

## Accelerated Automation and Designing the Future of Labor

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*"Any useful statement about the future should at first appear to be ridiculous."*

—*James Dater*

Prometheus is a trickster and the god of fire in Greek mythology. He was tasked with the responsibility of giving each creature on earth a different quality. He decided to make humans as mighty as the gods by giving them fire. Power over fire enabled humans to create and use tools and transform their world. As a result, the harmony between the human world and the divine world was disturbed. Prometheus was punished by Zeus for his act of defiance and was condemned to an eternity of having his immortal liver eaten by an eagle every day.

Prometheus means fore-thinker, one with the power to see or imagine a different future. Prometheus's offense against the divine order was that his gift actualized human imagination. It empowered humans with a properly divine capacity. Greek mythology is one of many historical traditions in which the gift that helps us gain mastery over the unpredictable is power only gods are worthy of having. Prometheus empowered humans with imagination.

Feeling devastated is the natural emotional response to the chaotic spread of a global pandemic. In order to move beyond that initial response, we can take inspiration from Prometheus's story and employ an imaginative approach to reshaping our future out of what is left in the pandemic's wake. For thinkers and designers, one of the most pressing tasks of a post-pandemic future is designing and rethinking the future of labor. Choosing an imaginative framework such as the field of Future Studies is the first step.

Future studies is an interdisciplinary field that studies how human life changes in the future. The image below shows "the Cone of Possibilities". As we look into the future, there are numerous possibilities. A holistic

study of the present and the past trends determines the most probable future. Next to a probable future, various futures could happen depending on the present. The next step in our design experiment is to tweak the expected future to explore an extensive list of possible futures. Possible and probable futures are used to design a preferable future imaginatively and suggest an action plan that bridges the gap between the most probable future and the preferable future.

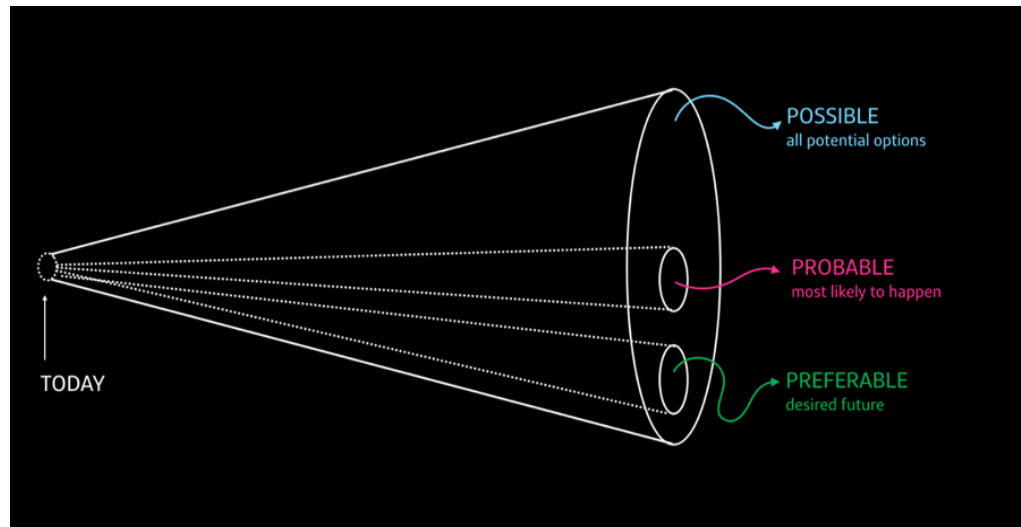


FIGURE 1. Draudt, Alida. "Cone Of Possibilities ." *Medium*, 4 Apr. 2017, [medium.com/capitalonedesign/how-do-we-think-better-about-the-future-s-58ff2e37fcab](https://medium.com/capitalonedesign/how-do-we-think-better-about-the-future-s-58ff2e37fcab).

### Probable Future

As a baseline, we need to predict the most likely or the expected future. To do that, we are going to assess relevant past trends and the current conditions of the labor market and automation to form a prediction. Below we will discuss current trends that are relevant to our analysis of automation and the future of labor and how each trend is likely to shape this probable future.

First we must acknowledge that long before the pandemic, automation has been affecting the labor market. Since the 1980s, median wages have been stagnant, and labor markets have become increasingly polarized as middle-income workers such as machine operators, bookkeepers, paralegals, and secretaries have lost their jobs to computers. [23] Since 1971, the share of American adults who live in middle-income households has gradually decreased from 61% to 51% in 2019. [15]

Professions that involve routine-intensive tasks have been particularly susceptible to initial waves of automation, because algorithms of the past were good at well-defined routine tasks. According to Frey and Osborne,

and contrary to popular belief, most low-income service occupations have not yet been affected by automation since they require a higher degree of flexibility and physical adaptability. As a result, migration from middle-income work to high-income or low-income professions has been the primary trend of the past. This trend is extending, since automation technology has made significant strides in the past few years. For example, less than ten years ago, in the chapter "Why People Still Matter", Levy and Murnane pointed at the difficulties of replicating human perception, asserting that driving in traffic is insusceptible to automation. [14] Today, Waymo, the former Google self-driving project, has driven 8 million miles on public roads using its autonomous vehicles. [84]

Parallel to these improvements in technology has been the trend of businesses more readily employing automation in work places. In 2017, Cafe X in SF started using robots to prepare 8-ounce lattes that are 40 cents less than a short latte at Starbucks. The grilled cheese chain, The Melt, introduced mobile ordering and semi-automated tech that lets customers know how long it will take for their food to be ready. Zume Pizza started using a robotic arm to spread toppings on pies and get them into the oven. [13] In May 2019, Ford announced that it is teaming up with Agility Robotics to add Digit to its self-driving technology. Digit is a two-legged robot that looks and walks like humans, is built out of lightweight material, can lift 40 pounds, and is agile when bumped. Additionally, Digit can go up and downstairs, and walk naturally through uneven terrain. [12] Amazon Go's "just walk out technology" is powered by computer vision, sensor fusion, and deep learning. The result is a shop people could walk in, take the items they need, and walk out. No lines, no checkouts. [11]

Seeing that increasingly sophisticated technology is building the potential to replace more areas of human labor, we might want to know the chronology of automation. According to Carl Benedikt Frey, director of the program on the Future of Work at the Oxford Martin School, and Michael A. Osborne, director of the EPSRC Centre for Doctoral Training in Autonomous Intelligent Machines and Systems at Oxford, most jobs that do not require high levels of creativity or social intelligence will be hit by the first wave of automation. After a plateau during which engineers will be working on bottleneck problems of automating creative and social intelligence, the second wave of automation will hit at which point most professions, as we know them today, will be automated.[14]

Some areas that are traditionally thought of as harder to automate, such as education, are predicted to be significantly impacted by leveraging improved user interfaces and big data. Machine-learning driven interactive tutors of the future will have the ability to personalize teaching and assessment for each student. The same big data and statistical analysis methods will impact professions like career-counseling, recruitment, and HR management.

McKinsey Global Institute calculates that adaptation of current automation technologies could affect 50 percent of the world economy, or 1.2 billion employees, and \$14.6 trillion in wages. [49] Another report by the International Robotics Federation claims that Industrial robots, with features enabled by machine vision and high-precision dexterity, will start to be cheaper and more easily adoptable by additional users over the next decade. [14]

When forecasting about automation, McKinsey Global Institute and researchers such as Frey and Osborne concentrate on technological feasibility. In addition to technical feasibility analysis, we consider research looking at political and economic factors done by The Brookings Institute which states that machines could do 70 percent or more of the tasks necessary for one-quarter of jobs in the United States. According to the same findings, 30-70 percent of their tasks of another 36 percent of jobs could be automated. [41]

Frey and Osborne present a chronology without specifying dates since they acknowledge that political movements, legislation, and labor prices can determine the exact speed with which jobs are lost to automation.

