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Memorandum

To: Members, Select Committee on Economic Disparity and Fairness in Growth
From: Select Committee Majority Staff
Subject: November 3, 2021, Select Committee Hearing entitled, "Our Changing Economy: The Economic Effects of Technological Innovation, Automation and the Future of Work"

The Select Committee on Economic Disparity and Fairness in Growth will hold a hearing entitled "Our Changing Economy: The Economic Effects of Technological Innovation, Automation and the Future of Work" on Wednesday, November 3, 2021, at 10:00 AM ET in CVC 200, Congressional Auditorium. There will be one panel with the following witnesses:

- **Professor Daron Acemoglu**, MIT Institute Professor, MIT Department of Economics
- **Dr. Kristen Broady**, Fellow in the Brookings Metropolitan Program, The Brookings Institution
- **Dr. Shawn Dubravac**, CEO and President, Avrio Institute
- **Ms. Zoë Baird**, CEO and President, Markle Foundation
- **Mr. Brent Orrell**, Senior Fellow, American Enterprise Institute

Overview

The purpose of the hearing is to explore the effects of technological innovation and automation on economic disparity and their implications for the future of work. Automation refers to the development and deployment of technologies that allow previously human-reliant tasks to be performed more efficiently (faster, better quality, increased output) with the addition of capital equipment, to complement and/or substitute for human work. This capital equipment includes both heavy machinery for production-related jobs and computer hardware and software that benefits all kinds of production- and service-sector work.

While technological innovations across history have always disrupted industries and their workforces, the rapid technological advancements of the digital and information age have the capacity to affect nearly all occupations and workers – with even more innovation and disruption quickly approaching. This hearing will focus on how technological advancements in machines (broadly defined) have both boosted overall economic productivity and changed the mix and quality of jobs that humans do, creating some jobs, eliminating others, but also eliminating parts of certain jobs. While technological innovations generally create more jobs than they destroy, they can have disparate effects on some groups of workers and the new jobs will require different skills. We will also discuss how labor market institutions, the private sector, and federal, state, and local governments are adapting to these changes to help the US economy equitably harness the benefits of technological innovation; examine what skills current and future workers need in order to remain globally competitive; and see how those skills can be taught.

Background/Introduction

Many economic factors, on both the demand and supply sides of the global economy, determine the mix of jobs that Americans work. Over the past several decades, the share of US employment in service-providing industries has increased and that in goods-producing industries has fallen, and this overall trend has been driven by changes in consumer preferences (a favoring of experiences over things) on the demand side, as well as shifts in the education/training of the workforce (toward knowledge skills and away from physical skills) and new cost-saving opportunities available to businesses on the supply side.[1] Globalization, but more specifically the offshoring of production to other countries with cheaper labor, has been one of the cost-saving actions that has reduced employment in manufacturing/production jobs in the US, as this Committee has focused on in our most recent past hearings.

Technological innovation and automation, which allows machine work to substitute for human work, is another way businesses can reduce costs, improve output per worker (productivity), and increase profits. Like globalization, there have been large and widespread benefits of automation enjoyed by the US consumer (the demand side of our economy) in the form of lower prices and greater and easier access to a wider range of goods and services. Further, the World Economic Forum (2018) reported that over just the next several years 75 million jobs worldwide may be displaced by a shift in the division of labor between humans and machines, but nearly double that number (133 million) of new roles could emerge that are more adapted to the new machine technologies. But also like globalization, the costs of automation on the supply side of the economy in terms of who loses work or wages due to cost-saving business practices have been unevenly distributed. While technological innovations could create net new jobs in aggregate, the distribution of the job gains and losses merits further study. While it is impossible in practice and in retrospect to look at the loss of certain jobs in certain sectors of our economy (such as the manufacturing sector) and attribute blame for the losses to automation vs. globalization vs. the other confluence of economic factors, it is easier in theory to both understand and predict which kinds of jobs are more likely to be lost to automation (as a specific factor) in the future.

