Progress and Protection:

ALIGNING AI INNOVATION WITH WORKER WELFARE

NorthStar
POLICY ACTION

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ABOUT NORTH STAR POLICY ACTION

North Star Policy Action is an independent research and communications institute that is dedicated to improving the lives of everyday Minnesotans by advancing bold ideas that change the conversation and bring communities together. We develop and promote data-driven solutions to persistent problems that allow working people to thrive, no matter who they are or where they live

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Introduction

Artificial Intelligence (AI) holds the capacity to not just reshape industries, but to redefine the fabric of the American workplace. As this technology propels us into new realms of innovation and productivity, it simultaneously presents profound challenges for working Minnesotans. According to a recent survey, 96% of business executives expect that AI will increase their company's productivity, but 77% of workers say these tools have added to their workload while decreasing their productivity.[1] This disconnect between employer expectations and worker realities calls out for policymakers to develop sound regulation.

Amidst federal gridlock, the onus falls on states to pioneer responsible AI governance. In 2023, state legislators across the country introduced 190 AI-related bills, a 440% increase from the previous year.[2] Demonstrating an accelerating concern, AI bills were introduced in states at a rate of 50 per week in January of 2024.[3]

While Minnesota has been part of this legislative surge, considering over a dozen bills addressing AI, there are several reasons that the current moment presents an important time to reflect on the state's response to AI.[4] First, AI technology has advanced rapidly in recent years, leading to greater adoption among organizations. Just one-in-five employers indicated they used AI in 2017. By 2024, nearly three-quarters said they did.[5]

Second, the public release of ChatGPT in late 2022 introduced the world to new capabilities in the form of generative AI, wherein AI can create new content based on prompts. While previous technological advances have been able to automate specific operations, such as self-use tablets taking orders in place of waiters and waitresses, generative AI holds the capacity to take on multistep complex tasks, like writing code in place of computer programmers. Both forms of job loss are troubling, but this capacity shift calls for a new analysis of AI's effect on working Minnesotans, particularly given the rapid adoption of generative AI illustrated in Figure 1.

Finally, the speed of AI development demonstrates the need to move beyond a whack-a-mole legislative approach that sees lawmakers retroactively responding to new problems as they arise. Rather, the scale of AI's risks and rewards for Minnesota's workforce requires a comprehensive regulatory framework capable of proactively protecting against future harms while encouraging growth.

This report addresses each of these issues. It begins by providing a new analysis of Minnesota workers placed at risk by technological advancement. We distinguish between the risk posed by computers and robotics more generally (what is referred to as computerization), and the specific impact of AI. In doing so, we highlight how AI threatens

1   Bryan Robinson, "77% of employees report AI has increased workloads and hampered productivity, study finds," Forbes, July 23, 2024, https://www.forbes.com/sites/bryanrobinson/2024/07/23/employees-report-ai-increased-workload/.

2   "BSA analysis: State AI legislation surges by 440% in 2023," BSA|The Software Alliance, September 27, 2023, https://www.bsa.org/news-events/news/bsa-analysis-state-ai-legislation-surges-by-440-in-2023.

3   Ryan Heath, "Exclusive: States are introducing 50 AI-related bills per week," Axios, February 14, 2024, https://www.axios.com/2024/02/14/ai-bills-state-legislatures-deepfakes-bias-discrimination.

4   Torey Van Oot, "Generative AI bills populate Minnesota's legislature," Axios Twin Cities, March 15, 2024, https://www.axios.com/local/twin-cities/2024/03/15/generative-ai-bills-regulation-minnesota-social-media-privacy.

5   "The state of AI in early 2024: Gen AI adoption spikes and starts to generate value," Quantum Black AI by McKinsey, May 30, 2024, https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai.