Now, the COVID-19 pandemic is going to be another factor to impact the speed of these shifts. Due to the COVID-19 pandemic, more than 40 million Americans have filed for unemployment since mid-March, and automation has replaced many of these workers. Historically speaking, automation is more quickly adopted during economic downturns when companies look to slash labor costs, and social distancing measures only add to the effect. Mark Muro, a fellow at the Brookings Institution studying labor markets emphasizes that "Economic literature over the last decade shows that capital investments are made especially during a crisis." [76] This means that automation will not slow down due to economic uncertainty.

Frey and Osborne thought that by 2035 it would be technically possible to automate 86% of restaurant jobs, three-quarters of retail jobs, and 59% of recreation jobs. These are the same industries that are struggling the most during the pandemic and stay-at-home orders. Furthermore, automation will aid in efforts to protect the safety of workers, decrease public health risks, avoid legal liability, and reduce costs.

This pandemic is affecting public opinions about automation, too. It is a point in favor of policies that pave the way for automation. Richard Pak, who is researching the psychological factors around automation, says: "Pre-pandemic, people might have thought we were automating too much. This event is going to push people to think what more should be automated." According to him, "No one would probably have thought of a cashier's job as being dangerous until now." [75]

Empirical data supports the above analysis of current trends; forecasting a probable future when automation happens faster. As

companies prepare for a gradual return to regular activity," 41% of businesses responding to a survey by the auditing firm EY said they were investing in accelerating automation as businesses prepared for a post-crisis world." [8] Most businesses surveyed have already started investing more heavily in technology or are planning to do so as soon as life is normal again. Robotics companies and automation services are seeing a surge in demand. Phil Duffy, vice president of the autonomous solutions company, BrainCorp, reports a 13 percent increase in average daily usage of their floor cleaner robots in retail locations in the first quarter of 2020. Simbe Robotics' CEO, Brad Bogolea, attributes the increased interest in autonomous shelf-scanning retail robot, Tally, to the pandemic.[37] Microsoft's CEO, Satya Nadella, said they had seen two years' worth of digital transformation in two months due to the pandemic.[16] AMP Robotics, a company that rents out and sells AI-enhanced robots that sort recyclable material, has seen a significant boost in orders after the pandemic hit the US.[75] Amazon's checkout-less grocery stores are expanding, and their deep learning computer-vision "just walk out" technology is being offered to more retailers.[9]

Replacing humans is not the only way technology is reducing the need for human labor. Since businesses have to cut costs and the stay-at-home orders have given them a chance to experiment with remote-meetings, many might continue to replace business trips with video conferencing calls. As a result, cab drivers, hotels, commercial airlines and other industries that are reliant on business travelers might continue to see losses.

When businesses start hiring again, they will do so in smaller numbers. Muro believes automation could substantially depress rehiring even after economic recovery. [75]

These changes are going to permanently affect the way we view work in the future. Optimistically, history suggests that new technology generates new areas of work as it destroys the old ones. [85] Nonetheless, we have no way of knowing exactly how revolutionary technologies will affect our future, precisely because they are rare and revolutionary. In some cases, past worries about technology were disproven as new industries emerged through creative destruction and the capitalization effect of emerging industries. However, what makes automation unique today is that current trends suggest that history may not be repeating itself for three main reasons:

1) Data from the Stanford Center on Inequality and Poverty reports that "in terms of labor markets, poverty, safety net, wealth inequality, and economic mobility, the US comes in 18 of the top 21 most well-off countries." [46] No matter what measurement metric we choose, economic inequality in the US is prevalent and growing. [15] Historically one of the ways new technology has created new industries is through raising the standard of living. Today, economic inequality hinders the standard of living from rising for enough people to create new major industries. [86]

2) Technological capabilities are growing exponentially fast. The number of patent applications published by the United States Patent and Trademark Office, including the phrases "artificial intelligence" and "machine learning", has increased from 373 publications in 2009 to 6,476 publications in 2019[10] As Artificial intelligence evolves in its capabilities, more and more jobs are going to be susceptible. This radically fast change means that the workforce that is affected most by automation has no way of adjusting their skillset in time.

3) Even if new jobs and new industries were to result from this industrial revolution, new jobs would not be available as fast as old jobs are destroyed. The fast-paced and substantial nature of future changes creates the need for an agile attitude from businesses and workers. During periods of economic downturns, such as this one, worker displacement has not been gradual but rather episodic and concentrated, leading to large groups of displaced workers at any given time. [43]

Minority well-being is particularly in danger. Women are particularly vulnerable since they account for 77% of jobs that require close personal contact. [40] Moreover, unemployment in the pandemic has fallen disproportionately on Latina women, with many in the service industry. [40] 44 and 47 percent of jobs performed by Black and Hispanic workers are at higher risk of being automated. The Midwest is another vulnerable area since more jobs in the Midwest revolve heavily around manufacturing and agriculture. [41]

On another hand, due to automation capabilities, the world's overall productivity rate is likely to increase. Automated systems are time-efficient, less prone to error, and can help offset the impact of a declining share of the working-age population [22]. Before the pandemic, JPMorgan Asset Management estimated that automation would increase global GDP by more than \$1.1 trillion in the next 10-15 years [34]. The G20 economic forum estimated that "by 2065, automation could potentially add productivity growth in the largest economies in the world (G19 plus Nigeria) that is the equivalent of an additional 1.1 billion to 2.3 billion full-time workers" [5].

We are not ready to translate the prosperity of the planet into the shared prosperity of its inhabitants. For example, education costs are rising as most of the clerical and office jobs have disappeared and are instead automated at no cost to the education systems. According to the report, from MIT's "Work of the Future" task force, "From 1973 to 2016, labor productivity rose by 75%, but workers' compensation only rose by 12%." Moreover, the stagnant earnings hit people of color particularly hard [7]. According to the Federal Reserve Bank of New York, American households added \$193 billion of debt in the fourth quarter of 2019..., and overall debt levels rose to a new record at \$14.15 trillion. [55] Empirical evidence shows that economic inequality, whether measured through the gaps in income or wealth between richer and poorer households, continues to widen [6]

Inequality is proven to harm the political influence of the disadvantaged and intensify geographic segregation by income [15]. The expected future comes with a deeper wealth gap and further political polarization. Political polarization largely mirrors economic polarization. [23] When drastic changes call for coherent policy and assistance from the public sector, political polarization can be especially paralyzing for nations struggling to adjust.

Which jobs are going first?

Assuming that innovation does not stop, emerging professions of the future will provide 2.4 million opportunities by 2022. [4] As increasing number of high-wage cognitive workers move down the occupational ladder and have to look for new jobs, workers in the low-wage and service industries are going to face more competition and be pushed even further down the occupational ladder and, eventually, out of the labor force. It seems unlikely that occupations requiring a high degree of complex perception, creative intelligence, and social intelligence or working in unstructured work environments will be automated in the next decade or two. [14] Creative thinking and social intelligence will be the most valuable skill to humans. According to the WEF's report on jobs of the future, between 2020 to 2022, 37% of job opportunities in emerging professions will be in the Care Economy; 17% in Sales, Marketing, 16% in Data and AI; 12% in Engineering and Cloud Computing; and 8% in People and Culture. [4]

Global labor markets will affect national labor markets as more jobs can be done remotely. On a global level, based on growth in the working-age population, the challenges of technological progress, labor force participation rates, and unemployment, more than three-quarters of a billion jobs will need to be created in 2010–2030. Adding to this challenge is the fact that most of these jobs have to be created in low to low-middle-income countries, often lacking a strong tradition of decent work conditions. [26]

Workers will have less of a voice in their work environments since the "threat of automation" increases employers' bargaining power in negotiations and removes employees' power to shape company culture, raise ethical concerns, or advocate for themselves. Reduced bargaining power for employees means that the real wage will remain low in industries, even if a particular employer is not choosing to lower them.

