

# Technology and Economic Growth in the Information Age: A Follow-Up

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*In the 17 years since the NCPA published Michael Cox and Richard Alm's report, "Technology and Economic Growth in the Information Age," the technology landscape in the United States has changed dramatically, with a largely positive impact on the U.S. economy.<sup>1</sup>*



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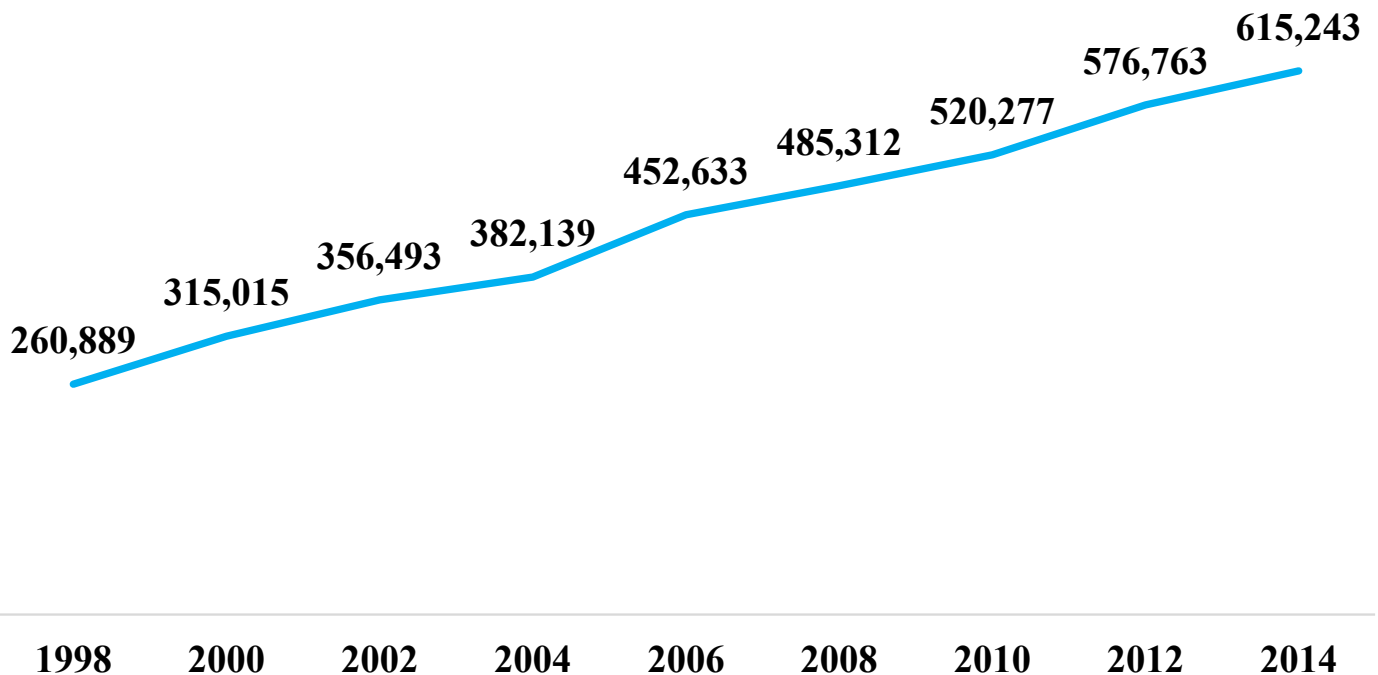
For example, 21 percent of Gross Domestic Product (GDP) growth from 1996 to 2001 is attributable to the Internet, and the development of software used in almost all U.S. businesses accounted for 15 percent of all gains in U.S. output from 2004 to 2012.<sup>2</sup> Future global machine-to-machine (M2M) technologies — devices able to network to other devices through the use of microchips, sensors and wireless communications — could contribute from \$2.7 trillion to \$14.4 trillion to the world economy by 2025.<sup>3</sup> Cox and Alm's 1998 prediction that the coming years would see a dramatic increase in technology advancing the economy and improving everyday life for the average American has come true.

