



Investing in the Future of Work



The future is specialized. The rise of artificial intelligence (AI) is affecting the professional job market in much the same way automation and robotics impacted production and service jobs over the past decade. The current turmoil in the global economy may temporarily slow the pace of change, but could trigger accelerated adoption of AI as economies recover and companies seek to reduce reliance on personnel. The question remains: As technology advances and the required workforce skills change, will there be enough skilled workers to fill those future jobs? How can workers acquire the skills needed in the new paradigm?

Rethinking education and training. The U.S. employment market pre-pandemic was characterized by millions of unfilled jobs along with a pool of underemployed or “discouraged unemployed” who had given up seeking work. When economic activity resumes, this dynamic will still exist and may in fact be exacerbated by ongoing social distancing and companies’ ramping up focus on technological solutions to business challenges.

What can investors do to help close the growing skills gap? Reskilling and upskilling may provide the answer to the current and future employment skills gap. We have identified a series of funds that invest in practical solutions to help train, reskill and upskill the workforce of today and the future. Some of the funds focus on improving the skills of young people just entering the workforce, and some provide lifelong learning needed to adapt to the rapidly changing economy.

In this report, we address the widening workforce skills gap and identify the socio-demographic groups that may be most exposed to changing technology such as automation and robotics. We identify specific investments which may help close the widening skills gap. We also share case studies of innovative training and skill-building programs.

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Key Takeaways on the Future of Work

- Given the rapid evolution in artificial intelligence, robotics and automation, many of today's jobs might be handled by a much smaller percentage of the population by 2060. Conversely, while many jobs will be eliminated, new ones will likely be created.
- The systemic shocks currently hitting the global economy may temporarily slow AI adoption, but the fallout from the coronavirus pandemic may accelerate adoption of AI as economies recover and companies seek to reduce reliance on personnel.
- If AI and automation replace human jobs at an accelerating rate, including those requiring complex thought and interaction, people may have to change their jobs, their companies, and even their careers. Further, the jobs of tomorrow will require at least some competency in the STEM fields — science, technology, engineering, and math.
- The solution to closing the skills gap may lie in **upskilling** and **reskilling**. The term upskilling refers to the expansion of people's capabilities and employability, typically in their existing role, to fulfill the needs of a rapidly changing economy. Reskilling teaches new skills and trains individuals for new jobs in the evolving economy.
- Who is most exposed to career risk from AI and automation? Nearly all workers face some impact. Men with less formal education, young workers, and some racial/ethnic groups all appear likely to face significantly more challenges from automation near term than do educated men and women, prime-age workers, and whites. But in the medium and long term, many vocations and demographics face a challenge from evolving AI which can automate a wider range of jobs.
- Though automation may spell difficulties for many workers in a variety of industries, sectors that are automating appear on the whole to be increasing their profitability over time. For further analysis of profit and loss related to automation and capex investments, please see Appendix A.
- The economic crisis developing as a result of the coronavirus is starting to shine a light on companies that look to the future, have a culture of learning and prepare for the unexpected. These forward-looking companies may prove to be more resilient than others that do not embrace change, training and education. Environmental, social and governance (ESG) analysis and a focus on sustainable and impact investing may help identify the more resilient companies.
- To prepare for the future, companies will need to engage in retraining (upskilling) employees either in-house or in partnership with educational institutions or organizations. They might redeploy workers with certain skills to different roles that might be more impactful to the company or operation.
- The relationship between education and work is evolving to meet the needs of this changing landscape. Educational technologies and creative business models are emerging. We offer a number of examples in this report.
- For investors interested in funding access to educational tools and services, there are ample opportunities in the venture capital/private funding space. Investors in public equities can also address worker training issues related to the evolving future of work through shareholder engagement. Investors can encourage and hold corporations accountable for meaningful workplace training programs that provide employees with effective technological skills to meet the companies' changing needs, either through direct engagement with management or indirectly through their asset managers.





Introduction

At the start of the 20th century, more than 75% of the U.S. population worked on farms. Today, that figure has dropped below 2%, driven in large part by industry consolidation into large, technology-driven enterprises. Given the rapid evolution in artificial intelligence, robotics and automation, many of today's jobs might similarly be handled by a much smaller percentage of the population by 2060.¹ Conversely, while many jobs will be eliminated, new ones will likely be created. Will the workforce of the future have the skills needed in an evolving digital economy?

Implications of the coronavirus crisis

Before we address the future of work, we would like to comment on the current coronavirus and its impact on this issue. The most immediate impact has been a rapid acceleration in trends such as remote work using online collaborative tools, and telemedicine. Millions of students and teachers are mastering new technological solutions, including online discussion forums, video lectures and remote test-taking. Grocery stores are now using robots to stock shelves to avoid human exposure to the virus.² This amounts to unprecedented change and it is likely that the use of technology for education and work sparked by COVID-19 will not revert to the status quo.

