
THE FUTURE OF WORK

BY MACY CHANG

Self-driving cars are hitting the streets. Machines are databasing faster and more accurately than any office worker. Service robots are expanding from airport kiosks and grocery stores to serve restaurants, receive phone calls, build nanotechnology, and care for the elderly. As modern artificial intelligence reaches new heights in speech recognition, learning ability, and response to environmental stimuli, it is reasonable to wonder: which jobs will fall to the onslaught of robots? In the next couple of decades, the capabilities of AI are expected to overtake human performance and displace workers from nearly 50% of job categories.⁶ Along with forcing political change, this shift in the job market will impose an adjustment of our economic system as well as a reassessment of core American values, notably the value of work.

THE WINNERS AND THE LOSERS

The trend of unemployment as a cost of increasing industrialization is a precedent from the first three Industrial Revolutions. Respectively, the advents of engine-powered mechanics, mass production, and electronic information technology severed large parts of the labor force; however, as noted by many job market researchers such as Wayne F. Cascio, new types of jobs will provide new employment opportunities.¹

So far in our Fourth Industrial Revolution, which consists of rapid digital and physical technological integration, Cascio's prediction has proven correct; middle-class jobs have fallen and steadily been replaced by higher-skilled careers like programming and web design.¹ However, what sets this revolution apart is the unprecedented rate of machine adaptability. This leaves Amer-

icans to wonder whether human input will ever again be a baseline requirement for most tasks.

Whether or not a renaissance of new jobs is coming, short-term unemployment is an unavoidable consequence of high-level machine automation. The largest job losses are expected for a slew of middle-class jobs in the blue-collar and service sectors, particularly the transportation industry, personal vehicles industry, office and administrative jobs, sales, and construction.^{2,4} As described by researcher Carl Benedict Frey, these job types are within the 47% of jobs bound for automation in the next two decades. 19% more jobs are in moderate risk.⁴ Jobs involving creative and social intelligence, speaking or entertaining, and high-level scientific and technological skill are considered safe.¹

THE ECONOMY

The future of technological progress warrants a variety of ideas about how a human-machine hybrid economy would function. Regarding the outcome for the economy, there should be a distinct separation between the whole and the individual workers. On a grand scale, there are guaranteed benefits, including long-term GDP growth and significant returns for capital holders.⁸ The increasing efficiency and inexpensiveness of machine workers will lower capital costs for all major companies.

What is more undefined, however, is the fate of the workforce. Historical trends can justify how job loss will be mitigated by new industries. However, there is no guarantee this will occur; lack of need for human input may create "perpetual job anxiety", and even if some jobs were created, workers' rights might be discounted.^{6,8}



“The largest job losses are expected for a slew of middle-class jobs in the blue-collar and service sectors, particularly the transportation industry, personal vehicles industry, office and administrative jobs, sales, and construction.”

Other perspectives combine possibilities of capital gain with job creation, offering the idea that “ubiquitous technology” will benefit companies while being used to increase human efficiency rather than displace workers.¹ All of these perspectives are contingent on effectiveness and adaptivity of government policy.

POLITICAL COMPENSATION

Mass automation will force the American political system to conform through revisions of labor laws, corporate restrictions, and school curriculums. Secular stagnation and a diminished middle class are a reality with a “business-as-usual” approach, meaning that no government action is taken to mitigate unemployment.³ However, as economics researcher Young Joo Kim clarifies, government intervention is highly likely to occur before any major unemployment crisis. He considers that, even in a scenario where there are not enough jobs to go around, radical social programs with government-pro-

vided incentives may be a viable reality.⁷ Though incentivized social work is one viable future of employment, there are a great number of other possible political responses to consider, including set quotas for human workers, science and technology-based educational reform, and guaranteed basic income.

A universal basic income (UBI) scheme is an especially contentious, but possibly suitable, solution for job loss. Basic income would entail annual grants to every citizen of a baseline amount of money, likely around the \$10,000 range. Groundwork for UBI has been set in other countries, including by Canada’s Manitoba Project and Finland’s current universal welfare experiment. Universal income could prove synergistic; studies performed in North Carolina, Namibia, and India all demonstrated correlations of basic income to increased literacy and test scores in school.¹⁰ Higher educational performance will be vital for employment in a future with increasing demand for technical skill, meaning that UBI could possibly be an effective mitigator for job automation.

There are evident drawbacks to the universal basic income scenario, including budget impact, dismantling of other welfare infrastructure, and, of course, the fear of an idle population. Universal basic income studies in North America found a 13% decrease in work hours per family, mostly among mothers and teenagers.¹⁰ These studies and scenarios of UBI, despite entailing much controversy, are worth careful examination, as are other political mitigation techniques to handle potential job automation in the future.