Technological Innovation and Economic Productivity

The standard of living in the United States has increased substantially in the post-World War II period. Between 1947 and 2020, the real per capita gross domestic product (GDP) increased from $16,054 to $63,277—a nearly fourfold increase.[2] The quadrupling of real per capita GDP in the span of one lifetime was unimaginable for most of human history and only became possible through rapid technological innovations and increases in efficiency—and in turn corresponded with massive and widespread increases in the quality of life for Americans. Technological innovation has allowed more goods and services to be produced with the same amount of or fewer inputs.[3] Indeed, labor productivity, which measures the value of economic output per hour worked in the United States, has been steadily climbing over the past 70 years. In the nonfarm

[1] According to Bureau of Labor Statistics historical establishment survey data, the services share of total employment grew from 55% in (January) 1980 to 61% in 1990, 66% in 2000, 69% in 2010, and 71% in 2020.
[2] U.S. Bureau of Economic Analysis, Real gross domestic product per capita [A939RX0Q048SBEA], retrieved from FRED, Federal Reserve Bank of St. Louis, October 15, 2021.
[3] McKinsey Global Institute, A Future That Works: Automation, Employment, and Productivity., January 2017, Last Accessed October 29, 2021.

business sector, total labor productivity increased 369.5% between 1947 and 2020.[4] The standard of living and consumer gains in the postwar period in the US are in large part attributed to technological advancements.[5]

Similar to the economic benefits and costs that come from global trade and production, technological advances have benefitted Americans quite broadly through their role as consumers, when businesses pass along at least part of their cost savings on to consumers in the form of lower prices and/or improved quality of products. However, these widespread benefits of technology to US consumers have coincided with a much more uneven distribution of costs in how machine technology has increasingly displaced the tasks and jobs of American workers. The ways in which automation has affected employment and earnings in the manufacturing sector specifically have been closely examined and publicized, but the effects of automation have been felt by workers in a range of industries and occupations. A 2021 study by Acemoglu and Restrepo finds that over the past four decades, task displacement and its economy-wide impacts explain about 48% of changes in US wage levels. According to the study, "task displacement", defined as the type of automation that replaces jobs in which workers are engaged in repetitive tasks like some blue-collar manufacturing jobs and clerical jobs, strongly correlates with negative real wage growth among affected workers.[6] But as will be elaborated below, this task displacement does not affect all demographics of workers equally.

Technological Innovation and the Impacts of Automation Across Occupations

While some occupations can be greatly enhanced by rapid advances in technology, others have the potential to be made obsolete. For instance, new digital technologies may bolster the productivity of software developers and create new investment and manufacturing opportunities (e.g., production of autonomous vehicles), while other advancements, such as in robotics, are linked to declining employment and wage opportunities in manufacturing.[7]