Possible Futures

The next step in our design experiment is to manipulate and tweak the expected future to explore a range of possible futures. Below are some of the possible futures we should consider in this design experiment. Thinking about these opens up possibilities for design. These possibilities

range from no automation to wide-spread automation creating utopias, dystopias and all variations in between.

One of the main areas of uncertainty around automation is whether or not automation potential turns into wide-spread automation adoption. In one version of the future, automation does not become wide-spread due to an environmental catastrophe, political movements, societal trends, or massive unrest. This possible future is less than ideal given the loss of the productivity boost that automation provides to the planet's economy.

Another possibility is that quantum computing makes the task of ensuring cybersecurity so hard that the internet is shut down or replaced by local networks. As a result, the public and the business sector lose their trust in globalized and automated technology. Distrust in technology could cause many to seek to use humans in their businesses as much as possible. This future is harder to plan for and in order to avoid such a fate, we must invest in cyber security research.

In another possible future world, wide-spread adoption of technology does take place, but mass surveillance leads to the emergence of more central systems of power in governments or corporations. As a result, most people and businesses would lose their fundamental freedoms. In this dystopian world, technology serves only the people in power, and the majority not being instrumental to the world economy will be left to fend for themselves.

Instead of automated systems replacing humans, there is a possibility that more and more humans start to want to become cyborgs with enhanced abilities or are forced to in order to get jobs. Neuroscience would have to make more rapid improvements for this to be a reality, but companies like Neuralink are already working on the technology. Due to its well-established intellectual property laws, the US has become a hub for research and innovation. If these laws are somehow undermined, progress could stop or slow down drastically.

In a utopian possible future, where we have solved the issues of inequality, security and accountability, people that are released from the employment trap are allowed to spend their time on different forms of purposeful activity. This utopian possible future, society stands to gain from ambitious and passionate workers motivated by principle rather than money being physicians, lawyers, artists, caretakers and scientists.

Another utopian possibility is that collective bargaining gains momentum. The rise of the gig economy and its employees' struggles for their rights, for example, has the potential to drastically change the laws around unions. If that happens, employees' well-being will become more and more of a priority in workplaces leading to a more ideal future of labor for all.

The expected future discussed in the previous section seems bleak, but hope lies in actively imagining new ways forward as familiar paths fade away. Future studies can take the form of a participatory social movement. We saw that changing underlying assumptions can lead to



possible alternative futures. Activating some amount of individual, collective, and institutional agency, can lead to a preferred future.

### Concluding thoughts; Preferable Future

Now is the time to ask how the future of labor ought to look. Which attributes of future labor markets are preferred? We must look at past and present labor markets and our expected future and decide what we want to preserve. Additionally, we will consider how the technology we have obtained during our transition from past to present can amplify our desirable future.

The economic incentives to innovate that the current tech revolution is founded on is an aspect of the present we might want to preserve, but well-paying jobs for the middle class [7], well-balanced power relationships, and opportunities for growth have been in better shape at some point in the history of labor than now.

Our future would ideally include safer, more fulfilling and less tedious jobs for all who want it, base-level economic security, better work-life balance, well-funded, up to date and accessible education systems, a fair share of the benefits of prosperity caused by automation, improvements in the mental and physical well-being of the workforce [72], and inclusive work cultures.

Thinking about ways we can use our new technologies to create this preferred future opens up even more possibilities for design. Automation provides us with excellent tools to fight COVID-19 and redefine a new normal in a post-COVID world. It can fill the gaps left due to human contact limitations in our grocery stores, hospitals and factories. It can be useful in maintaining vaccination and testing records, managing vaccine supply and scheduling and mapping and forecasting the spread. We are also starting to see how innovation can power the future of work as governments exchange slow, manual processes for workflows that are fast and scalable, and hospitals abandon inefficient procedures to support their frontline caretakers. Automation improves overall productivity and consistency. Its cost-saving effects can lead to cheaper prices, and some wealth increase for workers, partly mitigating labor displacement.

Self-driving vehicles are safer and can move people and goods simultaneously. A trip could double as a delivery service, dropping off packages in between transporting passengers. [12] This technology has the potential to be used in our advantage in battling climate change.

Recycling in the US was dwindling before the pandemic. Now, cities are suspending recycling services because it requires workers to be in close proximity and touch potentially contaminated waste. Machines like AMP Robotics's recycling robots can help us keep recycling our waste. [75] Advances in agricultural vehicles, agricultural research, and high-tech production of cultured meats are all helpful in ensuring an equitable future is sustainable.

Additionally, automation frees us from having to do tasks that endanger or inconvenience us. The robot in cafe X, for example, mostly cleans the store. Cafe X founder, Henry Hu, says: "What we do not need baristas to do is move thousands of cups around. They will have a more enjoyable job." [13] Although Hu might be incentivized to overstate the benefits of robots in his cafe, his point stands that executing automation thoughtfully designed to work well with humans to eliminate tedious parts of a job can make it more enjoyable for employees.

Throughout the pandemic, cleanliness has been the priority for businesses, warehouses, and hospitals. Technologies like Brain Corp.'s janitor robots have been leveraged to free up workers' time so they can sanitize high-contact surfaces, support customers, and take more breaks.[37] The number of workplace casualties is expected to fall across industries if robots are assigned most mundane or unsafe tasks.[45] When machines handle routine and dangerous activities, human capacity is freed-up to create new products and new tasks.

Automation optimizes public spending and potentially diverts money to more ambitious mitigation policies. Computers can scan legal briefs and precedents to assist in pre-trial research. [14] In healthcare, many diagnostics tasks are already being automated. A combination of a patient's individual symptoms, genetics, family and medication history, and data from millions of patient records and clinical trials, allows for more efficient patient care. This can mean replacing treatment with preventative care and saving money for public healthcare in aging countries. This money can fund policies that lead to a more desirable future. [14]

Education is essential to a future where the labor market demands employees who are lifetime learners. Technology can make education and skills-training accessible, regardless of location or socioeconomic background. Machine learning can vastly increase the quality of education by assessing students' individual needs and learning styles.

Career Counselling and mentorship are limited resources, but soon it becomes possible for people to seek mentorship, advice and guidance from AI. As a result, critical information that disadvantaged populations lack could be widely-distributed, and therefore we might get closer to a society with equal opportunity for all. Powerful digital talent platforms can make finding new jobs faster and more efficient for people in between jobs. Moreover, current technology combined with user interface improvements can give rise to a new category of knowledge-enabled entrepreneurship that workers can access with little training.

## Realizing a Preferable Future

The next step is backcasting the preferable future, making an actionable plan, and examining the plan's implications. After looking through numerous solutions and propositions, this essay suggests the following six areas of focus to help us create a desirable future:

## Education

The first step for realizing the above preferred future is for the public sector to incentivize companies to invest in the continued education of their human resources through tax breaks, investment metrics, and facilitated partnerships with certificate schools and community colleges. New technology brings with it new jobs. In the case of automation, based on the WEF's predictive report, between 2018 to 2022, more than 75 million jobs may be lost to automation, and 133 million new jobs will emerge. [51] These new jobs require different skill sets. The ever-changing technology changes the skills required to perform high-paying jobs very often.