## **Technological Advancement Predictions Were Accurate.**

When Cox and Alm wrote about technology in 1998, they mentioned such future products as self-driving automobiles, the new Global Positioning System (GPS), and micro-machines with gears the width of the human hair. These and numerous other technologies are now either about to be or have already been made available to the public:

- Several companies — Mercedes, BMW and Tesla — currently have prototypes of cars with self-driving features. It is predicted that an automobile with the capacity to drive from point A to point B without a driver will be released by 2019.<sup>4</sup>
- In May 2000, Selective Availability — an intentionally distorted and imprecise civilian-use Global Positioning System (GPS) signal implemented by the military for national security purposes — was disabled.<sup>5</sup> Now accurate GPS technology is incorporated into a variety of other technologies ranging from cell phones to automobiles to ATMs.<sup>6</sup>
- Nanotechnology developments in the early 2000s enabled the creation of consumer products such as dent-resistant car bumpers, clear sunscreens, scratch-resistant glass coatings,

## Number of U.S. Patent Applications, 1998-2014



Source: U.S. Patent and Trademark Office, “U.S. Patent Statistics Chart,” October 28, 2015. Available at [http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us\\_stat.htm](http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm).

improved TV and cell phone displays and wrinkle-resistant clothing.<sup>7</sup>

**Creative Destruction Is the Price of Advancement.** As with all great advances in technology, the principle of “creative destruction” is at work. While the number of patent applications in the United States has steadily increased [see the figure], advances in technology also create job churn. For example, in 1900, there were 109,000 employed carriage and harness makers — now those jobs have almost completely vanished.<sup>8</sup> Similarly, e-mail, word processors and other office technologies increased efficiency, resulting in a reduced number of secretarial jobs, albeit while creating jobs in new technology driven industries.

**Improvements in Technology Benefit Society.** “Technological unemployment” is not the only side effect of technological advancement. New developments also increase the health and lifespan of Americans through the incorporation of technology in medicine. The Centers for Disease Control and Prevention reports that in 1998 the average life expectancy in the United States was 77 years compared to 79 years in 2013.<sup>9</sup> In 2007 alone there was a 10 percent drop in the death rate related to HIV/AIDS, an 8.4 percent decline in deaths due to influenza and pneumonia, and a 4.7 drop in heart-disease-related deaths.<sup>10</sup> The development of new drug treatments like antiretroviral therapy (ARV) and improved vaccination technology

has played a critical role in increasing U.S. life expectancy.<sup>11</sup>

Researchers continue to push forward, developing technologies to improve efficiency and the quality of life. New projects include “smart” contact lenses and glasses — Google now has two patents for “Ophthalmic Electrochemical Sensors,” contacts which monitor glucose levels — and refrigerators with Wi-Fi.<sup>12</sup> GE’s new refrigerator, the ChillHub, has 8 USB ports, and the engineers reported future ideas for “auto-fill water pitchers, scales, deodorizers, bacteria detectors.”<sup>13</sup> These are just glimpses of future technological developments.

**Economic Benefits of Technology Continue to Increase.** Advances in technology continue to drive down manufacturing costs. For example, in 1985 Ford Motor Company spent \$60,000 on every test collision used for safety diagnostic analysis. Now, collisions are simulated on a computer at only \$100 per simulation.<sup>14</sup> As the costs of technology dramatically decreased, the ability to integrate microchips, sensors and cameras into everyday products increased. The price tag for sending one trillion bits of information decreased from \$150,000 to 17 cents in just 30 years.<sup>15</sup> Additionally, the ability for devices to network to other devices through the use of microchips, sensors and wireless communications capabilities holds limitless potential.

The economic impact has been dramatic, according to McKinsey Global Institute: “smart” devices will create “\$1.1 trillion to \$2.5 trillion in value in the health care sector, \$2.3 trillion to \$11.6 trillion in global manufacturing, and \$500 billion to \$757 billion in municipal energy and service provision over the next decade.”<sup>16</sup>

**Avoid Overregulation of Technology.** As the country continues to embrace and adapt to new advances in technology, careful thought should be given to technology regulations. However, regulatory policies should be drafted regarding the use of unmanned aerial systems

(UASs) to guard against Fourth Amendment privacy violations.<sup>17</sup> Though drones raise safety and privacy concerns, if addressed correctly the economic potential could have significant benefits for the U.S. economy. Spending on drones is estimated to increase to \$11.3 billion by 2021 and the growing industry is creating new jobs and improving efficiency in commercial and civilian life.<sup>18</sup>

Developments in technology also create new possibilities for taxation and spark attempts at unnecessary regulation. For example, in order to “manage” the Internet, Congress attempted to rewrite sale tax laws and to limit content in the Communications Decency Act.<sup>19</sup> Yet, when nine of the top 25 businesses in U.S. capital expenditures are technology and telecommunications companies, inhibiting economic growth through overregulation is a dangerous trap to avoid.<sup>20</sup> Improving IP protection, and reevaluating current technology regulations could help ensure that this growing sector of the U.S. economy continues to flourish.<sup>21</sup>

Cox and Alm’s predictions regarding the impact of technology on the economy proved accurate. Seventeen years after their report, U.S. citizens purchase new products, live healthier lives and enjoy an improved economy due in part to the technological advances made since 1998. One hopes that continuing to encourage innovation in technology and avoid encumbering regulations will permit this trend to continue for the next 17 years.

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### Notes

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