The crisis is starting to shine a light on companies that look to the future, have a culture of learning and prepare for the unexpected

Further, the crisis is starting to shine a light on companies that look to the future, have a culture of learning and prepare for the unexpected. Currently, the widespread social distancing and cessation of nonessential activities, as well as extreme instability in the oil market, are causing the economy to go into a deep recession. The economic upheaval under way is highlighting the downside of just-in-time manufacturing – highly efficient until there is an unexpected surge in demand for, say, residential-grade toilet paper. We may also see a retreat from economic globalization or the emergence of other unforeseen structural impacts on the economy. The crisis has fueled innovation as well, with companies adapting their customer service approach or pivoting from producing one product to another to meet pandemic-related needs. Wholesalers in some areas are selling directly to consumers to address shortages, and many small businesses have applied creative solutions to attract business. Consumers are taking notice of which companies are adapting well, taking care of their employees and displaying a sense of community and generosity – and which are not.

Forward-looking companies with a culture of innovation and resilience will likely emerge from this crisis stronger than those without a strategy for *adapting to future workplace realities*

While no one knows what the coming months (and years) will bring, forward-looking companies with a culture of innovation and resilience will likely emerge stronger than companies without a strategy for adapting to future workplace realities. Environmental, social and governance (ESG) analysis and a focus on sustainable and impact investing is designed to identify more resilient companies. Companies that treat their employees well, and that train those employees to adapt to changing technology and market conditions, may experience better customer service, better employee productivity and presumably better margins in the future. Identifying asset managers who pay attention to the ESG characteristics of their investments may enable investors to experience less volatility in trying times.³

Creative destruction

Much has been written about the current widespread anxiety over the future of work⁴ and the need to protect those displaced by automation and other technological changes. However, there is a long history of technological displacement of workers coinciding with substantial job creation. This process is known as *creative destruction*, which the famed Austrian economist Joseph Schumpeter recognized as the heart of economic progress.⁵

Creative destruction refers to the relentless product and process innovation by which new products and processes replace outdated ones

Creative destruction refers to the relentless product and process innovation by which new products and processes replace outdated ones.⁶ While anxiety-provoking for workers experiencing these transitions, concerns about technology-driven unemployment (or “technological unemployment,” per Schumpeter) have not been borne out by evidence over the long term.⁷ For example, e-mail, word processors and other modern office technologies have reduced the number of administrative assistants needed — but have added to the demand for computer programmers. The advent of the internet spawned a need for thousands of webmasters, an occupation that did not exist as recently as 1990.⁸

According to Schumpeter, attempts to soften the blow of creative destruction by trying to protect jobs or industries will lead to economic stagnation and decline, hindering progress.

Is it different this time?

Increasing automation results in “frictional technological unemployment”: There are still jobs, but not everyone is skilled enough to do them

Increasing automation results in frictional technological unemployment. This means there are still jobs, but not everyone is skilled enough to do them. Before the current crisis, U.S. unemployment was low at 3.6%,⁹ but the participation rate (the number of people employed or seeking employment) was depressed, with one in six men of working age having dropped out of the workforce — double the level in 1940.¹⁰ The reason was likely a mismatch of skills: men have been losing jobs that may be automated and have been unwilling or unable to take on jobs that are seeing growth, such as nursing, teaching, housekeeping, and hairdressing. But there may be more to the story to explain the declining participation rate.

There is another school of thought which holds that the impact of creative destruction is different this time. In 2012 there was a “Big Bang” in big data and artificial intelligence (AI). AI algorithms are designed to make decisions, often using real-time data. With massive improvements in storage systems, processing speeds, and analytic techniques, these algorithms are capable of

Artificial Intelligence: a threat to professionals?



Recent research is sounding the alarm bells for workers of every level of education and skill. While automation is clearly affecting less-educated, lower-wage workers performing routine tasks who are being displaced by robotics, a recent study by the Brookings Institute suggests that well-educated, higher-paid workers (along with manufacturing and production workers) will generally be the most impacted by the new artificial intelligence (AI) technologies. The study opines that workers with bachelors, graduate or professional degrees will be four to five times as exposed to the risk of displacement by AI as workers with just a high school degree. This current wave of automation and AI appears likely to impact white-collar, well-paid workers in fields ranging from radiology and optometry to those in the legal profession and beyond.^{11 12}

sophisticated analysis and decision making. Using sensors, digital data, or remote inputs, they combine information from multiple sources, analyze the material instantly, and act on the insights derived from those data. Access to more data and more powerful machines enabled AI researchers to deploy machine learning, a well-established type of statistical technique. Machine learning, and in particular a sub-set called deep learning, enables machines to carry out non-routine tasks that require creativity.

