

CALIFORNIA LEGISLATURE

STATE CAPITOL
SACRAMENTO, CALIFORNIA
95814

The Future of Work: How Technology and Automation Impact Workers' Rights and Job Quality

*Joint Hearing of the Senate Labor and Industrial Relations Committee and the
Assembly Committee on Labor and Employment, Pan and Thurmond, Chairs*

March 20, 2018

Since the American Industrial Revolution, technological developments have transformed the nature of work in the United States. As jobs were increasingly aided by machines, the U.S. economy shifted its focus from “agriculture and the artisan shop, to manufacturing and clerking, to service and management occupations.”¹ New technology led to notable inventions such as the textile mill, the automobile, and the personal computer, which have all impacted work and the workplace. Today, across industrial sectors, the utilization of new technology is automating key job-related tasks, activities, and some occupations, and the effect of these changes is relatively uncertain.

What is Automation?

In the context of the workplace, automation means creating and applying technology to monitor and control the production and delivery of products and services.² Automation includes technologies such as robotics, cybersecurity, control systems, and wireless applications. Employers seek to automate means of production to increase productivity and efficiency, but in doing so, raise important questions about the role of human labor in the process.

Automation and Jobs

Much of the research on trends in workplace automation focuses on the threat of job loss. Labor economists have found it hard to predict an overall figure for job loss because there are so many forces beyond automation that impact the labor market. A novel approach to the challenge of forecasting looks at the factors that can either speed up or slow down the adoption of workplace

¹ Carl Benedikt Frey and M. A. Osborne, “The Future of Employment: How Susceptible Are Jobs to Computerisation?” University of Oxford, working paper, September 17, 2013, p. 13.

² This definition comes from the International Society of Automation, a global nonprofit professional organization.

automation. Some of the factors that will influence the pace of automation include: technical feasibility, the cost of developing the technology, the quantity and quality of labor, and regulatory and social acceptance.³ The confluence of these factors will impact the pace of automation, which in turn, affects the extent of worker displacement.

While the extent of job loss due to automation is difficult to forecast, labor market economists have been able to project the percentage of work performed that could be automated. A 2017 report by the McKinsey Global Institute estimates that around 15 percent of work performed globally could be displaced by 2030.⁴ In the United States, that number is slightly higher at 23 percent.⁵ If advanced technology is developed more quickly than expected, due to factors such as increased feasibility and lower cost, then the global number is closer to 30 percent.⁶ The Institute contends that although these numbers are significant, they lack context. They argue that empirically when employment shifts from one sector to another, worker displacement is largely temporary. For example, while the agricultural share of employment in the U.S. went from 60 percent in 1850 to less than 5 percent in 1970,⁷ most workers were able to move into manufacturing jobs.

Labor economists generally point to the potential for automation to displace “work activities” rather than jobs because few jobs can be fully automated. In fact, some predict that fewer than five percent of jobs are at risk for complete automation.⁸ Instead, they argue that certain job tasks are susceptible to mechanization. For example, repetitive and routine tasks found in predictable settings such as bookkeeping, clerical work, or production line activities, are highly susceptible to automation.⁹

Conversely, tasks that are least susceptible to automation generally fall into two categories. The first category includes tasks that are abstract in nature. These job tasks often involve problem-solving, creativity, and persuasion.¹⁰ They are generally associated with professional and managerial occupations.

The second category involves tasks characterized by physical labor or interpersonal communication. Some examples of occupations associated with these tasks are home health aides, custodians, and groundskeepers.¹¹

³ James Manyika et al., “Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation,” McKinsey Global Institute, December 2017, p. 2.

⁴ *Id.* The McKinsey Global Institute is the economics research branch of McKinsey and Company, a global management consultant firm.

⁵ *Id.* at 3.

⁶ *Id.*

⁷ Manyika et al., “Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation,” McKinsey Global Institute, December 2017, p. 4.

⁸ *Id.* at 2.

⁹ David H. Autor, “Why Are There Still So Many Jobs? The History and Future of Workplace Automation,” *Journal of Economic Perspectives*, vol. 29, no. 3, Summer 2015, p. 11.

¹⁰ *Id.* at 12.

¹¹ *Id.*

Another labor market theory posits that the automation of certain tasks in production will increase demand for the remaining tasks.¹² In other words, as tasks are automated, the complimentary human tasks must keep pace with them or the production chain will fail. Therefore, those who are skilled in the complementary functions should have a valuable role in the work process.

Employment trends will also play a role in the extent and impact of workplace automation. Some researchers believe that the growing demand for certain occupations over the next ten years will help offset job displacement due to automation. For example, researchers theorize that demographic trends, such as the growth in our aging population, will increase the demand for health care and personal care services.¹³ In addition, the development of new technology, which is projected to see an increased investment of over 50 percent in the next decade, could create millions of jobs in computer science, IT administration, and engineering.¹⁴

Challenges for the Workforce

Even if automation creates new jobs while displacing others, there is significant concern that this process will lead to job and income polarization. A number of labor economists worry that, over the next decade, automation will exacerbate the hollowing-out of middle class jobs.¹⁵ Technological advancements have historically fostered employment in high-income cognitive jobs and low-income manual occupations. Some examples of high-income cognitive jobs are architects and senior managers while examples of low-income manual jobs are cleaners and fast food workers.¹⁶ The effect of this polarization is seen in the decline in the employment share of four middle-class occupations: sales, office workers, production workers, and operators. In 1979, these occupations accounted for 60 percent of employment, while in 2007, they accounted for 46 percent.¹⁷ Some labor economists argue that policy interventions may be necessary to halt or reverse this trend.

Some researchers also raise the concern that the current pace of automation will cause an occupational shift so dramatic that worker retraining needs will be immense.¹⁸ Unlike previous waves of technological advancement, where workers could move from one routine job to another, the next phase of automation will require large numbers of workers to switch

¹² *Id.* at 6.

¹³ *Supra* note 7, p. 6.

¹⁴ *Supra* note 7, p. 7.

¹⁵ See Manyika et al., "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation," McKinsey Global Institute, December 2017; Frey and Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?" University of Oxford, working paper, September 17, 2013; and David Rotman, "How Technology is Destroying Jobs," *MIT Technology Review*, June 12, 2013.

¹⁶ The Economist, Special Report, "The Impact on Jobs: Automation and Anxiety," June 25, 2016, online at: <https://www.economist.com/news/special-report/21700758-will-smarter-machines-cause-mass-unemployment-automation-and-anxiety>.

¹⁷ *Supra* note 9, p. 14.

¹⁸ Manyika et al., "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation," McKinsey Global Institute, December 2017, p. 9.

occupations and also enter new industries.¹⁹ In addition, many of these workers will be at the midcareer point, and could find it challenging to reenroll in training or educational programs.

In conclusion, the world of work is becoming increasingly automated. While researchers may disagree over the extent that automation will displace jobs or job-related tasks over the next decade, they fundamentally agree that investing in human capital during this process will be critical. As David Autor, a leading U.S. economist states, “human capital investment must be at the heart of any long-term strategy for producing skills that are complemented rather than substituted for by technological change.”²⁰ What that investment will look like is an open question that warrants further examination and discussion by stakeholders.

¹⁹ *See id.*; The Economist, Special Report, “The Impact on Jobs: Automation and Anxiety,” June 25, 2016.

²⁰ *Supra* note 9, p. 27.