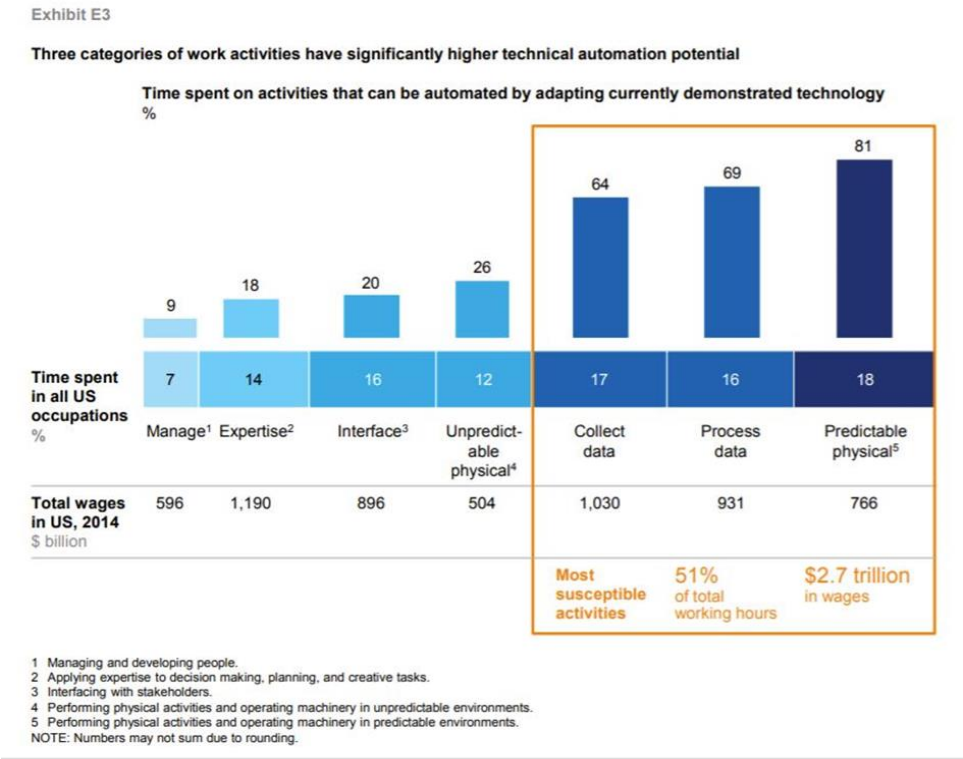
The magnitude of the impact of digital and automation technologies on employment varies considerably – primarily due to the challenge of defining the tasks that are at risk of automation.[8] For instance, Frey and Osborne (2013) project that about 47% of US employment is at high risk of automation.[9] On the other hand, the jobs that are safe from automation are those that require the skills in "perception and manipulation" (e.g., the ability to make precisely coordinated movements to assemble small objects or work in cramped spaces), "creativity" (e.g., the ability to come up with creative solutions to a problem or create a work of art), and "social intelligence" (e.g., being persuasive, skilled at negotiation and caring for others).[10] Other studies, building on the authors' methodology but using more detailed data, estimate considerably lower employment

[4] U.S. Bureau of Labor Statistics, Nonfarm Business Sector: Labor Productivity (Output per Hour) for All Employed Persons [OPHNFB], October 13, 2021, Last Accessed October 29, 2021.
[5] Brookings Institution, Technology and America's Good Times: An overview, December 1, 2001. Last Access October 29, 2021.
[6] Acemoglu and Restrepo, Tasks, Automation, and the Rise in US Wage Inequality, June 2021, Last Accessed October 2021.
[7] Frank, et al., Toward Understanding the Impact of Artificial Intelligence on Labor, 2019.
[8] OECD, The Local Dimension of Job Automation, Job Creation and Local Economic Development 2018: Preparing for the Future of Work, 2018.
[9] Frey, et al., The Future of Employment: How Susceptible Are Jobs to Computerisation?, 2017.
[10] Ibid.

loss.[11] For instance, analyzing the job-level tasks, Arntz et. al. (2017) estimates the automation risk of US jobs is only 9%.[12]