FIGURE 1. ADOPTION OF AI BY ORGANIZATIONS, 2017 TO 2024
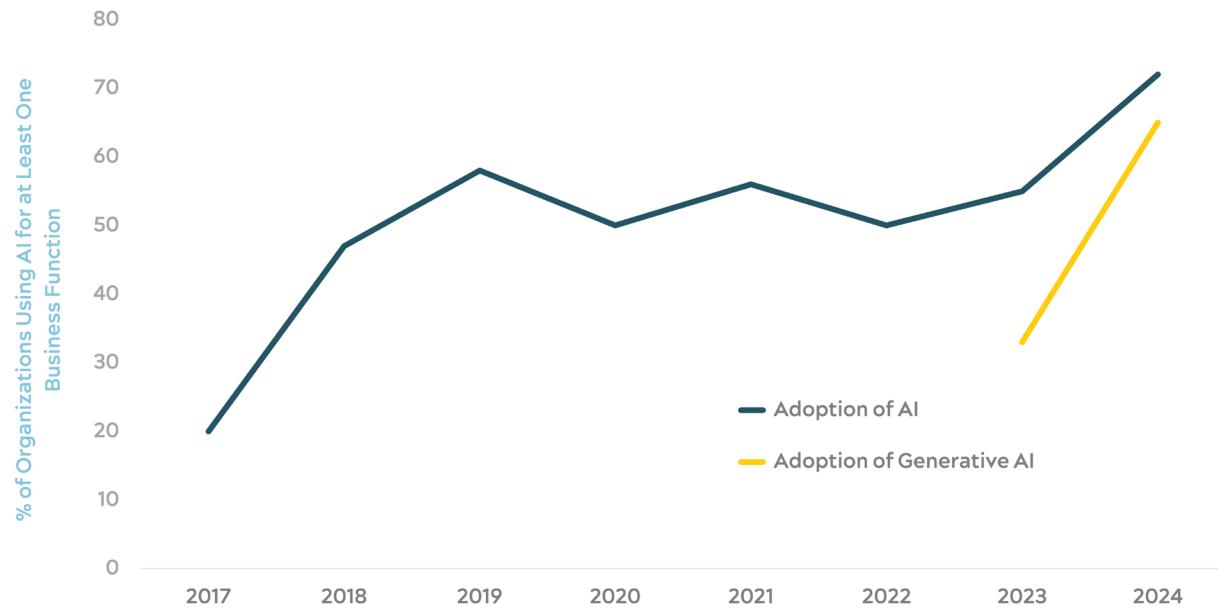
Figure source: "The state of AI in early 2024," McKinsey and Company, May 30, 2024, https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai.

a different set of workers from those with jobs generally jeopardized by technology.

To help inform a legislative response to this threat, the second half of the report puts forward policy guidelines for an AI regulatory framework. By championing principles that enhance workplace organizing, train workers for new opportunities created by automation, and restrict AI's role in surveillance and discrimination, Minnesota has the potential to lead a balanced approach to AI innovation—one that supports its workforce, promotes innovation and productivity, and reduces inequality.

Key Takeaways:

◆ In total, **17% of Minnesota workers, or nearly 500,000 people, are at a high risk of having their job impacted by AI**. More than 150,000 are at a very high risk of impact. These statistics make Minnesota the 10th most affected state in the US and the 2nd most impacted state in the Midwest region. In the context of this report, "risk" simply indicates that AI will impact a job, which could mean complimenting one's work or displacing it.

◆ The types of workers threatened by AI differ from those affected by the broader computerization of the economy (i.e., the use of computers to replace human workers). Where computerization poses a greater challenge for jobs dominated by women, people of color, and those with lower levels of education, **AI appears more likely to influence jobs predominantly held by men, white people, and those with advanced college degrees**.

◆ Beyond differences across job types, the analysis also indicates **AI will do more to shift jobs in Greater Minnesota**, with a particularly pronounced impact on agricultural workers. By contrast, **industries with greater union density appear less likely to see their jobs changed by AI**.

◆ Technological advancements are likely to significantly alter the future for Minnesota workers. **Half of the ten fastest growing jobs in Minnesota are at high risk of being impacted by AI or computerization**.

◆ While the rise of AI raises concerns for workers, it also **presents an opportunity for organized labor**. The impact of AI on white-collar professions that have generally avoided unions creates an opening to organize a new class of laborers. Moreover, recent union victories provide a roadmap for collectively bargaining over technological innovation in a way that allows AI to improve job quality for workers.

◆ To protect against the harms of AI and promote worker-centered AI innovation, **Minnesota lawmakers should prioritize making it easier for workers to organize.** Strengthening collective bargaining is essential for including worker perspectives in AI development, ensuring that any AI advancements will benefit working people.