THE VALUE OF WORK

As a final point of consideration, how will American social values manage the pressure of workforce automation? Digital technology will strengthen class opposition toward capital holders as the lower and middle classes face the short-term consequences. In the long run, increases in efficiency will likely be paired with increasing class inequality.⁹ From here, there are a few possible pathways. Human-machine interactions may become more natural over time and promote integration into the workplace.⁵ On the other hand, class opposition may be so contentious that political change is obliged to maintain social order. The middle route, and most adaptive route, is large-scale educational revision to create a science and technology-orient-



Figure 1. Sophia, a social humanoid robot created by Hanson Robotics Ltd., at the AI for GOOD Global Summit in Geneva, Switzerland. In the modern age, new heights in machine learning and visual data processing are being achieved.¹¹

“Mass automation will force the American political system to conform, including through revisions of labor laws, corporate restrictions, and school curriculums.”

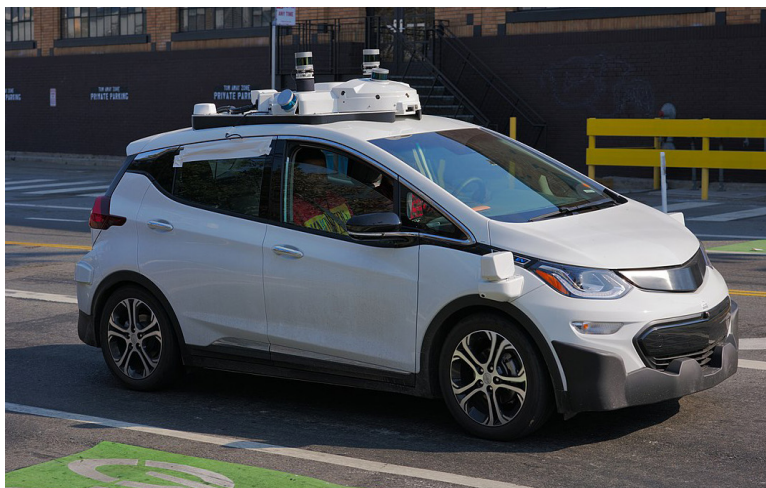


Figure 2. A third generation Cruise Automation Chevrolet Volt driving on the streets of San Francisco. Self-driving cars are expected to cause major upsets in the transportation and personal vehicle industries in the next few decades.¹²

ed focus in school, training future workers to enter emerging industries.⁷ What amplifies this possibility is the estimate that twice as many students will be in higher education by 2025.⁶

A core principle of American culture is to be self-made—to work for what you have—and may stem from the Marxist idea that equates the input of labor to how much labor can be purchased.¹⁰ This value is intrinsic to the economy and all of American capitalist politics. However, as the U.S. sits at the epoch of a new Industrial Revolution, how will Americans change their laws and values when, like agricultural production, most of the work is done by machines? Whether future digital technology is used for workforce integration or corporate benefit, whether the government can create a comprehensive game plan, and whether Americans can adapt their values to a machine-hybrid society will all be powerful determinants of artificial intelligence’s impact in the next generation.

REFERENCES

1. Cascio, W. F. and Montealegre, R. (2016). How Technology is Changing Work and Organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 3(1), 349-375.
2. Clements, L. M. and Kockelman, K. M. (2017). Economic Effects of Automated Vehicles. *Transportation Research Record: Journal of the Transportation Research Board*, 2606, 106-114.
3. Cockshott, P. and Renaud, K. (2016). Humans, robots, and values. *Technology in Society*, 45(2016), 19-28.
4. Frey, C. B. and Osborne, M. A. (2016). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting & Social Change*, 114(2017), 254-280.

5. Gonzalez-Jimenez, H. (2018). Taking the fiction out of science fiction: (Self-aware) robots and what they mean for society, retailers and marketers. *Futures*.
6. Inayatullah, S. (2017). Teaching and Learning in Disruptive Futures: Automation, Universal Basic Income, and Our Jobless Futures. *Knowledge Futures: Interdisciplinary Journal of Futures Studies*, 1(1), 00-00.
7. Kim, Y. J., Kim, K., and Lee, S. (2017). The rise of technological unemployment and its implications on the future macroeconomic landscape. *Futures*, 87(2017), 1-9.
8. Nica, E. (2016). Will Technological Unemployment and Workplace Automation Generate Greater Capital-Labor Income Imbalances? *Economics, Management, and Financial Markets*, 11(4), 68-74.
9. Prettner, K. (2017). A Note on the Implications of the Automation for Economic Growth and the Labor Share. *Macroeconomic Dynamics*, 1-8.
10. Ruckert, A., Huynh, C., and Labonte, R. (2017). Reducing health inequities: is universal basic income the way forward? *Journal of Public Health*.

IMAGE REFERENCES

1. (2017, June 8). AI for GOOD Global Summit [Digital image]. Retrieved from <https://www.flickr.com/photos/itupictures/35008372172>.
2. (2017, October 18). Cruise Automation Bolt EV third generation in San Francisco [Digital image]. Retrieved from https://upload.wikimedia.org/wikipedia/commons/b/be/Cruise_Automation_Bolt_EV_third_generation_in_San_Francisco.jpg.