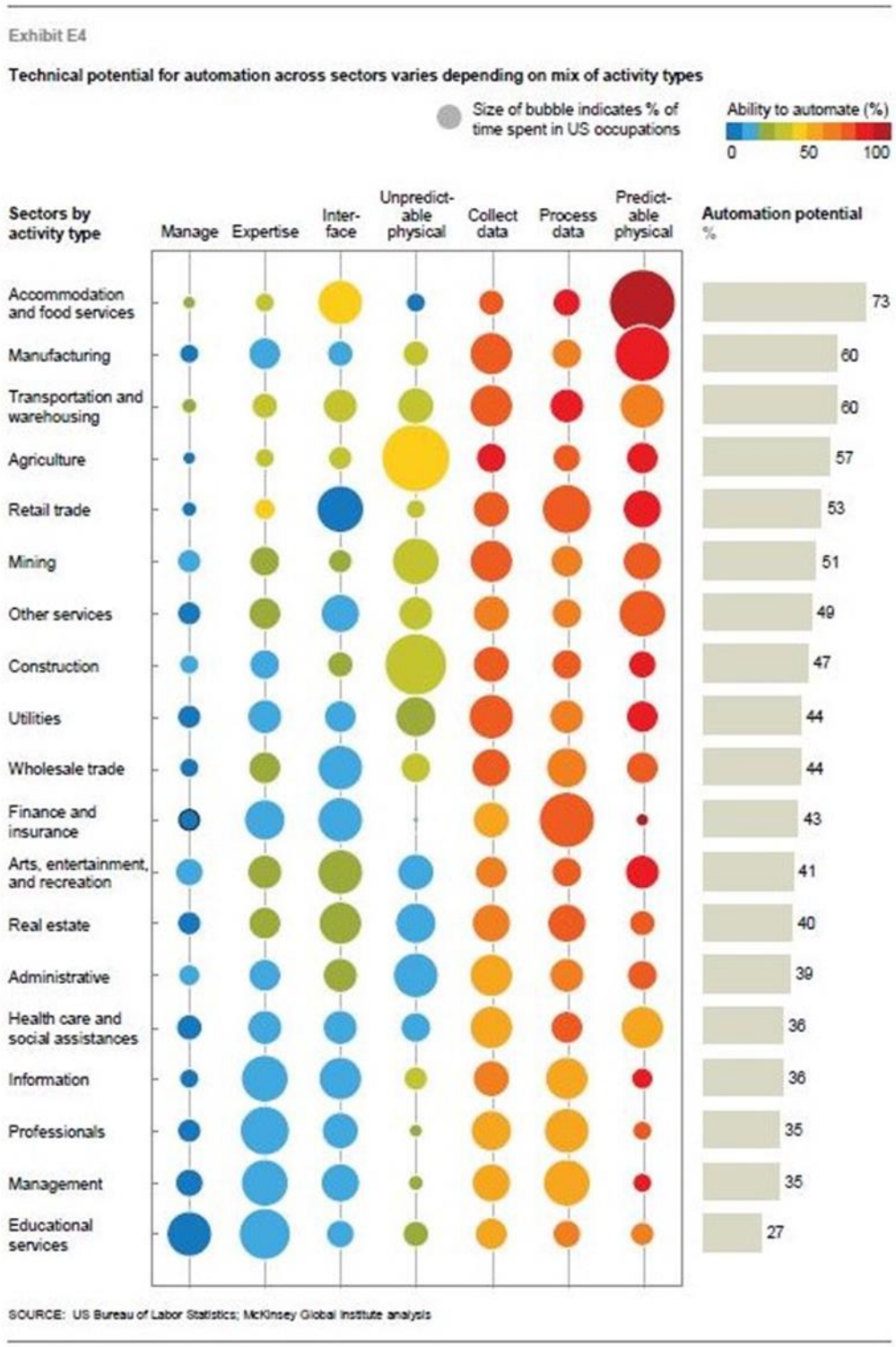
The McKinsey Global Institute report (2017) likewise contends that the potential impact of automation should be analyzed at the level of individual activities rather than entire occupations.[13] At the time of the report, less than 5% of occupations were candidates for full automation, but almost every occupation had partial automation potential. As shown in **Figures 1 and 2**, reproduced from the report, the activities defined by the report as most susceptible to automation were "physical ones in highly structured and predictable environments, as well as data collection and processing." According to the McKinsey predictions, these activities make up 51% of all activities in the US economy, account for $2.7 trillion in wages, and are most prevalent in manufacturing, accommodation and food service, and retail trade sectors.

Figure 1. Types of Job Tasks Most Likely to be Automated (McKinsey (2017))



[11] OECD, The Local Dimension of Job Automation, Job Creation and Local Economic Development 2018: Preparing for the Future of Work, 2018.
[12] Arntz, et al. Revisiting the risk of automation, 2017.
[13] McKinsey Global Institute, A Future That Works: Automation, Employment, and Productivity, 2017.

Figure 2. Risk of Job Automation Due to Mix of Tasks, by Industry (McKinsey (2017))



The Brookings Institution further highlights that automation least threatens tasks associated with certain skills: those requiring nonroutine cognitive tasks in high-wage jobs; those required for dealing with unpredictable human behavior (e.g., in childcare or elderly care); or those requiring detailed manual handling (such as gardening and construction in low-wage jobs).[14] Therefore, these jobs will likely remain in demand for the foreseeable future. Meanwhile, middle-skilled jobs that require specialization in routine labor tasks are at higher risk of automation. Brookings estimates that three middle-skilled occupations—cashiers, retail salespersons, and secretaries and administrative assistants— represent the largest groups subject to automation risk, totaling nearly 9 million workers.[15]