◆ **Government leaders should further protect Minnesota workers** by providing advanced notice of job losses due to automation, offering opportunities for new employment facilitated by AI advancements, restricting the use of AI for monitoring workers, and curtailing AI's role in making important decisions, such as those concerning hiring and firing.

◆ At a minimum, Minnesota policymakers should ensure that all **AI models are transparently implemented and rigorously evaluated to prevent bias**, while establishing an infrastructure for the **initial and ongoing assessment of AI's impact in the workplace**. This proactive approach will ensure that AI developments do not inadvertently harm workers and that adjustments can be made in a timely manner.

AI's Impact on Working Minnesotans

DATA AND METHODS

In this analysis, we draw on the methodology utilized in a 2023 report from the Project for Middle Class Renewal at the University of Illinois School of Labor and Employment Relations.[6] In that report, Luisa Nazareno and Robert Bruno focus on the risk that workers face from automating technologies, being careful to note that "assessing risk does not equal job displacement," insofar as factors beyond technological capabilities can shape decisions to eliminate jobs.

In this same way, the findings put forward here should not be understood as an indication of how many workers will lose their jobs due to technological advancements, but rather how many are likely to be impacted. Such impacts could include positive changes (e.g., automating tedious tasks), mildly negative alterations to a job (e.g., technology supplementing a worker's task leading to lower wages), and more drastic negative scenarios (e.g., job loss).

In their analysis, Bruno and Nazareno use two approaches to identify at-risk workers. First, they employ Carl Benedikt Frey and Michael Osborne's technique for estimating the risk of workers being impacted by the move to replace human workers with automated computerized processes.[7] Labeled computerization, this approach sees AI as one technological development among many that have the capacity to affect workers, with others including advances in software capacity and machine robotics. To develop these risk scores, Frey and Osborne relied on a panel of experts to evaluate the potential automation of 700 occupations.

The second method comes from Michael Webb.[8] Differing from Frey and Osborne's broader analysis of computerization, Webb examines the specific impact of AI on American workers. In doing so, Webb provides a definition of AI that we adopt here, referring to it as "algorithms that learn to complete tasks by identifying statistical patterns in data, rather than following instructions provided by humans." Put more simply, AI represents computers independently learning to do human tasks, as opposed to being taught by humans to do those tasks.

Through this definition, Webb distinguishes the impact of AI from the impact made possible by advances in robotics and software, wherein computers are not learning for themselves, but merely following instructions. For example, a computer that replaces a software developer by learning how to code would be an example of AI displacement. By contrast, a tablet replacing a server by being programmed to take food orders is an example of displacement via computerization.

To carry out this AI-focused analysis, Webb aligns the text of patents for AI technology with text describing the tasks of occupations. Significant overlap between the patent language and the occupation language indicates AI's capacity to perform those same occupational tasks, suggesting that the occupations are likely to be impacted by AI. For example, if the text of an AI

6   Luisa Nazareno and Robert Bruno, "AI and the Future of Work in Illinois," University of Illinois Project for Middle Class Renewal, November 20, 2023, https://lep.illinois.edu/publications/ai-and-the-future-of-work-in-illinois-an-assessment-of-workers-at-risk-by-automated-technologies/.

7   Carl Benedikt Frey and Michael Osborne, "The future of employment: How susceptible are jobs to computerization?" Oxford Martin Programme on Technology and Employment, September 17, 2013, https://www.oxfordmartin.ox.ac.uk/publications/the-future-of-employment.

8   Michael Webb, "The impact of Artificial Intelligence on the labor market," SSRN, November 15, 2019, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3482150.

patent discussed a technology being able read multiple law briefs, analyze them, and provide summaries, it is likely to overlap heavily with language describing the tasks of paralegals.

The variation between these methods creates two subtle but crucial distinctions. First, computerization puts more jobs at risk. Again, workers in food service are threatened by computerization due to the risk of advanced software systems utilizing tablets to replace these jobs. Webb's more specific focus does not find that these jobs are threatened by AI, recognizing that being able to order on a screen at a restaurant has to do with a human instructing a computer how to take orders rather than the computer learning to take orders on its own.