By 2022, 54% of all employees will require significant re-skilling and upskilling. Of these, about 35% are expected to require additional training of up to six months, 9% will require reskilling lasting six to 12 months, while 10% will require additional skills training of more than a year. [65] An example is France's tax system that provides a tax credit equal to the number of training hours in a company multiplied by the minimum wage. In Singapore, all citizens over the age of 25 receive a \$360 "Skills Future Credit" They can use to invest in their education. [35]

Employers benefit from prioritizing employee training too. According to research from the Society for Human Resource Management (SHRM), 83 percent of HR professionals report difficulty in recruiting qualified candidates [70]. Meanwhile, some people believe that complaints about the skills gap are baseless [87]. The disagreement might be due to the fact that these two groups mean different things when they talk about the skills gap. Take the field of design as an example; in the past ten years, the wages of the top 10% of designers have risen sharply, while the average designer's wages have not. [47] If an educated designer with the knowledge of design principles and fundamental design skills, doesn't update their skills of the proper software as frequently as the market changes, they will be left in the dust. This will leave employees to compete for the limited number of available skilled workers. According to a report from Deloitte, "technology implementations rarely fail because the technology did not work but rather because people are not willing, or find it too difficult, to use them." [35] Furthermore, viewing human resources as an investment-worthy resource rather than a cost allows businesses to harness talents and tap into new innovative ideas. Investment in work-integrated learning is an investment in the future. The price of severance, recruiting, and onboarding is higher than investment in reskilling existing workers.

With regards to apprenticeship programs, researchers report that US workers who complete an apprenticeship make about \$300,000 more than comparable job seekers over their lifetimes. [67] The return on investment for apprenticeships is reported to be \$23 for every public dollar invested. [67] Companies must also realize that today, the reasonable course of action is to hire for core competency, and train on the job. The insurance

company, Guardian Life, helps close the skills gap that makes insurance companies competitive by building on the core competencies of actuaries through teaching them to work with data generated by Fitbit monitors and car sensors while assessing insurance risks. According to one student, "[The course] opened my mind to thinking more about data. I see a task that may be redundant or repetitive or monotonous, and I explore ideas where I could use Python or automation to free up my time to work on other activities." [35] In the UK, the Apprenticeship Levy requires employers to set aside funds for hiring Apprentices [35]. McKinsey Global Institute recommends the German apprenticeship model for countries like the US with looser links between education and the private sector. [35]

The education system must adapt as well. Digital literacy, for example, must be integrated into curriculums to give students the fundamentals that empower them to be life-long learners. To plan for the new reality, it is not just enough to teach kids to code. Education systems must learn to emphasize student's humanity by helping them acquire competencies such as critical thinking, social intelligence, creativity, communication and complex problem-solving, teaching, and mentoring along with improvement of STEM education. By taking advantage of the new technology, teachers will have more time to dedicate to one-on-one learning. They can work with students interactively to achieve their learning objectives.

Education and industry both will benefit from working more closely together. Most university professors lack real industry experience, and curriculum development cycles can be as long as seven years. [35] As companies start to realize that automating without developing the talent that can work with technology is impossible and education systems realize the importance of life-long learning, more partnerships form. Big businesses already realize this. For example, in July 2019, Amazon announced it was investing \$700 million to upskill 100,000 employees (\$7,000 per person). Meanwhile, General Assembly works with over 500 global organizations- including Adobe, L'Oréal, and BNP Paribas- and a variety of international governments that are pursuing fresh approaches to education. The same year, Microsoft signed a partnership with GA to upskill 15,000 workers by 2022 and establish standards for power cloud computing skills, and two years ago, Capital One began investing several million dollars in developing a "Tech College" to reskill its employees and candidates. [35]

Other policies, such as land-use regulation in support of high-housing density in high innovation clusters, can make it easier for low-income displaced workers to move into new locations and find new work. These policies can help us fight economic inequality as more workers from disadvantaged backgrounds gain access to desirable and sustainable jobs in areas of high economic growth. In order to help with the remaining portion of unemployment, the public sector must also encourage

technology-enabled knowledge-based entrepreneurship to empower all and create upward mobility for all.

### Profit-sharing

According to the World Economic Forum, the rise of US wages in the past 35 years has not been proportional to the rise in US productivity. Instead, it has been correlated to a 150% wage increase for high-level managers and CEOs- who are also typically share-owners. [66] One big reason is that middle-income families are more dependent on home equity as a source of wealth than upper-income families. The latter derive a larger share of their wealth from financial market assets and business equity. After the 2006 housing bubble burst, upper-income families had an easier time bouncing back because the stock market quickly recovered. Future economic downturns will likely affect wealth distribution in the same manner.

On the other hand, profit-sharing (incentivized compensation program that awards employees a percentage of the company's profits) [88], combined with opportunities for participation in decision-making, has been shown to foster employee engagement and loyalty, reduce turnover, and boost productivity and profitability. [66] There is no consensus on the underlying mechanisms, but scholars agree that profit sharing is good for business and the economy in the long run.

The resistance mostly comes from the fact that profit-sharing would cause high-level management to see less of the generated profit. Therefore, focusing on short-term success metrics might cause some to oppose. Another factor that causes share-holders and executives to not appropriately consider the benefits of profit-sharing is the traditional view of labor as a cost-driver rather than an investment. [66] However, as essential workers during the Covid-19 pandemic have shown us, it is time to reevaluate the way we view and value human resources in terms of purpose, fairness, transparency, growth, and collaboration as well as market value. [36]

Providing tax and other incentives to encourage companies to share their profits with their workers would mean a more engaged workforce.

The US law allows businesses to deduct from their taxable income the wages of all employees, except the top five executives. As a result, corporations have shifted top executives' compensation toward shares, options, and other forms of profit sharing and stock ownership. [66] Therefore, there are not enough shares for all employees. This means that the federal government's \$400 billion subsidy for asset development primarily benefits higher-income families. In contrast, low-income families are stuck with social safety nets that incentivize staying low-income and exacerbates wealth inequality and racial wealth disparities. [33] Profit-sharing is an investment in the country's economic mobility.

### UBI

Upon implementation of the technology available to us, there will come the point when there will not be as much of a need for most people to keep working in the traditional sense. According to Frey and Osborn “Even tasks most people think are impossible to automate such as programming for complex design parameters and bug-finding have the potential to be reliably automated “[14]. No job is safe from automation in the long run. It makes neither economic sense nor moral sense to give humans busy work if technology can finish the work faster and more efficiently. Many people work to feel a sense of purpose; however, unnecessary busywork is not going to provide them with the same sense of purpose and meaning.

Many ethicists, philosophers, and economists are making compelling arguments in favor of UBI. The ethical arguments speak to our humanity and sense of justice. Traditionally, labor and capital have worked in partnership to give us prosperity beyond the dreams of kings of the past. Since the need for labor is steadily on the decline, ignoring philosophical fairness considerations is not only denying our humanity, but is dangerous because it would lead us back to the days of feudalism, lords, vassals, and fiefs, and a world where we have to rely on grace from institutions and people who are not accountable to us to maintain our basic human rights.

One key difference is that modern businesses rely on a vast array of marketplace offerings. They need consumers to pay for their products and services, so that they can exchange that money for other goods and services. In the absence of mitigating factors, the public's lack of cash can lead to extreme recessions. As desperate people seek to borrow money from the rich minority, interest rates become more and more unreasonable leading to further inequality.