Advanced technologies have given rise to the platform economy, enabled by new economic connections based on the Internet, data, and computation. The new forms of digitally enabled activities have provided individuals with more flexibility in work location and schedules, providing more options for fitting work around other responsibilities.[16] For firms, new business models and consequent cost reductions through non-standard employment arrangements and outsourcing have allowed for more flexibility and agility to manage and adjust their workforces to changing and sometimes unpredictable economic conditions.[17] More broadly, the emergence of the platform economy can help lower labor market entry barriers, improve labor matching, and bring firm transaction costs down, ultimately benefitting consumers.[18] On the other hand, the platform economy jobs, including "gig" and self-employment, generally fail to provide benefits or bargaining power and can frequently face health and safety issues due to the lack of regulation.[19] In turn, firms that rely excessively on non-standard work arrangements may experience erosion of firm-specific skills and lower productivity growth due to lower investments in training.

The COVID-19 pandemic has amplified labor market trends associated with automation and digitization. Automation, robotics, cloud computing, and videoconferencing have all allowed firms to continue operating and employees to work remotely or maintain social distancing while working in person. Yet telework is out of reach for many, particularly those without a college degree. [20] And because workers of color are less likely than their white counterparts to hold a bachelor's degree or higher and hence higher-quality, higher-paid jobs, they are less likely to be afforded the opportunity to telework.[21] Furthermore, workers of color have been more likely to contract COVID-19 in the workplace and suffer negative economic outcomes—such as reduced wages or unemployment—due to the pandemic's disproportionate impact on human-contact-intensive occupations.[22] While the occupational spread of digital technologies was already projected to increase prior to the COVID-19 pandemic, the forced adaptation of the US economy to public health crisis conditions has certainly accelerated these trends and perhaps shifted the

[14] Brookings Institution, Race and Jobs at Risk of Being Automated in the Age of COVID-19, March 2021.
[15] Ibid.
[16] OECD, Managing self-employment, new forms of work, and the platform economy, Good Jobs for All in a Changing World of Work. 2018.
[17] Ibid.
[18] Ibid.
[19] Ibid.
[20] IMF, Teleworking is Not Working for the Poor, the Young, and the Women. 2020.
[21] Census.gov, Educational Attainment in the United States: 2015, March 2015.
[22] VoxEU Centre for Economic Policy Research (CEPR), The macroeconomic effects of automation and the role of COVID-19 in reinforcing their dynamics, June 23, 2020, Last Accessed October 26, 2021.

reach of automation further into even those human-intensive jobs previously thought to be more immune to machine replacement.[23]

Technological Innovation and the Impacts of Automation by Gender and Race/Ethnicity

While almost every job in the economy will be affected by technological innovation, workers in occupations that are most at risk of being automated can correlate with specific demographic groups.

First, the propensity for men and women to work in different occupations, a phenomenon known as occupational gender segregation, contributes significantly to the different ways that automation interacts with employment trends for each group.[24] Despite representing 47.4% of the overall workforce, between 2014 and 2016 women made up 58.4% of the workers in occupations considered "high-risk" for being automatable, which is defined as an occupation that has a 90% or higher probability of automation.[25] On the other hand, the highest-paid of the "automatable" jobs have traditionally been male-dominated, heavy manufacturing jobs (where big machines have replaced human physical labor), while the lowest-paid automatable jobs are the female-dominated, customer and clerical service jobs (where small machines/computers have replaced human processing tasks), so that those jobs displaced by automation are likely to actually *reduce* the gender pay gap in the economy overall, across all industries. Women are also disproportionately represented in the (rapidly growing) health and education services workforces, and these are jobs that rely more on human skills and interactions and are hence less likely to be replaced by machines.[26]

In addition to falling along gender lines, occupational segregation falls along racial and ethnic lines, although to a greater degree for men than for women. Automation will disproportionately affect Black and Latino workers due to their higher representation in the most at-risk occupations.[27] Specifically, 31.2% of Latino workers and 27.3% of Black workers are concentrated in the 30 occupations that are most susceptible to automation over the next 16 years. In contrast, these same 30 jobs account for just 23.7% of white workers and 19.9% of Asian workers.[28]