Second, Frey and Osborne's computerization analysis predates Webb's AI study by three years, a substantial gap given the speed of AI development. This time difference shows up in Frey and Osborne's assessment that AI lacks capacity in social and creative intelligence, leading them to suggest AI will struggle to affect jobs that are based on understanding people and generating new content. By the time Webb's analysis was completed, AI's capacity in these areas had improved and was better understood, leading Webb to classify certain jobs as at risk which were not caught by Frey and Osborne. For example, Webb identifies several health care positions, such as optometrists, as threatened due to AI's increasing capacity to learn and diagnose patients. The impact of these methodological differences will be made clear throughout our analysis.

Given that our focus is on AI, we place more weight on the findings derived from Webb's approach, but this weighting should not be taken as a sign that we believe Webb's methods are more accurate in predicting how technology will impact working Minnesotans. Rather, they do a better job of capturing the specific influence of AI, while we include findings gained through Frey and Osborne's computerization method as an indication of the broader scale of impending change resulting from technological advancement.

The two methods described above both provide risk scores for each occupation in the US. In their analysis, Nazareno and Bruno take these scores and label occupations as "high risk" if their score is at or above the 75th percentile, while occupations at or above the 90th percentile are seen as "very high risk."[9] We adopt this same methodology to identify Minnesota jobs threatened by technological development. Accordingly, occupations can fall into one or more of four categories:

1. AI- High Risk (Webb methodology- 75th percentile or above)
2. AI- Very High Risk (Webb methodology- 90th percentile or above)
3. Computerization- High Risk (Frey and Osborne methodology- 75th percentile or above)
4. Computerization- Very High Risk (Frey and Osborne methodology- 90th percentile or above)

To apply these categories to the Minnesota workforce, we utilize data from the 2022 American Community Survey. This dataset provides the most recent, accurate, and comprehensive data on the occupations held by Minnesota workers. As the data is measured at the individual level, it also provides the opportunity to assess the demographics of the Minnesotans who work in impacted occupations, providing a sense of not only how many people are at risk but also what communities will be affected.

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9 For the full list of occupations and their placement into risk categories, see Table A1 in the Appendix of Nazareno and Bruno's report at https://lep.illinois.edu/wp-content/uploads/2023/11/AI-Report-Nov-2023.pdf.

IMPACT ON ALL MINNESOTA WORKERS

Starting at the statewide level, our analysis reveals that 16.7% of Minnesota workers are in jobs that are at high risk of being impacted by AI, representing nearly 500,000 people. Among this group, 5.3% (160,000 people) are at a very high risk of impact.

Reflecting the more expansive nature of Frey and Osborne's methodology, a greater number of Minnesota workers appear to be at risk of having their job impacted by computerization. According to this metric, 22.1% and 5.6% of workers are at a high or very high risk of computerization impact, accounting for 660,000 and 170,000 Minnesotans, respectively.

FIGURE 2. NUMBER AND SHARE OF MINNESOTA WORKERS WITH JOBS AT RISK OF TECHNOLOGICAL IMPACT
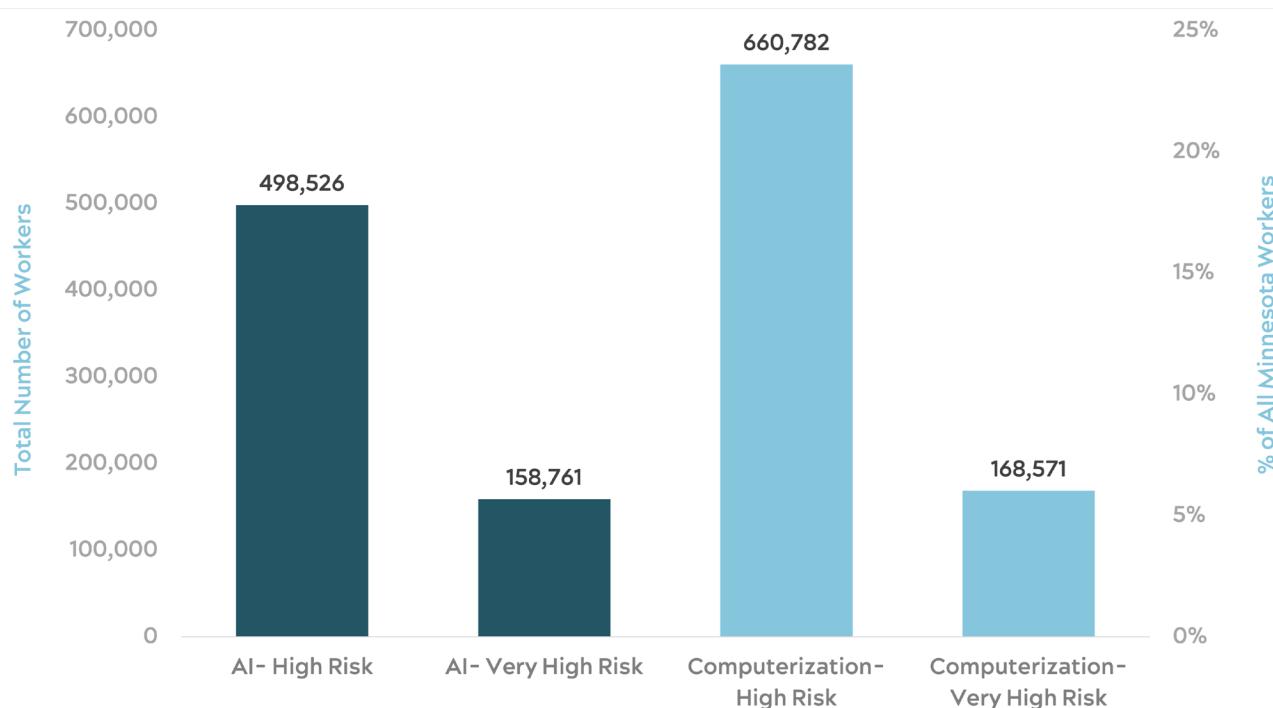