A universal basic income would give people money to spend on the goods and services, save up to start small businesses or to spend on education, plus negotiation power in the labor market and a better sense of well-being. By removing their desperation for income, a UBI would give workers the ability to decline job opportunities that pay poorly, which would cause wages to rise. [54] The added debt will make it harder to deal with the country's already significant household debt problem. [55]

The ideas behind a universal basic income, or UBI, is centuries old. 16th-century Spanish-born humanist Juan Luis Vives believed that "Even those who have dissipated their fortunes in dissolute living — through gaming, harlots, excessive luxury, gluttony, and gambling — should be given food, for no one should die of hunger." In his 1967 Stanford lecture, Dr. Martin Luther King Jr. declared his support for the idea by stating that it will help address the nation's poverty and race inequality problem. Between 1974 and 1979, the "Mincome" experimented with the idea in Manitoba, Canada. It was not until 20 years later that people realized that the experiment has been utterly successful in lifting people out of poverty by all measures. People in the experiment were found to be healthier and more likely to finish their education. Most of them did not stop working except for students and new mothers. In 1797, the American revolutionary

Thomas Paine argued for a similar program as a remedy for economic injustice. [20] In recent years, the idea has gained popularity again with people such as Mark Zuckerberg, Elon Musk, Richard, Branson, and previous presidential candidate Andrew Yang advocating for it. Spain is moving to establish a permanent basic income in the wake of the coronavirus pandemic for low-income citizens. [21]

The Mincome experiment stopped as soon as a more conservative local government was elected. The program's history shows that implementation is politically challenging, even though experimental data does not validate the skeptics' worries. The main criticisms are that UBI will lead to laziness and unreasonable spendings and that it is too expensive. Economist Ioana Marinescu of the University of Pennsylvania, who researches UBI, says, "many studies find no statistically significant effect of an unconditional cash transfer [or universal basic income] on the probability of working. The evidence shows that an unconditional cash transfer can improve health and educational outcomes, and decrease criminality and drug and alcohol use, especially among the most disadvantaged youths." [28] According to the World Bank, poor people spend their money on household goods, health care, and that various costs that come with schooling. The hope is that as more and more people start advocating for the idea, more research will focus on it. More research makes advocating for the case easier with political skeptics. When it comes to financial concerns, an automated economy will provide us with more than enough money as a society. This global pandemic has taught us that essential workers are creating significant value while being paid the least. It is not necessarily those generating the most value that get paid higher under the current system. Therefore, it matters how we choose to distribute the money. Should it go only to those who own capital? If not, progressive tax codes and other progressive ideas such as Bill Gates' robot tax must be further explored. Money functions well only when it is mobile and flowing through the economy. It has not been designed to be hoarded away. According to Rutger Bregman, Dutch historian, "Wealth must be distributed more-or-less evenly throughout an economy for it to function smoothly and grow sustainably." [54]

Furthermore, UBI solves this problem of economic inefficiency due to government bailouts. [54] As a result, governments are not burdened with saving jobs if that means bailing out inefficient and inferior business practices. A healthier market can generate greater wealth. It also frees us up to dedicate our time to meaningful creative and social pursuits. It leads to a greater sense of security in all, which is a basic human need. UBI would also allow those performing hard, unpaid domestic work such as child-care, elderly-care to be gain more financial freedom. [78]

### Health insurance

America's current healthcare system is not the result of an elaborate design, but rather an unintended consequence of businesses competing for

top talent, during a federal ban on wage increases. During the second world war, many qualified workers left the country to enlist, leaving the country in a labor shortage. Companies started competing for the workers, and the government feared that wages would increase so much that the inflation would become unmanageable. After the ban, companies started trying to attract workers by offering health benefits. Later the IRS made these benefits tax-exempt, which meant it would be cheaper to get health insurance through employment. When the war was over, unlike most other countries, the US did not have to rely on the government for health benefits because the US businesses had the means to continue to offer employees health insurance through their jobs. The result has been severe entanglement of healthcare benefits and employment. [61]

A health care system that makes people rely on employment has never proved more ineffective than now. Since the beginning of the pandemic, an estimated 12.7 million people have lost their employer-provided health coverage. [61] This unnecessary partnership leaves workers desperate and powerless.

Yanis Varoufakis, the former Greek Minister of Finance, sums this up perfectly: "To have a genuine right to turn down a job, you must have an alternative option, because desperate people will accept to do desperate things." [54]

This employer-sponsored model has also inflated US health spending. Most people do not see the actual cost of the care that they use since most of the price is covered by the employer. Employers rarely push back against the higher prices charged by providers. The average premium for an employer-sponsored family plan has risen by 22% in the past six years. This number far past the rate of inflation. [61]

Untangling health benefits from employment reduces worker desperation. It presents employees with more autonomy over their working conditions and the ability to walk away from work that threatens their dignity or health. It would also save the country vast amounts of money. In 2017, employer-sponsored health insurance cost the federal government about \$260 billion in lost income and payroll taxes. This amount is significantly more than the cost of the Affordable Care Act each year. [63]

### Human-centered automation

Although all automation seems to be treated the same in most labor discussions, the truth is that there are two different approaches to automating labor: one that views automation as a replacement for humans, and the other as a partner for humans. The most desirable form of innovative technology is designed to partner with humans and complement their abilities.

In human-centered automation, the talents of people take precedence. Systems are optimized for keeping the humans engaged, alert, and in a state of flow. They automate tasks that the human has repeatedly



performed in the past, correct their biases, and act as an advisor and an assistant to maximize capabilities of the human operating the system. They act to provide the human with "alternative interpretations, hypotheses, or choices." [60] They can also help simulate and rapidly prototype human ideas and insights. Investments in Human-Computer interaction research and interactive and intuitive design can make it possible for a variety of people to find ways to implement their innovative ideas even if they are not particularly good programmers.

We, as a society, invest in research, make business decisions, and are implementing the technology, and we must take care to differentiate between these two categories. Despite the looming possibility of all work being automated, we must prioritize investing in the development and adaptation of technology that partners with human workers to perform unsafe, physically draining, time-consuming, unhealthy, tedious, or even impossible jobs. These partnerships would allow humans to be more productive, innovative, and happy while feeling like they are meaningfully contributing. Earlier investment in collaboration between humans and intelligent systems can also guide their progress onto a more humanistic path helping us get better sleep as we hand down more and more of our tasks to these machines.

## Unions

While the field of future studies focuses on the long-term future, when it comes to the future of labor, we are at such an inflection point, that it is essential to discuss what must be done in the near future to help with the transition. In this transitional point, unions must be empowered to act as organizing forces advocating for policies and actions that lead to a preferable long-term future, such as including continued training support for employees in job negotiations.

Long term benefits of automation look promising, but for many low-income workers, the storm is coming, and they do not have the money, the time, or enough life years to adapt. This is where unions are most helpful. For those who simply will not be able to reskill or upskill in time, unions can act as a great source of support. According to Zachary Parolin, a researcher interested in poverty and social inequality from Columbia University, union membership affects the likelihood that a routine worker:

1. remains employed in a routine job for a longer duration of time,
2. avoids unemployment, and
3. achieves higher earnings over time relative to non-unionized routine workers. [53]

In the longer term, unions must stay flexible by anticipating the continually changing needs of the labor market in order to stay relevant. A wise step might be to find ways to attempt to raise the collective bargaining powers of freelance and gig economy workers. Another strategy might be to foster more partnerships with research centers and

universities to stay current with patterns that are affecting workers they are representing and the businesses that employ them. [52] It might seem tempting to oppose the change altogether; however, effective advocacy in the age of automation requires adaptability. [52]

Unions are in a position to be the driving force behind most of the previous suggestions. More than anything, unions can collaborate with employers and educators to facilitate retraining programs. They can ensure that employee contracts include proper notice of automation and retraining benefits. A good example is the Italian Federation of Metalworkers, which promotes professional training as an individual right for workers. [52] Another good example is the protections that the Culinary Workers Union Local 226 in Las Vegas guaranteed their members. These protections include six months' notice of the adoption of new technology that could lead to layoffs or reduction of hours, free reskilling to use new technology in current jobs and access, and free job training if any new jobs are created because of automation and technology. [56]

Unions can also help protect workers from unethical uses of technology that worsens their working conditions, such as surveillance technology, through collective bargaining. Amazon's "auto-firing" technology used in its fulfillment centers is a horrific example of such technology. The employees would be given warnings or even fired by the system if they took too long to scan the packages. [56]

In the US, inequality and wage stagnation is tied to the decrease in union membership. [57] Some changes need to be made to current labor laws and union protections for unions to be able to advocate for workers effectively. We must make these changes to avoid the harms that automation could bring to our communities. Though some of the suggestions made above have much research supporting them, there is no guarantee that their implementation will lead to the desired results as long as the people who should benefit from these programs have no advocates participating in the discourse on their behalf. For example, some workers are concerned that profit-sharing may cause employers to dock their wages in return, leaving them with lower compensation overall. Unions can ensure that safety measures are in place to prevent such outcomes.

