# National Foundation for American Policy

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## Research: Dramatic Changes in Technology Since 1990 Have Boosted Demand for High-Skilled Labor, While Immigration System Has Stood Still

## Reforms to U.S. Legal Immigration System Would Address Low Quotas and Long Waits

**Arlington, Va. –** Changes in technology over the past 25 years have increased the demand for high-skilled labor in America at the same time U.S. limits on high-skilled immigration have remained stuck at levels set in 1990, according to a new report released by the National Foundation for American Policy (NFAP), an Arlington, Va-based policy research group.

"Before the iPhone, the iPad, YouTube, Netflix, Amazon and Google, back when Mark Zuckerberg was still in kindergarten, Congress passed its last major piece of legislation on high-skill immigration," said Stuart Anderson, the author of the study, executive director of the National Foundation for American Policy, and former head of policy and counselor to the Commissioner of the INS (August 2001 to January 2003). "Given all the changes in technology over the past 25 years, it is not plausible to argue that there has been no significant increase in the demand for high-skilled labor in America since 1990 when current high skill immigration visa limits were set into law. It makes little sense to argue that Congress established the correct immigration limits 25 years ago, at a time before the World Wide Web, smartphones, mobile apps, social media, and online streaming and gaming."

The report did not attempt to list every technology or exciting company that has emerged on the scene since 1990. But it focused on how we live in a different world than the one that existed in 1990, concluding, "Our country's immigration laws should reflect the world not of 1990, but of 2015 and beyond."

The report, "The World Has Changed Since 1990, U.S. Immigration Policy Has Not," is available at www.nfap.com.

A second report, "Reforming America's Legal Immigration System," is also available at www.nfap.com.

"Many problems exist in America's legal immigration system," concluded the second report released. "There is no visa category for workers to fill year-round jobs in sectors like construction, restaurants and hotels. And the visa categories that exist for lower-skilled workers are plagued by bureaucratic rules. Over the years, these problems have contributed to illegal immigration and thousands of migrant deaths at the border. Employment-based immigrants are saddled with wait times of 6 to 10 years or longer and employers typically are unable to hire many high-skilled foreign nationals on H-1B temporary visas due to low annual quotas. These problems can largely be addressed by increasing the annual limits in these categories. Similarly, the annual limit on family-based immigration has led to long waits for U.S. family members sponsoring close relatives. Many problems in the legal immigration system can be addressed by either relaxing

bureaucratic rules or by increasing annual quotas. Such changes would be in the best tradition of America as a nation of immigrants."

The 1990 Immigration Act set in law the 140,000 quota on employment-based green cards, the per country limits that restrict Indian and Chinese immigrants, the 65,000 numerical limit on H-1B visas, along with other measures that, with only minor modifications, have not changed in 25 years. In the meantime, fundamental changes in technology and commerce – the Internet becoming a part of daily life, for example – have greatly expanded the demand for skilled technical labor as America's immigration laws have restricted access to much of that labor at levels established 25 years ago. Many of today's major technologies and companies did not exist nor could have been imagined by lawmakers when Congress debated the 1990 Act. The research documents the enormous changes in the U.S. economy and technology since 1990 and contrasts that with the lack of change in America's policies on employment-based immigration.

**Table 1**
**Technological Advances Since 1990**

| TECHNOLOGICAL ADVANCE | 1990 | 2015 |
|---|---|---|
| **World Wide Web*** | Did not exist | 3.2 billion users worldwide, integrated into operations of all major companies. |
| **Smartphones** | Did not exist | Over 2 billion owners; have transformed entire industries. |
| **Mobile Applications** | Did not exist | Over 179 billion app downloads yearly on mobile devices. |
| **Social Media** | Did not exist | 74% of U.S. Internet users visit a social media site. |
| **Streaming Music** | Did not exist | 164 billion songs streamed in U.S. in 2014. |
| **Streaming Video** | Did not exist | 84% of Internet traffic will be streaming video by 2018. |
| **Gaming over the Internet** | Did not exist | 671 million people worldwide play online games. |

Source: National Foundation for American Policy, Money, The Telegraph, Forbes, Pew Research Center, Nielsen SoundScan, Cisco, comScore. *Software for World Wide Web not distributed widely until 1991; in 1990 World Wide Web did not exist for individuals on a global scale.