Figure source: Author's analysis of 2022 American Community Survey Data.

Comparing this risk of AI to other states reveals a particularly impactful picture for Minnesota workers. The 16.7% of working Minnesotans who are at high risk of AI impact ranks 10th among all states and is more than a full percentage point greater than the proportion of at-risk workers across the country. Within the Midwest region, only South Dakota has a greater share of impacted workers, while Minnesota and Nebraska share the second spot. Though this analysis suggests a substantial impact on working Minnesotans, it is worth noting that these estimates are considerably smaller than the 1.6 million jobs that a recent state analysis found will be highly exposed to AI.[10]

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10   Luke Greiner and Cameron Macht, "Northern Exposure: Measuring Artificial Intelligence in Minnesota's Economy," Minnesota Department of Employment and Economic Development, https://mn.gov/deed/newscenter/publications/trends/september-2024/exposure.jsp.

FIGURE 3. SHARE OF WORKERS AT HIGH RISK OF AI IMPACT, MIDWEST REGION
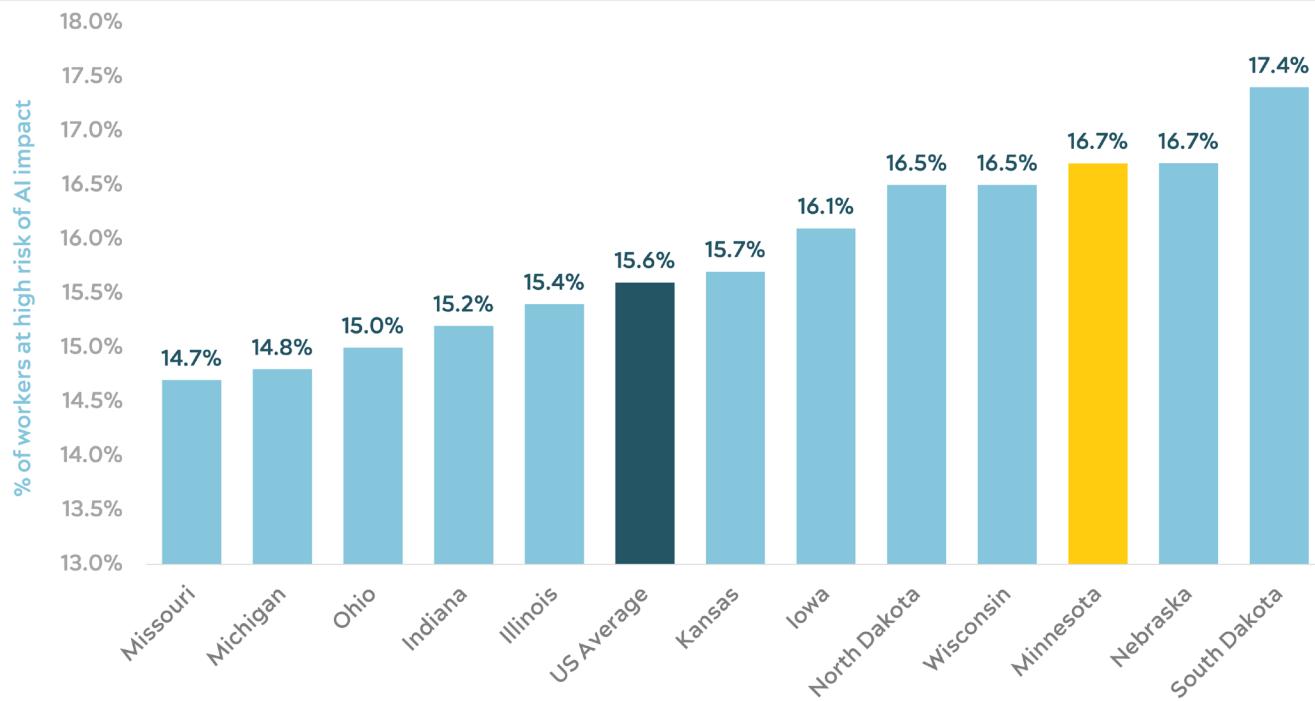
Figure source: Author's analysis of 2022 American Community Survey Data.