While machines have been taking on manual tasks for decades, cognitive capabilities are now becoming automated

Dr. Daniel Susskind¹³ projects a fairly dystopian view of the future of work in his book *A World Without Work*.¹⁴ He believes the threat of mass technological unemployment is real and may be just a few decades away. Susskind notes that employment skill levels can be classified as manual, cognitive, and affective (i.e., referring to moods, feelings and attitudes). While machines have been taking on manual tasks for decades, cognitive capabilities are now becoming automated. For example, using AI and big data, machines can already discern a person's mood. The research-driven AI firm DeepMind Technologies created software that beat the world's top human Go player, a complex game with nearly an unlimited number of alternatives to consider per move. In the field of law, JP Morgan developed a system that reviews commercial loan agreements in a few seconds that would have taken about 360,000 hours of human lawyers' time. In medicine, DeepMind created a program that can diagnose many eye diseases as well as or better than clinical experts.¹⁵

If automation replaces human jobs at an accelerating rate, including those requiring cognitive or affective skills, people may have to change their jobs, their companies, and even their careers. Further, the jobs of tomorrow will require at least some competency in the STEM fields — science, technology, engineering, and math.

The critical need for training services is fueling investment into new educational technologies and programs

While Susskind's grim forecast may not fully come to pass, it is clear that the need for reskilling and upskilling is essential to meet the changing landscape of the future of work.^{16 17} **Reskilling** is the process of teaching new skills so an individual can do a different job. Also, for those whose jobs evolve along with technology, upskilling could be a solution. **Upskilling** is the process of enhancing an employee's abilities within the same job profile.

In this report, we will address reskilling and upskilling as an important facet of the future of work. The critical need for these services is fueling investment in new educational technologies and programs, largely in the form of venture capital investment funds. We highlight a number of such funds – as well as opportunities for public equity investors to influence corporate practices around skills development in their workforce.

What Skills Will Be Needed in the Future?

In the previous section we outlined how automation, while enhancing productivity, is threatening many existing jobs. At the same time, there is a severe shortage of qualified talent for the new digital economy. Jobs requiring technical knowledge of artificial intelligence (AI), robotics, and the Internet of Things are going unfilled.

McKinsey expects demand to soar by 90% for advanced IT/programming skills in the next ten years

Research from McKinsey suggests that through 2030, the time spent using advanced technological skills will increase by 40-50% in the U.S. and Europe. McKinsey expects a rapid rise in demand for advanced IT and programming skills, with such jobs estimated to grow by 90% between 2016 and 2030. More broadly, basic digital skills will become a core employment requirement.

Accompanying the adoption of advanced technologies into the workplace will be an increase in the need for workers with finely tuned social and emotional skills — skills that machines are a long way from grasping.¹⁸

The solution to closing the skills gap may lie in **upskilling** and **reskilling**. The term upskilling refers to the expansion of people's capabilities and employability, typically in their existing role, to fulfill the needs of a rapidly changing economy.²⁰ Reskilling teaches new skills and trains individuals for new jobs in the evolving economy.

Skills needed in different sectors

In the digital age, various sectors of the economy will require workers with more advanced skill sets. Some of the developments highlighted below have already come to pass or are well under way. For example:

- As automation grows, the financial services sector will continue to need fewer tellers and accountants but will demand more customer service and sales personnel — roles requiring stronger social and emotional skills.
- In healthcare, the requirement for IT and digital skills will grow, as will the need for nurses and medical assistants, while machines will monitor patient vitals and records.

Case study: L'Oréal goes digital



Like many companies, L'Oréal has determined that its workforce needed to be ready for the digital age. To prepare for the inevitable changes, the company created a leadership development program. As part of the program, the top 1,000 executives took part in a range of events aimed at empowering them to develop digital road maps for their offices and regions, and to create a more open, innovative and agile culture that their office and workforce need to have to execute this strategy. Over 14,000 employees have completed an upskilling program consisting of online lessons and workshops developed in collaboration with General Assembly, a subsidiary of The Adecco Group (a large global staffing company). The program teaches skills such as search engine optimization, digital media allocation and digital analytics in order to design a baseline of digital knowledge for every employee. To encourage employees to participate in the program, the company employs a variety of tactics, including gamification, incentives and executive communications.¹⁹

- In retail, self-check-out machines and shelf stocking robots will replace cashiers and manual labor. Retailers will demand advanced IT skills to help analyze marketing data or develop ecommerce initiatives, along with people possessing interpersonal skills that can boost sales.
- Automation and AI will disrupt manufacturing production. Manufacturing companies will need highly skilled individuals who can collaborate with machines and perform computer analytics to improve production efficiency. Demand for engineers and sales personnel should grow as the manufacturing sector evolves.²¹

Though automation may spell difficulties for many workers in a variety of industries, sectors that are automating appear on the whole to be increasing their profitability over time. For further analysis of profit and loss related to automation and capex investments, please see Appendix A.