For the most sophisticated work, U.S. employers today seek people with graduate degrees in technical fields. At U.S. universities, foreign nationals accounted for 77 percent of full-time graduate students in electrical engineering and 71 percent in computer science in 2013. In 2013, there were 8,130 full-time U.S. graduate students in electrical engineering and 11,481 in computer science. These are small numbers, which include lawful permanent residents (green card holders), relative to a U.S. labor force of over 150 million and an $18 trillion economy.

Among the key findings in the research:

- Between 1990 and 2013, the number of computer scientists and systems analysts in the U.S. labor force increased by 381 percent, from 472,549 to 2.3 million. The number of computer software developers increased by 131 percent. And these numbers include only those individuals formally listed within those occupational categories by government classifications, which generally exclude counting those in management, marketing, teaching, etc. In comparison, during the same period, the number of people in the U.S. civilian labor force overall increased by only about 24 percent.

- Between 1990 and 2010, the supply of college degree holders outside the United States increased by 184 million people (or 155 percent), larger than the entire U.S. labor force. As a result, the U.S. share of world college degree holders declined from 26 percent to 18 percent between 1990 and 2010.

- The employment-based based green card quota of 140,000, half of which goes to dependents, has not changed since 1990 and the per country limit has made wait times far longer for immigrants from large countries, particularly India and China. The annual limit of 65,000 on H-1B visas established in 1990 has not changed, only exemptions were added for universities and non-profit and government research institutes, as well as a 20,000 exemption for foreign nationals with graduate degrees from U.S. universities. Employers have exhausted the supply of H-1B visas every fiscal year for more than a decade.

- Between 1996 and 2013, research and development (R&D) expenditures increased around the world by more than $1 trillion (in current dollars). Inside the United States, R&D spending increased by $245 billion. But the U.S. share of global research and development expenditures declined from 36 percent in 1996 to 27 percent in 2013, according to the National Science Foundation.

- The demand for high-skilled labor has increased significantly since 1990 due to the emergence of new technologies, new companies and new ways of delivering content and services to consumers. Many of today's major technologies and companies did not exist when Congress debated the 1990 Act.

- While the Internet existed in 1990, the World Wide Web did not exist for individuals on a global scale. Back in 1990, members of Congress could not have known that the Internet would become an enormous commercial force that would change life for businesses and consumers – and increase the demand for skilled labor.

- Computing power has increased beyond most people's imaginations. A UC Berkeley researcher estimated that the Apple iPhone 6 is about "1 million times more powerful than an IBM computer from 1975," an IBM computer that filled a room compared to a device that fits in one's pocket.

- International students have played a key role over the past two decades. The number of U.S. citizens and lawful permanent residents who received graduate degrees between 1995 and 2013 in electrical engineering declined by 5 percent for Ph.D.s and 11 percent for master's degrees. At the same time, the number of international students between 1995 and 2013 who received Ph.D.s in electrical engineering increased by 105 percent and by 124 percent for master's degrees.

- Between 1990 and 2013, the number of Ph.D.s in computer science increased by 250 percent for international students and by 135 percent for U.S. students (including lawful permanent residents). During those same years, the number of master's degrees in computer science earned by U.S. students increased by 55 percent and by 292 percent for international students.

- The demand for high-skilled labor to meet increased demand for new products and services can be seen in in the enormous increase in the market capitalization of a half dozen companies over the past 20 years. Apple, Intel, Cisco System, Oracle, Microsoft and Qualcomm have a combined market capitalization today of over $1.6 trillion, a $1.4 trillion increase in value (adjusted to 2015 dollars) since 1995. A look at a dozen technology-related companies that did not exist in 1990, such as Amazon, Facebook and Google, shows a collective a market capitalization for those companies of over $1.1 trillion. (The German stock market has a market

capitalization of $1.2 trillion.) The demand for high-skilled labor is also seen at Domino's and other non-tech businesses that incorporate software and highly skilled workers into their operations to serve customers.

**About the National Foundation for American Policy**

Established in the Fall 2003, the National Foundation for American Policy (NFAP) is a 501(c)(3) non-profit, non-partisan public policy research organization based in Arlington, Virginia focusing on trade, immigration and related issues. The Advisory Board members include Columbia University economist Jagdish Bhagwati, Ohio University economist Richard Vedder, former U.S. Senator and Energy Secretary Spencer Abraham and other prominent individuals. Over the past 24 months, NFAP's research has been written about in the *Wall Street Journal*, the *New York Times*, the *Washington Post*, and other major media outlets. The organization's reports can be found at www.nfap.com.

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