Minnesota's relative position shifts substantially when focusing on the broader issue of computerization. In this case, Minnesota's share of at-risk workers ranks 37th across all states, comprising the lowest risk of states in the Midwest region. These results suggest that when it comes to the intersection of technology and Minnesota's labor force, AI presents a particularly strong concern.

MOST IMPACTED OCCUPATIONS AND INDUSTRIES

The relatively large impact of AI in Minnesota indicates that the state holds a greater concentration of at-risk occupations. To get a sense of what these jobs look like, Table 1 displays the high risk occupations with the greatest number of Minnesota workers.

In showcasing the largest impacted jobs, the table reveals a vast occupational range. This range illuminates the varied capacity of AI, pointing out the difficulty of finding an industry that will remain protected from its effects.

Table 1. Largest AI-High Risk Occupations in Minnesota	
Occupation	**Number of MN Workers**
Software Developers	32,936
Farmers, ranchers, and agricultural managers	28,277
Carpenters	24,414
Lawyers, and judges, and other judicial workers	19,840
First-line supervisors of production and operating workers	17,301
Other agricultural workers	16,468
Computer support specialists	16,128
Medical and health services managers	15,473
Inspectors, testers, sorters, samplers, and weighers	15,258
Construction managers	14,856
Table Source: Author's analysis of 2022 American Community Survey Data.	

For example, the list includes office jobs like software developer and medical service manager, as well as more manual labor jobs, including carpenters and agricultural workers. Where the former category may seem intuitive insofar as AI is associated with executing computing tasks that are prominent in office work, the latter category may be surprising. Yet as Webb points out in his own study, industries like agriculture contain stable, systematic relationships, along with abundant historical data (e.g., how changes in weather shift crop yields). As a result, an AI algorithm can relatively easily learn how to utilize inputs (e.g., weather data) to make decisions on outputs (e.g., planting and harvesting).[11]

Similar dynamics impact carpenters. AI's machine learning capacity allows it to analyze large amounts of data to inform predictions around popular designs and useful materials. In addition to this help with project conception, AI-powered computer vision means it can operate machines to make exact cuts and assemble pieces together. Even industry groups are noting the capacity for AI to create unprecedented efficiency, precision, and productivity for carpenters.[12] To reiterate an important point, the placement of carpenters on this high-risk list does not imply that AI will replace carpenters, only that it will significantly impact their work. This impact could take the form of replacement or augmentation. The difference between these two scenarios may come down to carpenters' capacity to shape the implementation of AI in their field, as will be discussed in greater detail below.

To provide a more comprehensive view of AI's influence, Figure 4 shows the percentage of impacted workers across every industry in the state. Furthering a finding from Table 1, this figure reveals AI's potential alteration of an important Minnesota industry: agriculture. Again, this impact relates back to the stable, systematic relationships within agriculture that make AI useful. Similar dynamics are at play in professional and management positions, two other hard hit industries.