Shifting roles

Altering the allocation of time spent on different tasks will allow companies to make the most effective use of different qualification levels in their workforce and help improve efficiency. For example, registered nurses and physician assistants now perform some of the tasks that only primary care physicians once carried out, such as administering vaccinations and examining patients with routine illnesses.²²

To prepare for the future, companies will need to engage in retraining (upskilling) employees either in-house or in partnership with educational institutions or organizations. They might redeploy workers with certain skills to different roles that might be more impactful to the company or operation. Where necessary, companies may need to hire talent from the outside, such as contractors or freelancers, to fill in for areas lacking a particular set of skills.²³

Case study: Toyota and community college partnership



A collaboration between South Carolina's technical college system and the U.S. Department of Labor stimulated a ten-fold increase in apprenticeship programs in the state over more than a decade. Through a work-based Advanced Manufacturing Technician learning model, the program aims to train maintenance technicians. For example, Toyota partners with local community colleges to offer a two-year work-study course for which students attend class two days a week. On the other days, students intern at a Toyota factory or an area manufacturing company gaining hands-on experience in maintenance and production. Through this paid internship, students can earn as much as \$40,000 over two years, improving the feasibility of graduating without debt. Those who complete the program obtain an associate degree of applied science in advanced manufacturing and earn access to opportunities for additional training, other paid internships, and a full-time job with Toyota. While program graduates are not guaranteed a job at Toyota (both the business climate and student performance can affect employment opportunities with the company), those hired by an Advanced Manufacturing Technician partner firm can earn as much as \$64,000 a year in addition to benefits.^{24 25}

Who Is Most Exposed to Automation Risks?

Men with less formal education, young workers, and some racial/ethnic groups all appear likely to face significantly more challenges from automation near term

The technological evolution impacts all demographics, but some are more vulnerable to automation than others. Men with less formal education, young workers, and some racial/ethnic groups all appear likely to face significantly more challenges from automation near term than do women, prime-age workers, and whites. But in the medium and long term, many vocations and demographics face a challenge from evolving AI which can automate a wider range of jobs.

Nearly all workers are at risk

Men occupy 70% of production jobs, over 80% of transportation jobs, and over 90% of construction and installation jobs — all occupations with above-average projected automation exposure. By contrast, women comprise upward of 70% of the labor force in occupations such as health care, personal services, and education, which have relatively lower automation risk. As a result, men may face slightly more change in the future labor market than women. Overall, 23.7% of male workers hold jobs that are at potential high risk from automation, compared with 17% of women.²⁷ (Data provided do not reflect analysis of changes in the workforce resulting from the coronavirus outbreak.)

Case study: Adult skills-training boot camp



Trilogy Education Services is a for-profit workforce accelerator (aka developer) owned by 2U, Inc. Previously it was a portfolio company for City Light, an impact-focused venture capital firm. City Light Partners Josh Cohen, Tom Groos and Jeff Rinehart took interest in Trilogy's mission to partner with universities to create and manage skills-based training programs. This company offers an alternative to two- and four-year college, which may take too long and cost too much for some adults. By partnering with universities, Trilogy reduces its operating expenses and can offer programs at a lower tuition vs. the university system. Trilogy and its partners offer programs in web development, data analytics, cybersecurity and other market-driven curricula. These programs are geared to adult learners who may be working, looking to change career and are specifically looking to gain tech skills. The programs can be taken full-time over 12 weeks, part time over 24 weeks or part

time online to offer flexibility. The program's "graduates" have been employed by over 3,000 companies ranging from startups to Fortune 500 companies.²⁶

Case study: Walmart Academy



Walmart's upskilling initiative identified the need to transform its operational model and its workforce to meet the changing needs of customers and the integration and use of new technologies. In 2016, the company launched the Walmart Academy program in the U.S. as a dedicated training program utilizing the sales floor to train associates in areas that include advanced retail skills, leadership and change management. In two years, the U.S. program has grown to encompass salaried managers and market level positions, bringing additional training programs in house and influencing most associate training. Introducing the use of new technologies as part of the training program (e.g., smart tablets instead of textbooks). By the end of 2018, more than 720,000 U.S. associates had already gone through an academy program.^{28 29}

For women, technology is particularly likely to threaten good middle-skilled jobs that offer comprehensive benefits, such as entry-level administrative positions, bookkeepers, or accountants.³⁰ Today, women hold most of these jobs, making up 70% of the U.S. clerical and administrative workforce. The current-task automation potential of such occupations is estimated at 60%. In retail, where women are more likely to work as cashiers, newer technologies such as self-checkout already pose a threat.³¹ And while female workers dominate the jobs least likely to be replaced by technology — such as child care, elder care, and education — these “safe” jobs often pay less at the same level of education than other jobs, and the quality of some of these jobs can be low and provide less access to benefits.³² (For more on the impact of automation, see our report [Women in an Automated World](#).³³)

Education a key differentiator

Education is clearly a factor in determining automation risk. As noted above, sectors that are growing, such as healthcare and education, tend to be dominated by women.³⁴ In many cases, these sectors require educational attainment beyond high school. Women account for the majority of people enrolled in college and the majority of those receiving degrees.³⁵ Industries that tend to be dominated by men, such as manufacturing and mining, traditionally did not require education beyond high school — and lost over 20,000 jobs.³⁶ Indeed, for the first time in over a decade, women held more U.S. jobs (50.4% of total) than men in December 2019. This may reflect the future of the American workforce.