Over the next decade, we will be facing some of the hardest problems we have ever faced. Climate change, political polarization, inequality, an aging country, rapidly growing health costs, and large amounts of debt are only some of these problems. Emerging from a global pandemic, we have learned many lessons about our world, our technology, our humanity, our interdependence, and how we must value each other's contributions.

Now is the best chance to rethink how we want our future to be and how we can enable meaningful collaboration between humans and technology to make that future a reality. If we don't act now in ways that guarantee we are the designers of the future of labor, by focusing on education, profit-sharing, collective bargaining, healthcare and UBI systems, the most probable version of future of labor as depicted in the

first section is bleak. According to Thomas Friedman we must "build an eye that moves with the storm, draws energy from it, but creates a platform of dynamic stability within it." [36]

We cannot afford to fight the change, nor can we afford to let it form itself. Our businesses, our politicians and leaders, have a chance to step back into the world and try to recreate the past, or we can step out and start to imagine and build the future. The probable future looks bleak, but we are creatures of imagination and forecast. Designing our future is a form of a participatory social movement, and if we approach it as designers, we will prevail and prosper together.

## References

- [1] *Poverty in California*. (2020, August 19). Public Policy Institute of California. <https://www.ppic.org/publication/poverty-in-california/>
- [2] Simpson, W., Mason, G., & Godwin, R. (2017). The Manitoba Basic Annual Income Experiment: Lessons Learned 40 Years Later. *Canadian Public Policy*, 43(1), 85–104. <https://doi.org/10.3138/cpp.2016-082>
- [3] Inayatullah, S. (n.d.). *Futures Studies: Theories and Methods*. OpenMind. <https://www.bbvaopenmind.com/en/articles/futures-studies-theories-and-methods/>
- [4] World Economic Forum. (2020, January). *Jobs of Tomorrow: Mapping Opportunity in the New Economy*. <https://www.weforum.org/reports/jobs-of-tomorrow-mapping-opportunity-in-the-new-economy>
- [5] Frey, C. B. (2020, December 10). *The Future of Jobs and Growth: Making the Digital Revolution Work for the Many*. G20 Insights. [https://www.g20-insights.org/policy\\_briefs/future-of-jobs-growth/](https://www.g20-insights.org/policy_briefs/future-of-jobs-growth/)
- [6] *Trends in income and wealth inequality*. (2020, May 30). Pew Research Center's Social & Demographic Trends Project. <https://www.pewresearch.org/social-trends/2020/01/09/trends-in-income-and-wealth-inequality/>
- [7] Enwemeka, Z. (2019, September 10). *Robots Won't Take Away All Our Jobs, MIT Report Finds* | *Bostonomix*. WBUR.Org. <https://www.wbur.org/bostonomix/2019/09/10/mit-future-of-work-report>
- [8] Reporter, G. S. (2020, July 1). *Bosses speed up automation as virus keeps workers home*. The Guardian. <https://www.theguardian.com/world/2020/mar/30/bosses-speed-up-automation-as-virus-keeps-workers-home>
- [9] *Amazon Go*. (n.d.). Amazon Go. <https://www.amazon.com/b?ie=UTF8&node=16008589011>
- [10] *Artificial Intelligence-based Patents: Perspectives for Practitioners and Patent Owners*. (2020, February 21). Legaltech News. <https://www.law.com/legaltechnews/2020/02/20/artificial-intelligence-based-patents-perspectives-for-practitioners-and-patent-owners/?slreturn=20210418170632>
- [11] Dujmovic, J. (2020, March 31). *As coronavirus hits hard, Amazon starts licensing cashier-free technology to retailers*. MarketWatch. [https://www.marketwatch.com/story/as-coronavirus-hits-hard-amazon-starts-licensing-cashier-free-technology-to-retailers-2020-03-31?mod=article\\_inline](https://www.marketwatch.com/story/as-coronavirus-hits-hard-amazon-starts-licensing-cashier-free-technology-to-retailers-2020-03-31?mod=article_inline)
- [12] Company, F. M. (2020, October 24). *Meet Digit: A Smart Little Robot That Could Change the Way Self-Driving Cars Make Deliveries*. Medium. <https://medium.com/self-driven/meet-digit-self-driving-delivery-last-mile-solution-418d9995bb97>

- [13] Fowler, G. A. (2017, January 30). *Robot Baristas Serve Up the Future of Coffee at Cafe X*. WSJ. [https://www.wsj.com/articles/robot-baristas-serve-up-the-future-of-coffee-at-cafe-x-1485781201?mod=article\\_inline&adobe\\_mc=MCMID%3D65494453621899479754593453944419773211%7CMCORGID%3DCB68E4BA55144CAA0A4C98A5%2540AdobeOrg%7CTS%3D1590487322](https://www.wsj.com/articles/robot-baristas-serve-up-the-future-of-coffee-at-cafe-x-1485781201?mod=article_inline&adobe_mc=MCMID%3D65494453621899479754593453944419773211%7CMCORGID%3DCB68E4BA55144CAA0A4C98A5%2540AdobeOrg%7CTS%3D1590487322)
- [14] *The future of employment: How susceptible are jobs to computerisation?* (2017, January 1). ScienceDirect. [https://www.sciencedirect.com/science/article/abs/pii/S0040162516302244?mod=article\\_inline#bb0375](https://www.sciencedirect.com/science/article/abs/pii/S0040162516302244?mod=article_inline#bb0375)
- [15] *I. Trends in income and wealth inequality*. (2020b, May 30). Pew Research Center's Social & Demographic Trends Project. <https://www.pewresearch.org/social-trends/2020/01/09/trends-in-income-and-wealth-inequality/>
- [16] Hinsliff, G. (2020, July 1). *The next wave of coronavirus disruption? Automation*. The Guardian. <https://www.theguardian.com/commentisfree/2020/apr/30/coronavirus-disruption-automation>
- [17] Harris, S. (2020, May 1). *The Benefits Of Automation In Today's Workforce*. Forbes. <https://www.forbes.com/sites/forbestechcouncil/2020/05/01/the-benefits-of-automation-in-todays-workforce/?sh=e8095d51cc89>
- [18] Bayern, M. (2018, November 27). *3 ways robots can support human workers*. TechRepublic. [https://www.techrepublic.com/article/3-ways-robots-can-support-human-workers/?tactic\\_type=PRB&tactic\\_detail=MF\\_Byline+for+Forbes\\_The+Benefits+of+Automation+\\_NA\\_None](https://www.techrepublic.com/article/3-ways-robots-can-support-human-workers/?tactic_type=PRB&tactic_detail=MF_Byline+for+Forbes_The+Benefits+of+Automation+_NA_None)
- [19] *Humans wanted: why automation won't kill off your job*. (2019, January 15). World Economic Forum. <https://www.weforum.org/agenda/2019/01/humans-wanted-why-automation-wont-kill-off-your-job>
- [20] *Automation + Jobs: Not a Zero-Sum Equation*. (2017, January 11). Automation World. <https://www.automationworld.com/home/blog/13316619/automation-jobs-not-a-zerosum-equation>
- [21] *Here's how the Silicon Valley dream of universal basic income slowly — then suddenly — became a solution for inequality in the US and abroad*. (2020, August 13). Business Insider Nederland. <https://www.businessinsider.nl/what-is-basic-income-2016-8?international=true&r=US>
- [22] Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., & Dewhurst, M. (2018, May 3). *A future that works: Automation, employment, and productivity*. McKinsey & Company. <https://www.mckinsey.com/featured-insights/digital-disruption/harnessing-automation-for-a-future-that-works/de-DE#>