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11   The recently launched AI-CLIMATE Institute at the University of Minnesota provides an example of how AI will impact agricultural practices in the state: https://cse.umn.edu/college/news/university-minnesota-lead-new-20m-ai-institute-focusing-climate-smart-agriculture-and.

12   "How can AI be used in Woodworking?" Architectural Woodwork Institute, August 24, 2023, https://awinet.org/how-can-ai-be-used-in-woodworking.

FIGURE 4. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY INDUSTRY
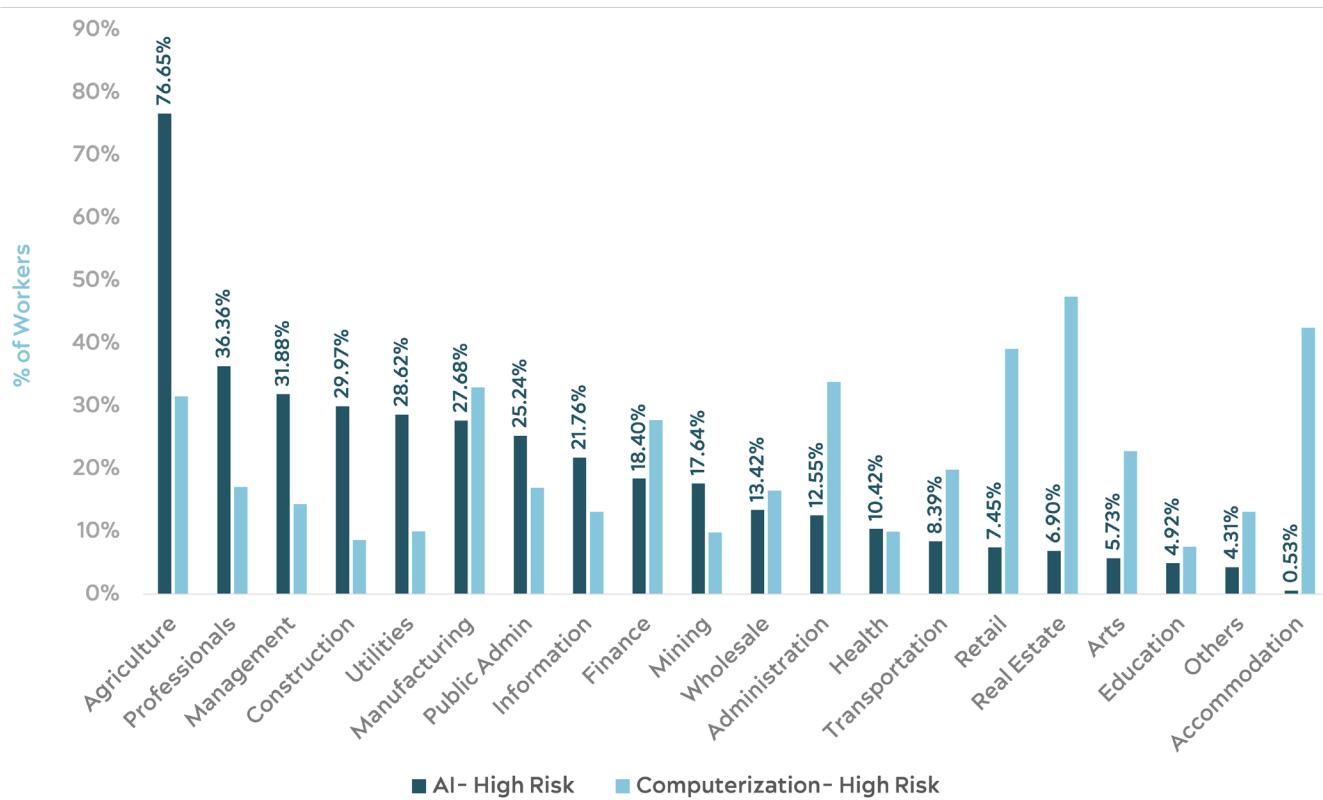

Figure source: Author's analysis of 2022 American Community Survey Data.

AI's contrast with the risk of computerization is also made plain in Figure 4. While computerization appears to affect agriculture too, the extent of this impact is much smaller. Instead, retail, real estate, and accommodations stand out as the industries with the most workers at risk from computerization, three industries where AI has a much smaller impact.