Case study: Aviation technician training program



Pierpont Community and Technical College in West Virginia offers workforce retraining opportunities through the Robert C. Byrd National Aerospace Education Center, an aviation technician training program. The Aerospace Center is a collaboration between a community college, industry, and Federal grant programs to create workforce opportunities for both young, inexperienced students, as well as experienced displaced workers or those seeking new opportunities. The Aerospace Center attracts workers from other industries such as the military, construction and the energy field. Approximately 46% of the Aviation Center’s student body consists of workers seeking vocational retraining, as opposed to recent high school graduates.

The Center offers two different programs: a two-year associate’s program culminating in a Federal Aviation Administration (FAA) certificate, allowing graduates to work in the field worldwide; or a shorter eight-week program whose participants typically become apprentices for aviation companies. The shorter program may eventually lead to other credentials and employment in the aviation field, albeit without nationwide portability. The Center is located near aerospace companies such as Pratt & Whitney and Bombardier and maintains close relationships with these companies, which have direct input in the Center’s training program. This ensures that the program meets labor market needs, so students graduate with in-demand skills. The curriculum is governed by FAA-approved coursework, but also includes a general education program that offers supports ranging from basic writing and math training to public speaking and digital literacy.

The Center not only offers displaced workers the opportunity to gain new skills and reenter the workforce, but also aims to transition them to a well-paying industry. According to the Bureau of Labor Statistics, aircraft mechanics in West Virginia earn \$53,940, on average, far higher than the average state income of \$40,250.³⁷



Younger workers at high risk

According to the Brookings Institution, automation exposure will vary even more sharply across age groups, with the young facing the most disruption. While prime-age workers — those aged 25-54 — have an average current-task automation potential of 40% in the next few decades, that same figure for workers aged 16-24 is 49%. Nearly 30% of young workers are in high-risk jobs with 70%-plus current-task automation potential. Nearly half of workers under 25 are employed in the occupations where average automation potential of current tasks exceeds 50% (much higher than prime-age workers). Young workers' concentration in low-wage food prep jobs is especially concerning given that the quick-service restaurant industry is projected to see much more automation in the coming decades.³⁸

Racial and ethnic disparities in risk

Automation will likely have greater relative impact on people of color. For example, Hispanic/Latinx and black workers may face a risk of current task automation displacement exceeding 47%, well above the risk for their white and Asian counterparts.³⁹ Furthermore, according to the National Center for Educational Statistics, in 2015-16 fewer than 9% of people graduating with a STEM (science, technology, engineering and mathematics) bachelor's degree were black, while just 12% of Hispanic/Latinx graduates held such degrees.⁴⁰

What Education Will Be Needed in the Future?

The U.S. education system focuses on preparing students for higher education. Yet fewer than one in five young Americans moves smoothly from high school to college to career. The six-year graduation rate for first-time, full-time undergraduate students who enrolled in four-year degree-granting institutions in fall 2011 overall was 60% as of 2017.⁴² Many will never earn even a two-year degree.

Case study: SV Academy



SV Academy is a “pre-hire” training program that teaches sales skills for business development jobs, typically an entry level position at a business-to-business (B2B) software or other type of technology firm. People in this role help drive sales by identifying and connecting with businesses that may need the tech company's products or services.

SV Academy partners with companies looking to fill these roles. The Academy provides training and development programs along with a one-year mentorship program for recent college graduates, with the cost covered by the prospective employers. According to Susan Cates of Leeds Equity Partners, this arrangement benefits all sides. It doesn't add to a student's debt load and offers training, connections and potential job opportunities for new college graduates looking to enter the workforce, particularly people of color and women.⁴¹

Better outcomes might be achieved if the system gave more emphasis to equipping people with marketable skills and helping them find the foothold of a first job. Focusing on less-educated workers and the employers who might hire and train them would likely create a larger pool of skilled workers and could make businesses that employ such workers relatively more attractive to build.⁴³

Approximately 53% of job openings are “middle skill,” requiring less than a four-year degree but more than a high school education.

Approximately 53% of job openings are “middle skill,” requiring less than a four-year degree but more than a high school education. This includes carpenters, plumbers and electricians, as well as dental hygienists, paralegals and licensed practical nurses. Only about 43% of the current labor force fits that educational profile.⁴⁴ Estimates from the Bureau of Labor Statistics suggest there were over 6.6 million unfilled job vacancies in the U.S. as of May 2018. Pre-coronavirus, presumably, these vacancies remained unfilled in part because those not in the labor force lacked the skills required to fill these job openings.⁴⁵

Even with an associate’s or bachelor’s degree, graduates may languish in jobs that don’t require higher education or remain unemployed, as employers seek candidates that already possess the skills they need. In earlier decades, companies often hired college and even high school graduates into company training programs. Today, companies use computerized tracking systems to hire candidates with specific skill sets. As a result, before the current economic crisis, nearly half of all recent college grads were either underemployed or unemployed because they lacked the required experience or skill set. Meanwhile employers were competing for a limited pool of skilled potential employees.^{46 47}

As the costs of recruiting and job churn continue to rise, however, it is becoming cheaper for employers to train candidates to fill skilled job openings.⁴⁸ The relationship between education and work is thus evolving to meet the needs of this changing training landscape.