Examples of racially segregated occupations include secretaries, administrative assistants, restaurant wait staff, retail salespersons and cashiers. Despite Black and Hispanic women having higher labor force participation rates than white women—60.3% and 57.0%, respectively, compared to 56.4%—they tend to be overrepresented in low-wage service jobs. Hispanic women face the highest risk of job automation; some 72.7% of jobs in their ten most common occupations are at risk of technological substitution.[29]

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[23] McKinsey Quarterly, Where Machines Could Replace Humans and Where They Can't (yet), July 2016; McKinsey Global Institute, The Future of work after COVID-19, February 2021.
[24] Institute for Women's Policy Research, Women, Automation, and the Future of Work, May 13, 2019. Last Accessed October 20, 2021.
[25] Ibid.
[26] Bureau of Labor Statistics, Employed person by detailed industry, sex, race, and Hispanic or Latino ethnicity, Updated July 30, 2021. Last Accessed October 29, 2021; Frey, et al., "The Future of Employment: How Susceptible Are Jobs to Computerisation?" 2017.
[27] Joint Center for Political and Economic Studies, Race and Jobs at High Risk to Automation, December 2017. Last Accessed October 2021.
[28] Ibid.
[29] Institute for Women's Policy Research, Women, Automation, and the Future of Work, May 13, 2019. Last Accessed October 20, 2021.

The Geography of Technological Innovation

The actual and potential impacts of emerging technologies on human employment and wages vary across different places in the US as well.[30] While some regions have greatly benefited from new job opportunities generated through technological advances, other locales have experienced economic hardships, particularly through losses of middle-wage jobs.

The differences in automation potential and overall economic impacts of new technologies also vary across *levels* of geography. For instance, in larger geographic areas like US states, the potential for automation and its consequences is less pronounced, as larger geographic spaces are more likely to contain a wide variety of industries and occupations in their economy than are smaller geographic spaces like particular cities and towns.[31] The variation in automation potential becomes sharper at more granular geographic levels, particularly for smaller, rural communities.[32] Among the large metro areas, employment-weighted task risk to automation by 2030 will be about 50% in locations like Toledo, OH, and Greensboro-High Point, NC. In metros like San Jose, CA, and Washington, DC, the risk drops to about 40%. In smaller, particularly industrial metros like Hickory, NC, the automatable share of work rises to 55%.[33]

The rapid adoption of the personal computer and digitalization of the economy drove a decline in manufacturing, clerical and other routine[34] jobs nationally, hitting the routine-work oriented local labor markets[35] particularly hard. The local labor markets with the highest shares of routine jobs in 1980 (including manufacturing centers like Winston-Salem, NC, Chicago, IL, and Pittsburgh, PA, and transitioning knowledge centers like New York, San Francisco, and Washington DC) saw the largest increases in low-skill service occupations employment by 2016, indicating a shift of middle-skilled, often non-college educated workers into lower-wage local service activities.[36]

While consumers have broadly benefitted from the expanded mix and lower cost of goods and services that digital technologies have made possible, the geographic concentration of technology-producing companies in the West Coast has possibly in part contributed to the lack of racial diversity among tech sector workers, especially in the highest-paid technical and management roles.[37] Not all Americans are able to fully access the benefits of the digital economy in terms of both the consumer marketplace and the labor market (which has also gone increasingly online). Given the geographic concentration of the benefits of digital work and the still-inadequate access to broadband/internet technologies in many parts of the country, closing the "digital divide" is a vital step in addressing existing economic disparities.[38]

