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**Title:** White House Says That AI Will Grow The Economy - But Lots Of Jobs Will Be Lost On The Way.

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**Source:** Forbes.com. 12/20/2016, p20-20. 1p. 2 Charts.

**Document Type:** Article

**Subject Terms:** \*UNEMPLOYMENT  
\*ARTIFICIAL intelligence  
\*AUTOMATION  
\*EMPLOYEE training  
UNITED States  
ECONOMIC aspects  
EDUCATIONAL attainment -- United States

**Company/Entity:** UNITED States. White House Office

**Abstract:** The article discusses a report from the White House that millions of jobs could be lost amid lots of economic opportunities provide by artificial intelligence (AI). According to the report, many people lose jobs because of automation and learned new skills in order to find new career paths. It also indicated the impact on the development of AI on people with less educational attainment.

**Full Text Word Count:** 1133

**Accession Number:** 120319940

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**Database:** Business Source Premier

## White House Says That AI Will Grow The Economy - But Lots Of Jobs Will Be Lost On The Way

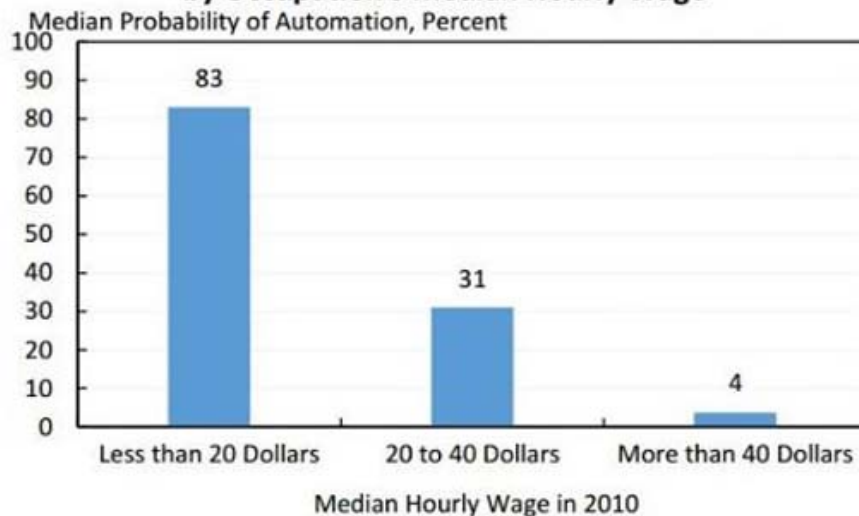
### TECH

There are lots of economic opportunities coming thanks to gains in artificial intelligence, the White House said in a report today, but that same report warns that millions of jobs could be displaced while the technology improves.

Artificial intelligence, the report notes, accelerates trends seen since the industrial revolution, as people lose jobs to automation and are forced to learn new skills to find new career paths. How fast we'll see those impacts is the question. The report notes that researchers' estimates about jobs threatened ranges widely from 9 to 47 percent, and notes that because "AI is not a single technology, but rather a collection of technologies that are applied to specific tasks, the effects of AI will be unevenly felt throughout the economy."

That said, the general assessment is that the jobs hardest hit are those that are more easily automated, which disproportionately impacts people with less educational attainment. The charts below highlight this.

**Figure 3a: Share of Jobs with High Probability of Automation, by Occupation's Median Hourly Wage**



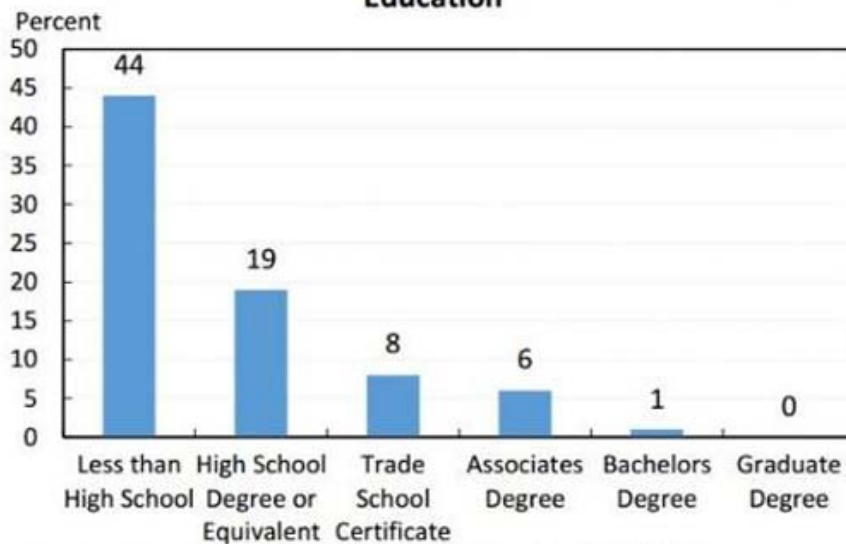
Source: Bureau of Labor Statistics; Frey and Osborne (2013); CEA calculations.