Closing the skills gap may require creating or using intermediaries between those looking to hire and those looking for good jobs

Closing the skills gap may require creating or using intermediaries between those looking to hire and those looking for good jobs. This may entail a public or private workforce accelerator or training program, a community college or other organization that could partner with companies to train people. One such accelerator is Achieve Partners, which seeks to close the skills gap with training designed to create better access to good technology jobs. As described by Managing Director Daniel Panko, such partnership-based programs could culminate in paid internships, free skills training offered by prospective employers, or salary-sharing arrangements whereby a portion of the new employee’s salary is used to pay for the training program.⁴⁹



Investing in Access to Education

Cornerstone Capital Group's [Access Impact Framework™](#) illustrates how our clients' portfolios can align in support of the UN Sustainable Development Goals. The framework links the Sustainable Development Goals (SDGs) to investment activities through a focus on access — access to the natural, human and economic resources that will create a more regenerative and inclusive world. The access theme of “Access to Education” focuses on access to inclusive and quality education for all —including employment training and continuing education. This access theme relates to several SDGs including (but not limited to) SDG 4: Quality Education and SDG 8: Decent Work and Economic Growth.

To measure whether asset managers and their respective funds foster access to education, we evaluate fund managers' investment approaches and shareholder engagement activities. Are they asking the right questions to the management teams of portfolio companies regarding training, reskilling and upskilling? We believe that asset managers should try to determine if the companies they invest in have a culture of continuous learning to develop their employees' skill base for the future of work at their companies. Below we suggest some funds and fund managers who focus on Access to Education. *(Fund names and further details are available to Cornerstone clients upon request.)*

Venture capital, private equity, private debt

Many funds that focus on this sector tend to be venture capital, private equity or private debt funds rather than public equity or debt

Funds focused on educational and workforce training tend to invest in earlier-stage companies. As result, many funds that focus on this sector tend to be venture capital (VC), private equity or private debt funds rather than public equity or debt.

We have identified 11 VC/private funds that address the following themes:

- Companies seeking to improve education outcomes and access, spanning early childhood, K12, higher education, and lifelong learning. This can include investments in crucial life skills, personalized learning, vocational preparation and college dropout prevention.
- EdTech companies across all stages of the education spectrum encompassing early childhood, K-12, higher education and career mobility/professional learning.
- Investments to make higher education more affordable, pioneer new approaches to learning, and help employers identify and hire talent from diverse backgrounds, with the goal of helping people get good-paying jobs and closing the skills gap.
- Provision of seed capital and regulatory support to entrepreneurs shaping the future of cities, with the “future of work” as a key investment theme.
- Investments in early-stage companies committed to closing gaps of access, opportunity or outcome for low-income communities and/or communities of color, including some educational and career-training-oriented companies.

Public Equities

Investors in public equities can address worker training issues related to the evolving future of work through shareholder engagement

While many of funds that address life-long learning tend to invest in venture capital or private equity, investors in public equities can also address worker training issues related to the evolving future of work through shareholder engagement. Investors can encourage and hold corporations accountable for meaningful workplace training programs that provide employees with effective technological skills to meet the companies' changing needs, either through direct engagement with management or indirectly through their asset managers

By using their rights as shareholders to address the widening skill gap between the demand for and supply of technologically adaptable workers, shareholders and asset managers might ask the following questions of company management:

- 1) Does the company offer and require training to develop its desired skill sets?
- 2) What type of training is the company providing to its existing workforce? What type of training is it providing to its entry level workers?
- 3) Has the company invested in reskilling or upskilling its existing workforce so they may adapt to the company's evolving business needs related to automation and technology?
- 4) If so, what types of programs is it investing in and what percentage of capital expense is dedicated to this training?
- 5) If not investing in reskilling/upskilling or training, how is the company addressing its current and future need for a technologically adept workforce?
- 6) Is the company considering investing in this type of program or planning to work with an educational institution or local government to develop the skills needed for the current and future workforce?

Conclusion

A broad array of workers and jobs face the risk of displacement from advancing automation and AI. Even highly educated workers in professional jobs may be at risk. To avoid massive worker redundancy and a supply shortage of skilled employees in the future, companies, individuals and policymakers need to collaborate to promote lifelong learning. Today, investors can help mitigate this risk by investing in funds that focus on upskilling, reskilling and education.

Further, the current global crisis is starting to shine a light on companies that look to the future, have a culture of learning and prepare for the unexpected. These forward-looking companies may prove to be more resilient than others that don't embrace change, training and education. Impact investing, or investing using an ESG lens, may help identify these more resilient companies that can rebound from adversity faster and stronger than others.

Appendix: Automation, Profitability per Employee, and Sector Trends

Automation and corporate profits

Productivity growth — the amount of output produced per worker — has been boosted in recent years by automation. Long-term economic growth, which is influenced by productivity gains, drives long-term growth in corporate profits. Profit growth is a key element of long-term stock market returns.