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[30] OECD, "The Local Dimension of Job Automation," Job Creation and Local Economic Development 2018: Preparing for the Future of Work, 2018.
[31] Brookings Institution, Automation and Artificial Intelligence: How machines are affecting people and places, 2019.
[32] Ibid.
[33] Ibid.
[34] In Brookings Institution, Automation and Artificial Intelligence: How machines are affecting people and places, 2019, the authors define "routine" jobs as jobs that require repetition and can be found in occupations requiring some post-high school education (e.g., sales, clerical-retail, and administrative roles).
[35] In Brookings Institution, Automation and Artificial Intelligence: How machines are affecting people and places, 2019, the authors use Commuting Zones as a unit of analysis for local labor markets. Commuting Zones represent geographic clusters of counties with strong commuting ties. For more information, please visit: U.S. Department of Agriculture Economic Research Service, Commuting Zones and Labor Market Areas, March 2019.
[36] Brookings Institution, Automation and Artificial Intelligence: How machines are affecting people and places, 2019.
[37] The Conference Board, Mind the Gap: Factors Driving the Growing Racial Wage Gaps and Solutions to Close Them, 2021.
[38] Brookings Institution, From Rural Digital Divides to Local Solutions, No Date, Last Accessed November 1, 2021.

The Future of Work and Labor Market Institutions

The industrial and technological changes shaping labor market and economic outcomes are not new.[39] In 1930, economist John Maynard Keynes recognized both: the opportunities of industrial automation and the danger of the consequent unemployment stemming from the disruption.[40] However, at the time, the mechanization of certain tasks was accompanied by the creation of new tasks and new jobs requiring a diverse set of skills. In addition, labor market institutions, such as minimum wages, collective bargaining, and regulations, were intended to support a shared prosperity and ensure that workers would continue to find secure jobs with high wages.

The role of collective bargaining (unionization) in encouraging shared prosperity in the face of technological advancements has declined over the past several decades. The proportion of union members among employees in the OECD countries decreased almost in half between 1985 and 2016 from 30% to 16%.[41] These trends are tied to increased global economic interconnectedness, the rise of automation and artificial intelligence, the emergence of non-standard "gig" work, and the decline of the manufacturing sector, among other factors. The decline in union density is also sometimes attributed to changing attitudes and preferences away from unions among workers, but this is disputed by some polling indicating openness to unions among younger workers.[42]

Whatever the reasons for the decline in unionization, there is some evidence that the decline has exacerbated the adverse impacts of automation on employment outcomes. A recent study on employment and earnings trajectories for US workers in routine (hence highly automatable) occupations found evidence for both higher employment stability and reduced risk of low earnings associated with union membership in the long term.[43] Specifically, the study found that between 1970 and 2015, union membership contributes to a 5 percentage point decrease in the likelihood of becoming unemployed and a 4 percentage point decrease in the likelihood of earning below 50% of national median earnings. The results hold across all age, race/ethnicity, gender, and level of educational attainment groups, thus providing evidence for the important role of organized labor in the worker outcomes associated with technological change.[44] The implications of these findings are crucial, particularly in light of the empirical findings from the study by Acemoglu and Restrepo (2017), which estimates that one additional industrial robot is associated with the reduction of 3 to 6 jobs as well as decreases in average wages in the US between 1993-2007.[45]

In contrast to the US, Germany's adoption of industrial robots did not result in overall job loss between 1994-2014, generating substantially different labor market outcomes, particularly in terms of job security, for the workers in the highly unionized manufacturing sector.[46] While industrial robots are far more prevalent in Germany than in the rest of Europe and the United

[39] Daron Acemoglu, AI's Future Doesn't Have to Be Dystopian, 2021.
[40] John Maynard Keynes, Economic Possibilities for our Grandchildren, 1930.
[41] OECD, Facing the Future of Work: How to Make the Most of Collective Bargaining, *OECD Employment Outlook 2019: The Future of Work*, 2019.
[42] Ibid.; Pew Research, Majorities of Americans Say Unions Have a Positive Effect on U.S. and that Decline in Union Membership is Bad, September 2021.
[43] Economic Studies at Brookings, Organized labor and the employment trajectories of workers in routine jobs: Evidence from U.S. panel data. 2020.
[44] Ibid.
[45] Acemoglu and Restrepo, Robots and Jobs: Evidence from US Labor Markets. 2017.
[46] VoxEU Centre for Economic Policy Research (CEPR "The Rise of Robots in the German Labour Market," September 2017.

