that taxation and regulation could harm the nascent Internet, a technology worth protecting from government interference.

Despite many problems associated with the combination of powers, the FCC began in the 1980s and 1990s to see itself as trying to get out of the way of new

technologies. In a series of rulemakings, the FCC consistently relaxed various regulations of telecommunications services. So too did various state regulatory commissions.

The FCC had a conscious effort not to regulate the Internet and not to regulate online companies. Four important decisions included the following:

- (1) no origination or termination fees on Internet traffic;
- (2) no preference or requirement of certain technological standards;
- (3) no governmental curating of content or blocking websites; and
- (4) no governmental use of the Internet to spy on Americans.

In contrast, other countries have attempted to regulate prices of Internet traffic, or to impose technology standards, or to block specific websites, or to spy on their citizens. These efforts have had harmful results and have hindered the development of the Internet in those countries.

Beginning in the 1990s, the American government consciously tried to remove impediments to the development of new information sector companies that now compete in both the United States and around the world. Recent concepts of network neutrality regulation and privacy regulation have, for the first time, threatened to lead to substantial federal regulation of the Internet.

C. Competition

One of the keys to any successful economic system is competition. Competition weeds out poor performance. Competition leads to lower prices for consumers and a wider array of choices. Competition was one of the central themes of the Telecommunications Act of 1996. Prior communications laws and regulations had

limited the number of telephone companies, cable companies, wireless companies, etc. The limited number was often *one*, a monopoly. Under the Telecommunications Act of 1996, statutory and regulatory monopolies were prohibited. Regulators were instructed to remove barriers to competitive entry.

Competition in American markets is primarily protected by antitrust law. Both the Department of Justice and the Federal Trade Commission have been active in markets in the information sector to protect the American consumer.

The competitive environment in the United States facilitated the expansion of the information sector. With competitive communications, new information companies had multiple competitive networks to develop new services and to reach customers. This competition in the United States almost certainly facilitated the development of the information sector.

Other countries have largely followed the United States on competition policy but with a substantial lag and with more restrictive rules on foreign investment and ownership. Well into the 1990s, most other countries had telephone companies that were partly or entirely owned by the national government. Private ownership of telecommunications networks, and private competition, had previously been proscribed. Today, the competitive framework of the United States is widely adopted around the world.

V. Despite early receptivity to the Internet, governments in other countries today are threatening the further development of the information sector

It would be comforting to report that all of the positive developments over the past few decades for the information sector, and their contributions to innovation and

growth in the United States and around the world, are likely to continue. The information sector is vulnerable to attack, and with it much of innovation and economic growth in America.

Perhaps the simplest index of the health of industry can be found—or, rather, not found in Washington. We have no Internet Regulatory Authority. We have no single agency responsible for regulating the information sector or the Internet. That absence is an American strength.

During the 1990s, other countries largely followed this American approach. The Internet spread internationally and was largely unregulated. The information sector is today the primary area of American commercial competitiveness in international markets. The information sector globally distributes information and entertainment, and much of the most popular forms are American in origin: American music, American videos, American software, and American technology.

But perhaps the most important American product distributed by the information sector is a simple American ideal: innovation is rewarded. Young people in America and around the world see the Internet and the information sector as tangible proof that the American ideal can work. Young people in America and around the world seek to work in the information sector in large because of faith in the American ideal and because of a hope that the American ideal can triumph over lesser ideals, including those that seek to limit innovation and to steal its reward.

The information sector globally is under attack. Over the past 15 years, many countries have steered towards destructive regulation of the Internet and the information sector. Many governments around the world have lessened property rights in the

information sector, have adopted punishingly stiff regulations, and have blocked competition. Some governments curate Internet content, steering some web sites to consumers and blocking others, and generally discouraging use. Some governments use the Internet to spy on their own people, further discouraging use. Some government use the Internet to engage in organized cybercrimes, stealing information, attacking innocent Internet users, many of them in America, and causing disruption and chaos everywhere. Some countries block American companies from offering services. Some countries use the Internet to facilitate piracy of intellectual property, much of it American. In international forums, many governments advocate an international regulatory body, possibly housed in the United Nations, to regulate the Internet.

These misguided efforts limit the prospects of the information sector in other countries. It would be naive to assume that these attacks on the information sector in other countries also do not spillover effects: they harm innovation in America; they reduce our economic growth. We should not imitate the bad policies abroad. The simple formula of clear property rights, reduced regulation, and competition unshackled the information sector in the United States in the past. The simple formula can continue to work in the future. This formula yields economic growth in America and the foundation to preserve the American ideal for countless individuals in America and around the world: innovation is rewarded.