What are the current trends in automation and, specifically, the substitution of capital for labor? Are companies investing in technological innovations such as automation, and laying off workers? If so, what is the impact on various sectors? While these issues are very difficult to measure, one potential metric for equity strategists to use is the growth of corporate profits relative to the number of employees.

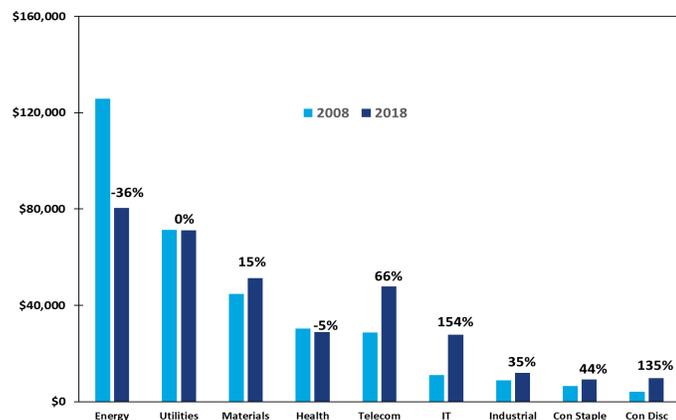
Automation has been a key driver of corporate profitability

Between 2008 and 2018 the operating earnings of the S&P 500 companies increased by 206%, but the number of employees grew by just 22%. This likely reflected, in large part, the impact of automation, i.e., U.S. workers being replaced by increasingly sophisticated technologies. In other words, automation has been a key driver of corporate profitability.

Profitability per employee at the sector level

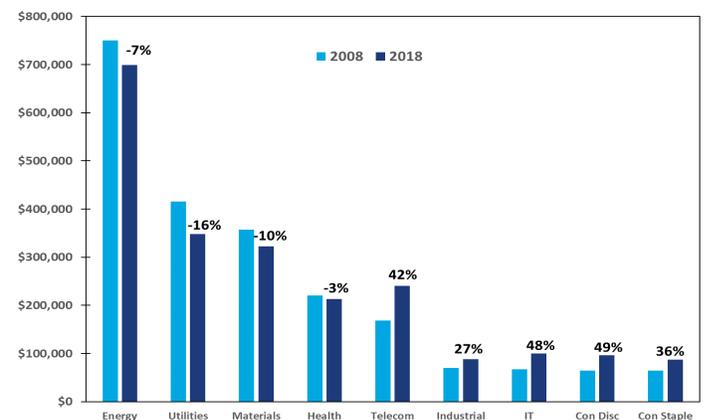
We examined the relationship between profit growth and employee growth at the sector level to get a more granular picture of potential future impacts of automation. Figure 1 shows EBIT (Earnings Before Interest and Taxes) per employee in the non-financial sectors in the S&P 500 in 2008 and 2018. So, for example, the EBIT per employee in the Utilities sector in 2018 was \$71,000, unchanged from 2008. Figure 2 shows the revenue per employee in the Utilities sector in 2018 was \$348,000, down 16% from 2008.

Figure 1: EBIT per Employee, Non-Financial Sectors in S&P 500



Source: Bloomberg.

Figure 2: Rev. per Employee, Non-Financial Sectors, in S&P 500



Source: Bloomberg.



The **Energy** sector generated the most income per employee, although that is down from ten years ago when oil prices were at much higher levels. This automated, capital-intensive, and highly profitable sector earned \$80,000 per employee in 2018, which is considerably more than most other sectors.

Not surprisingly, there was no growth in in profitability per employee in the heavily regulated **Utilities** sector.

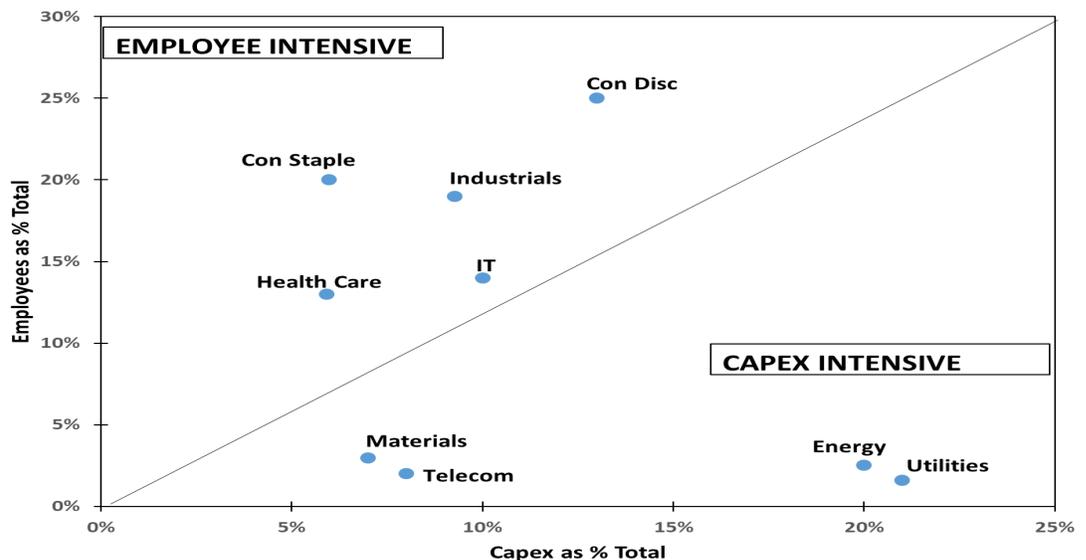
The rise in employee profitability in the Consumer Discretionary sector may reflect rising automation