States, Dauth et al. (2017) find that incumbent workers exposed to robots were more likely to remain employed in their original workplace even if performing new tasks.

In the meantime, across the OECD countries, new forms of labor market institutions, including unions, have been emerging alongside new labor market trends. For instance, Swedish Job Security Councils (JSCs), jointly owned by employers and unions, have been providing proactive support, including reskilling opportunities, and guidance to displaced workers—even before displacement occurs.[47] More traditional unions, such as the metal sector unions in Italy, have also been increasingly negotiating for the training access for the workers even at the cost of lower wage increases.[48] The OECD report (2019) argues that focusing on investing in skills is both useful for the labor market adaptability for the workers and is a way for the unions to "keep their roots in the local community" and attract new members.

Looking Forward: What works, and what is next?

The changing nature of work and technological advancements have brought about a new phenomenon often referred to as the growing skills mismatch. According to a McKinsey survey (2018), 77% of private-sector organizations with annual revenues of over $100 million in the US believed that addressing potential skills gaps related to automation and/or digitization within their workforces were a top-10 priority, and 29% believed it was top 5.[49] Additionally, 64% of the firms that believed that reskilling was a top-10 priority also believed that corporations were responsible for taking the lead in addressing potential skills gaps, compared to 14% that believed that the federal government was responsible and 13% that believed that local and/or state governments were. Of the same group of firms, 31% believed that the best way to resolve the skills gap was only or primarily through retraining, compared to 35% that believed that it was only or mainly through rehiring. Research conducted by the Lumina Foundation, a private Indiana based non-profit that's focused on increasing opportunities for learning beyond high school to all, has found that talent investments in employees pay off.[50]

A 2020 report released by the House of Representatives Education and Labor Committee has also outlined how Congress could support workers in the modern economy.[51] It suggests creating a universal displacement assistance program that provides income to workers of all categories of displacement enrolled in education training as well as increasing funding for key provisions of the Workforce Innovation and Opportunity Act. It also calls for the establishment of Lifelong Learning Accounts and the scaling up of registered apprenticeship opportunities and expanding access to affordable postsecondary opportunities.

Having recognized the need to keep our current and future workforce globally competitive, stakeholders in the private sector, federal government, and state and local governments have begun offering solutions. For example, the Markle Foundation has recently formed the Rework America Alliance, a collaboration of businesses, nonprofits, educational institutions, and

[47] OECD, Facing the Future of Work: How to Make the Most of Collective Bargaining, *OECD Employment Outlook 2019: The Future of Work*, 2019.
[48] Ibid.
[49] McKinsey & Company, Retraining and reskilling workers in the age of automation. January 2018. Last Accessed October 21, 2021.
[50] Lumina Foundation, Talent Investments Pay Off (Discover Financial Services), 2016.
[51] House Education and Labor Committee, The Future of Work: How Congress Can Support Workers in the Modern Economy, December 2020.

governments working toward helping unemployed and low wage workers find reliable on-ramps to high-quality, well-paying jobs that keep up with technological change.[52] The SkillUp program in northeast Ohio's Cuyahoga County helps firms in the region identify future workforce needs through a strategic planning process, determines the skills required for those jobs, and develops customized roadmaps to evaluate workers' existing skills and facilitate training for in-demand positions. The focus of the training is on soft skills, foundational skills, and technical and occupational skills—the skills that are believed to make workers more adaptable to the labor market impacts of the emerging technologies.[53]

Federal programs may also help accelerate the adoption of emerging/advanced technologies by regional economies that would otherwise be left behind. For instance, the Manufacturing Extension Program (MEP) has successfully assisted small- and medium-sized manufacturing with higher-tech productivity solutions, including in rural places.[54] The Build to Scale program administered by the U.S. Department of Commerce' Economic Development Administration (EDA) funds technology-based economic development initiatives that "accelerate high quality job growth, create more economic opportunities, and support the future of the next generation of industry leading companies."[55]

[52] See Markle Foundation website: Rework America Alliance.
[53] Brookings Institution, Automation and Artificial Intelligence: How machines are affecting people and places, 2019.
[54] Ibid.
[55] See EDA's website: https://eda.gov/oie/.