TABLE: Figure 3a: Share of Jobs with High Probability of Automation, by Occupation's Median Hourly Wage

**Figure 3a: Share of Jobs with High Probability of Automation, by Occupation's Median Hourly Wage**

Median Probability of Automation, Percent Median Hourly Wage in 2010 Less than 20 Dollars 83 20 to 40 Dollars 31 More than 40 Dollars 4 Source: Bureau of Labor Statistics; Frey and Osborne (2013); CEA calculations.

**Figure 3b: Share of Jobs with Highly Automatable Skills, by Education**



Source: Arntz, Gregory, and Zierahn (2016) calculations based on the PIAAC 2012.

TABLE: Figure 3b: Share of Jobs with Highly Automatable Skills, by Education

**Figure 3b: Share of Jobs with Highly Automatable Skills, by Education**

Percent Less than High School 44 High School Degree or Equivalent 19 Trade School Certificate 8 Associates Degree 6 Bachelors Degree 1 Graduate Degree 0

Source: Arntz, Gregory, and Zierahn (2016) calculations based on the PIAAC 2012.

(Chart from Executive Office of the President report on 'Artificial Intelligence, Automation, and the Economy')

The report also goes into detail about self-driving cars, which it estimates could impact 2.2 million to 3.1 million existing jobs in the United States, although it's quick to point out that this isn't "a net calculation -- it does not include the new types of jobs that may be developed."

What new jobs might be created by artificial intelligence? The report notes that "predicting future job growth is extremely difficult," but lays out a few broad categories that will likely see growth thanks to artificial intelligence. The report notes that a few type of AI categories may increase engagement with customers, which would in turn require more people to interact with those customers and handle work. They also note that AI can make some jobs more efficient and productive. For example, salespersons who spend a lot of time driving from client to client may benefit from having self-driving cars, because they can do more preparation and analysis as they travel from site to site since they don't need to be paying attention to the road.

The report notes other types of jobs that can be created by further investment in AI. One category is simply the development of AI itself -- as more AI applications open up, more programmers and developers are needed to make them a reality. It also notes that there will likely be avenues for more supervision of AI -- people needed to be on hand for when the programming limits are reached. Finally, the report notes that there will be employment opportunities available for "paradigm shifts" in AI. For example, more urban planning work will need to be done to accommodate self-driving cars.

It's noteworthy, though, that in most of these cases, AI will require humans to acquire more education and more skills. It's on that note that the report makes several different policy recommendations. One of the first of these is simply to develop a larger and more diverse workforce of people in the AI field. "Research has shown that diverse groups are more effective at problem solving than homogenous groups," the report notes, and so recommend gearing policy to the recruitment of more diverse students into STEM education and more diverse hires into the field of AI.

The report also recommends improving education and training so that Americans are better suited to the "jobs of the future." with an aim to developing "high-quality early education" and enabling students to graduate high school both "college and career ready." The report recommends ensuring all people have access to computers and digital tools and also improved access to a college education, because future jobs will require more education and training. But college isn't the only place where that education can be found. The report also recommends expanding job-driven training, apprenticeships, and lifelong learning programs to make it easier to facilitate people into careers.

The final aspect of the report has to deal with transitions. When hundreds of thousands of people lose their jobs because of AI or automation-driven efficiencies, how can those people be helped? Here the report recommends strengthening the social safety net, particularly unemployment insurance. "Job displacement is likely to be one of the most serious negative consequences of AI-driven automation," the report notes. Since losing jobs due to automation will likely require workers to take time to be trained and educated in new skills, the report recommends that benefits should be increased to 26 weeks, and even longer in states that experience strong spikes in unemployment.

Modifications to existing unemployment benefit laws are also recommended. "States could adopt temporary work-based training programs and allow workers to receive unemployment benefits while participating in on-the-job training." Other suggestions include ways for workers to receive partial unemployment benefits as a way for employers to save jobs by reducing hours without a sharp decrease in salary, having the government provide more services to help people find new jobs or new job training programs, and reducing geographic barriers to work -- particularly by streamlining occupational licensing laws so that it's easier for the 25% of workers who require a license to move from state to state.

Overall, the report is bullish on the economic prospects of artificial intelligence, but cautions that if policymakers aren't careful, those benefits won't extend to everyone. "There is a role for policy to help amplify the best effects of automation and temper the worst."

(Credit: Shutterstock)

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By Alex Knapp, Forbes Staff

I write about the future of science, technology, and culture. I've been working as the Social Media Editor and a staff writer at Forbes since October 2011. Prior to that, I worked as a freelance writer and contributor here. On this blog, I focus on futurism, cutting edge technology, and breaking research. Follow me on Twitter - @thealexknapp. You can email me at [aknapp@forbes.com](mailto:aknapp@forbes.com) Follow me on Twitter or Facebook. Read my Forbes blog here.

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