In contrast to Energy and Utilities, other sectors have seen a sharp *increase* in profitability per employee, including the **Information Technology** and **Consumer Discretionary** sectors. The fact that the Consumer Discretionary sector (which includes retail industries) has seen a sharp rise in employee profitability (+135%) in the past 10 years may indicate a rising level of automation in a traditionally employee-heavy sector. (For further detail, see our report [Retail Automation: Stranded Workers?](#))

The **Health Care** sector experienced a slight decline in profitability per employee in the past ten years, reflecting that growth in the number of employees exceeded profit growth. This may indicate that the labor-intensive healthcare sector has structural costs embedded in it that will reduce the likelihood of comparable profitability levels as compared to less labor-intensive industries.

Disaggregating the numbers reveals these trends more clearly. The y-axis in Figure 3 illustrates a sector's employees as a percent of total employees. The x-axis shows sector capex as a percent of total capex (i.e., the amount of capital required to maintain and acquire physical assets including information technology, physical plant, and real estate assets). So, for example, the Telecom sector accounts for 8% of total capex and employs 2% of workers.

Figure 3: Non-Financial S&P 500 Sectors: Employees Versus. Capex



Source: Bloomberg.



Key findings from Figure 3:

- More sectors are employee-intensive than capex intensive.
- The **Consumer Discretionary** sector employs 25% of workers — the most of any sector — but accounts for just 13% of total capex. While, as we pointed out above, it may be the case that the sector has already seen an increase in automation, it could well be that capital will continue to be substituted for labor in this employee-heavy sector.
- The **Energy** sector accounts for 20% of total capital spending, but it only employs 3% of workers, suggesting limited upside for more automation. Similarly, the **Utilities** sector accounts for 21% of total capital spending but employs only 2% of workers.

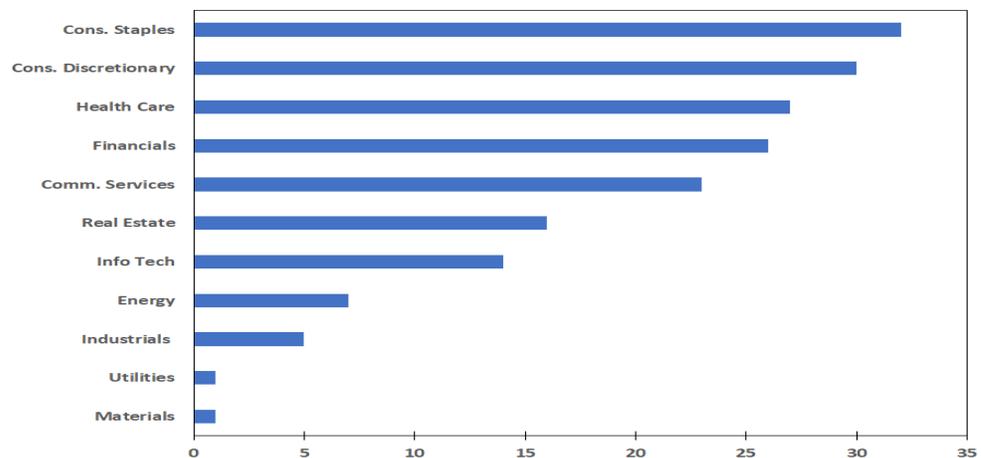
Combining the analysis in Figures 1 and 3 suggests that sectors that are automating appear to be increasing their profitability over time.

In many employee-intensive sectors where capital expenditures are relatively low, increased automation is likely

- In many employee-intensive sectors — **Consumer Discretionary, Consumer Staples, Industrials, IT, Telecom** — profit per employee has grown rapidly but capex is relatively low, suggesting there is room for still more automation. In Health Care, declines in profitability per employee, together with low capex, suggest the potential for automation-driven gains in profitability, although the labor-intensive nature of the sector may create hurdles.
- Capital intensive sectors — **Energy, Utilities** — seem to have limited options in terms of further automation.

Figure 4 illustrates that, in terms of gender diversity, several labor-intensive sectors — Consumer Staples, Consumer Discretionary, Health Care — rank at the top of the 11 sectors, while capital-intensive sectors (Materials, Utilities, Energy) rank at the bottom. This suggests that, in some labor-intensive sectors, women are particularly vulnerable to automation.

Figure 4: Workforce Diversity (Score 0 - 25 =weak, 26 – 50 = mid-to-weak)



Source: Wall Street Journal



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