- [24] *This new paper has a bold conclusion about automation and unemployment.* (2018, December 12). World Economic Forum. <https://www.weforum.org/agenda/2018/12/automation-and-unemployment-help-is-on-the-way>
- [25] *Humans Wanted: How Canadian youth can thrive in the age of disruption.* (2018, June). <https://www.rbc.com/dms/enterprise/futurelaunch/humans-wanted-how-canadian-youth-can-thrive-in-the-age-of-disruption.html>
- [26] *Demography, unemployment, and automation: Challenges in creating jobs until 2030.* (2018, December 18). World Economic Forum. <https://www.weforum.org/agenda/2018/12/demography-unemployment-and-automation-challenges-in-creating-jobs-until-2030>
- [27] Frazee, G. (2018, August 6). *Ontario is canceling its basic income experiment.* PBS NewsHour. <https://www.pbs.org/newshour/economy/making-sense/ontario-is-canceling-its-basic-income-experiment>
- [28] Cournoyer, C. (2021, April 20). *Silicon Valley Is Helping Cities Test a Radical Anti-Poverty Idea.* Governing. <https://www.governing.com/archive/gov-universal-basic-income-stockton-oakland.html>
- [29] V. (2020, August 3). *What Happens When People Get Cash With No Strings Attached?* Roosevelt Institute. <https://rooseveltinstitute.org/2017/05/16/what-happens-when-people-get-cash-with-no-strings-attached/>
- [30] Leduc, S., & Liu, Z. (2019). Robots or Workers? A Macro Analysis of Automation and Labor Markets. *Federal Reserve Bank of San Francisco, Working Paper Series*, 01–43. <https://doi.org/10.24148/wp2019-17>
- [31] Merchant, B. (2015, September 4). *The Only State Where Everyone Gets Free Money.* The Only State Where Everyone Gets Free Money. <https://www.vice.com/en/article/jp5wdb/only-state-free-money-alaska>
- [32] Tanzi, Sasso. (2019, November 9). *Richest 1% of Americans Close to Surpassing Wealth of Middle Class.* Bloomberg. <https://www.bloomberg.com/news/articles/2019-11-09/one-percenters-close-to-surpassing-wealth-of-u-s-middle-class>
- [33] *Nine Charts about Wealth Inequality in America (Updated).* (2017, October 4). Features. <https://apps.urban.org/features/wealth-inequality-charts/>
- [34] *Automation could add more than \$1.1 trillion to the global economy in the next 10 years.* (2017, November 10). Business Insider. <https://www.businessinsider.com/automation-one-trillion-dollars-global-economy-jpmam-report-2017-11?international=true&r=US&IR=T>
- [35] *How Companies and Governments Can Advance Employee Education.* (2019, September 26). Harvard Business Review.

- [https://hbr.org/2019/09/how-companies-and-governments-can-advance-employee-education?tactic\\_type=PRB&tactic\\_detail=MF\\_Byline+for+Forbes\\_The+Benefits+of+Automation+\\_NA\\_None](https://hbr.org/2019/09/how-companies-and-governments-can-advance-employee-education?tactic_type=PRB&tactic_detail=MF_Byline+for+Forbes_The+Benefits+of+Automation+_NA_None)
- [36] *Returning to work in the future of work*. (2020, May 15). Deloitte Insights. <https://www2.deloitte.com/us/en/insights/focus/human-capital-trends/2020/covid-19-and-the-future-of-work.html>
- [37] Hall, C. (2020, June 23). *Robot Manufacturers Work To Meet Demand Led By*. . . Crunchbase News. <https://news.crunchbase.com/news/robot-manufacturers-work-to-meet-demand-led-by-covid-19/>
- [39] *Whatâs the impact of globalization on wages, jobs and the cost of living?* (2018, August 22). Our World in Data. <https://ourworldindata.org/trade-wages-cost-living>
- [40] *Why More Women Have Lost Jobs During the Pandemic*. (2020, June 5). WSJ.Com. [https://www.wsj.com/video/why-more-women-have-lost-jobs-during-the-pandemic/32E822B7-EAF2-4E92-9D09-D0E4D010F207.html?mod=trending\\_now\\_video\\_3](https://www.wsj.com/video/why-more-women-have-lost-jobs-during-the-pandemic/32E822B7-EAF2-4E92-9D09-D0E4D010F207.html?mod=trending_now_video_3)
- [41] Muro, M. R. M. (2019, November 25). *Automation and Artificial Intelligence: How machines are affecting people and places*. Brookings. <https://www.brookings.edu/research/automation-and-artificial-intelligence-how-machines-affect-people-and-places/>
- [43] Hershbein, B., & Kahn, L. B. (2018). Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings. *American Economic Review*, 108(7), 1737–1772. <https://doi.org/10.1257/aer.20161570>
- [44] Vardi, M. Y. (2017, September 1). *What the Industrial Revolution really tells us about the future of automation and work*. The Conversation. <https://theconversation.com/what-the-industrial-revolution-really-tells-us-about-the-future-of-automation-and-work-82051>
- [45] Muro, M. R. M. (2019b, November 25). *Automation and Artificial Intelligence: How machines are affecting people and places*. Brookings. <https://www.brookings.edu/research/automation-and-artificial-intelligence-how-machines-affect-people-and-places/>
- [46] Ito, J. (2019, September 8). *The Paradox of Universal Basic Income*. Wired. <https://www.wired.com/story/the-paradox-of-universal-basic-income/>
- [47] *Employers Aren't Just Whining – the “Skills Gap” Is Real*. (2017, December 6). Harvard Business Review. <https://hbr.org/2014/08/employers-arent-just-whining-the-skills-gap-is-real>
- [48] *Why we should all have a basic income*. (2017, January 15). World Economic Forum. <https://www.weforum.org/agenda/2017/01/why-we-should-all-have-a-basic-income/>

- [49] Manyika, J. (2019, July 16). *Technology, jobs, and the future of work*. McKinsey & Company. <https://www.mckinsey.com/featured-insights/employment-and-growth/technology-jobs-and-the-future-of-work>
- [50] Shaban, H. (2018, September 18). *Machines will create 58 million more jobs than they displace by 2022, World Economic Forum says*. Washington Post. <https://www.washingtonpost.com/technology/2018/09/18/machines-will-create-million-more-jobs-than-they-displace-by-world-economic-forum-says/>
- [51] *The Future of Jobs Report 2018*. (2018, September 17). World Economic Forum. <https://www.weforum.org/reports/the-future-of-jobs-report-2018>
- [52] Gupta, K. (2016, October 12). *Will Labor Unions Survive In The Era Of Automation?* Forbes. <https://www.forbes.com/sites/kaviguppta/2016/10/12/will-labor-unions-survive-in-the-era-of-automation/?sh=387ff0223b22>
- [53] Parolin, Z. P. (2020, January). *Organized labor and the employment trajectories of workers in routine jobs: Evidence from US panel data*. <https://www.brookings.edu/research/organized-labor-and-the-employment-trajectories-of-workers-in-routine-jobs-evidence-from-u-s-panel-data/>
- [54] Stollery, B. (2020, June 3). *Universal Basic Income Is an Inevitable Part of Our Automated Future*. Medium. <https://medium.com/age-of-awareness/universal-basic-income-is-an-inevitable-part-of-our-automated-future-3cc181d4778d>
- [55] Marte, J. (2020, February 11). *U.S. household debt tops \$14 trillion and reaches new record*. U.S. [https://www.reuters.com/article/us-usa-fed-household-debt/u-s-household-debt-tops-14-trillion-and-reaches-new-record-idUSKBN20521Z#:~:text=\(Reuters\)%20%2D%20American%20households%20added,New%20York%20said%20on%20Tuesday.](https://www.reuters.com/article/us-usa-fed-household-debt/u-s-household-debt-tops-14-trillion-and-reaches-new-record-idUSKBN20521Z#:~:text=(Reuters)%20%2D%20American%20households%20added,New%20York%20said%20on%20Tuesday.)
- [56] Green, K. (2019, September 16). *How Unions Can Protect the Workers Vulnerable to Automation*. UnionTrack. <https://www.uniontrack.com/blog/unions-and-automation>
- [57] Nunn, R. J. O. (2020, April 6). *The shift in private sector union participation: Explanations and effects*. Brookings. <https://www.brookings.edu/research/the-shift-in-private-sector-union-participation-explanations-and-effects/>
- [58] Green, K. (2019a, July 16). *Role of Unions in Closing the Wage Gap Between High and Low Earners*. UnionTrack. <https://www.uniontrack.com/blog/unions-closing-the-wage-gap>
- [59] Pipes, S. (2020, May 11). *COVID-19 Makes Employer-Based Coverage Indefensible*. Forbes. <https://www.forbes.com/sites/sallypipes/2020/05/11/covid-19-makes-employer-based-coverage-indefensible/?sh=11b54c646af6>



- [60] Carr, N. (2014, November 21). *Automation Makes Us Dumb*. WSJ. <https://www.wsj.com/articles/automation-makes-us-dumb-1416589342>
- [61] *12.7 million workers have likely lost employer-provided health insurance since the coronavirus shock began*. (2020, April 30). Economic Policy Institute. <https://www.epi.org/blog/12-7-million-workers-have-likely-lost-employer-provided-health-insurance-since-the-coronavirus-shock-began/>
- [62] *Human-centered automation experimental studies of two human-machine interface designs*. (2002). IEEE Conference Publication | IEEE Xplore. <https://ieeexplore.ieee.org/document/1042840>
- [63] Carroll, A. E. (2017, September 5). *The Real Reason the U.S. Has Employer-Sponsored Health Insurance*. The New York Times. <https://www.nytimes.com/2017/09/05/upshot/the-real-reason-the-us-has-employer-sponsored-health-insurance.html>
- [64] Justice, C. (2018, July 31). *Using Automation To Enhance Not Replace The Workforce*. Forbes. <https://www.forbes.com/sites/kpmg/2018/07/31/using-automation-to-enhance-not-replace-the-workforce/?sh=78383bb14701>
- [65] *The Future of Jobs Report 2018*. (2018, September 17). World Economic Forum. <https://www.weforum.org/reports/the-future-of-jobs-report-2018>
- [66] *What are the benefits of a profit-sharing economy?* (2015, August 3). World Economic Forum. <https://www.weforum.org/agenda/2015/08/what-are-the-benefits-of-a-profit-sharing-economy/>
- [67] *Report of the Commission on Inclusive Prosperity*. (2015, January 15). Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2015/01/15/104266/report-of-the-commission-on-inclusive-prosperity/>
- [68] Devinney, F. (2018, May 14). *AI Needs Human-Centered Design*. WIRED. <https://www.wired.com/brandlab/2018/05/ai-needs-human-centered-design/>
- [69] Koperniak, S. (2021, March 16). *The Work of the Future: Building Better Jobs in an Age of Intelligent Machines*. MIT Work of the Future. <https://workofthefuture.mit.edu/research-post/the-work-of-the-future-building-better-jobs-in-an-age-of-intelligent-machines/>
- [70] Green, K. (2019c, October 1). *How Unions Can Help Reskill Workers for the Future*. UnionTrack. <https://www.uniontrack.com/blog/unions-reskill-workers>
- [71] *Young people view labor unions more favorably than business corporations*. (2018, June 4). Pew Research Center. [https://www.pewresearch.org/fact-tank/2018/06/05/more-americans-view-long-term-decline-in-union-membership-negatively-than-positively/ft\\_18-06-04\\_union\\_views\\_5young-people-view/](https://www.pewresearch.org/fact-tank/2018/06/05/more-americans-view-long-term-decline-in-union-membership-negatively-than-positively/ft_18-06-04_union_views_5young-people-view/)

- [72] *Humans Wanted: How Canadian youth can thrive in the age of disruption.* (2018, June).  
<https://www.rbc.com/dms/enterprise/futurelaunch/humans-wanted-how-canadian-youth-can-thrive-in-the-age-of-disruption.html>
- [73] Dzieza, J. (2020, April 10). *Warehouse workers are forcing Amazon to take COVID-19 seriously.* The Verge.  
<https://www.theverge.com/2020/4/10/21216172/amazon-coronavirus-protests-response-safety-jfk8-fired-covid-19>
- [74] *Centre for Welfare Reform: How to Fund a Universal Basic Income.* (n.d.). Centre for Welfare Reform.  
<https://www.centreforwelfarereform.org/library/how-to-fund-a-universal-basic-income.html>
- [75] Corkery, M., & Gelles, D. (2020, April 10). *Robots Welcome to Take Over, as Pandemic Accelerates Automation.* The New York Times.  
<https://www.nytimes.com/2020/04/10/business/coronavirus-workplace-automation.html>
- [76] Field, H. (2020, April 29). *COVID-19 will herald an automation boom.* Protocol  $\hat{A}$  The People, Power and Politics of Tech.  
<https://www.protocol.com/automation-boom-caused-by-coronavirus>
- [77] Khalid, A., Enwemeka, Z., & Fujiwara, D. (2017, October 30). *What The Data Tell Us About The Future Of Work In Mass. | Bostonomix.* WBUR.Org. <https://www.wbur.org/bostonomix/2017/10/30/future-jobs-data-massachusetts>
- [78] Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R., & Sanghvi, S. (2019, May 11). *Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages.* McKinsey & Company. <https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>
- [79] Kochan, T. A., Yang, D., Kimball, W. T., & Kelly, E. L. (2018b). *Worker Voice in America: Is There a Gap between What Workers Expect and What They Experience?* *ILR Review*, 72(1), 3–38.  
<https://doi.org/10.1177/0019793918806250>
- [80] *Recommendation of the Investor Advisory Committee Human Capital Management Disclosure.* (2019, May).  
<https://www.sec.gov/spotlight/investor-advisory-committee-2012/human-capital-disclosure-recommendation.pdf>
- [81] Cartwright, M. (2021, May 16). *Prometheus.* World History Encyclopedia.  
<https://www.worldhistory.org/Prometheus/#:%7E:text=In%20Greek%20mythology%2C%20the%20Titan,was%20helplessly%20chained%20to%20a>
- [83] Draudt, A. (2018, April 9). *How do We Think Better about the Future(s)? - One Design Community.* Medium.  
<https://medium.com/capitalonedesign/how-do-we-think-better-about-the-future-s-58ff2e37fcab>

- [84] *TechCrunch is now a part of Verizon Media.* (2018, July 20). Tech Crunch. <https://techcrunch.com/2018/07/20/waymos-autonomous-vehicles-are-driving-25000-miles-every-day/#:~:text=Waymo%27s%20autonomous%20vehicles%20are%20driving%2025%2C000%20miles%20every%20day,-Kirsten%20Korosec%40kirstenkorosec&text=Waymo%2C%20the%20former%20Google%20self,roads%20using%20its%20autonomous%20vehicles.>
- [85] Creative Destruction Definition. (n.d.). Investopedia. <https://www.investopedia.com/terms/c/creativedestruction.asp>
- [86] *Decades of rising economic inequality in the U.S.: Testimony before the U.S. House of Representatives Ways and Means Committee.* (2019, March 27). Economic Policy Institute. <https://www.epi.org/publication/decades-of-rising-economic-inequality-in-the-u-s-testimony-before-the-u-s-house-of-representatives-ways-and-means-committee/>
- [87] Weaver, A. (2020, April 2). The Myth of the Skills Gap. MIT Technology Review. <https://www.technologyreview.com/2017/08/25/149485/the-myth-of-the-skills-gap/>
- [88] How Does Profit Sharing Work? (2020, September 15). King University Online. <https://online.king.edu/news/how-does-profit-sharing-work/>