Some of this industry variation also maps onto union density. Figures 5a and 5b provide a scatterplot to illustrate the relationship between the share of impacted workers by industry and the share of workers in that industry who are union members. The lines in each graph reflect the general trend within this relationship, with the negative slope of the lines indicating that the percentage of impacted workers tends to increase as union density falls. Recent research from the Brookings Institution similarly found that AI exposure is higher in industries with weaker union representation, setting up a troubling dynamic in which the most impacted workforces will have the weakest ability to defend themselves.[13]

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13 Molly Kinder, Xavier de Souza Briggs, Mark Muro, and Sifan Liu, "Generative AI, the American worker, and the future of work," Brookings, October 10, 2024, https://www.brookings.edu/articles/generative-ai-the-american-worker-and-the-future-of-work/.

## FIGURE 5A. AI IMPACT BY INDUSTRY AND UNION MEMBERSHIP SHARE
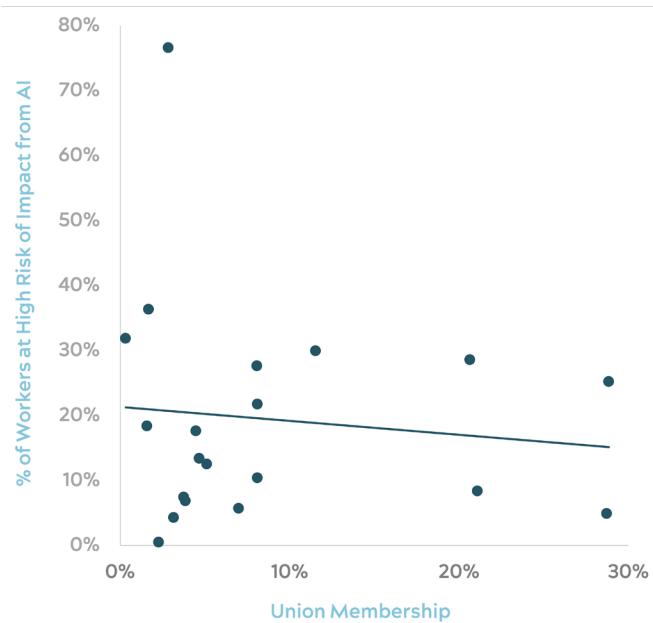
Figure source: Author's analysis of 2022 American Community Survey Data.

## FIGURE 5B. COMPUTERIZATION IMPACT BY INDUSTRY AND UNION MEMBERSHIP SHARE
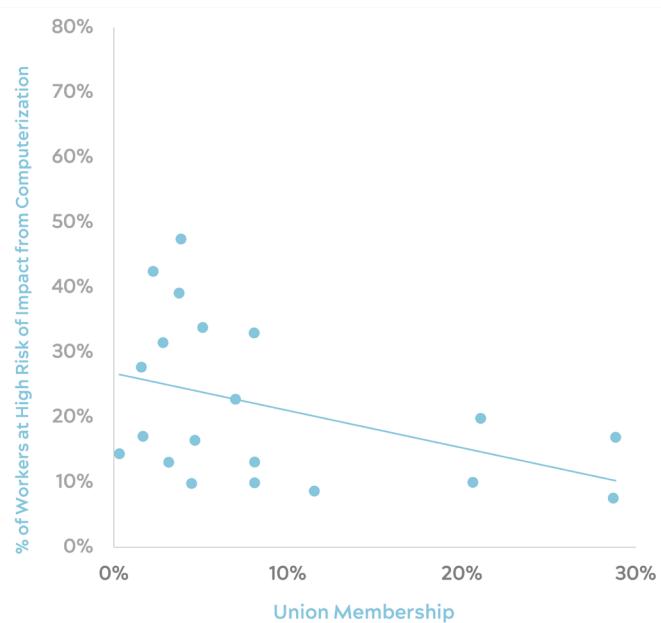
Figure source: Author's analysis of 2022 American Community Survey Data.

GEOGRAPHY

Perhaps reflecting some of this industry variation, and the large influence of AI on agriculture, the impact of AI shows up as particularly strong in Greater Minnesota. While the Twin Cities and Greater Minnesota look similar in terms of the share of workers in high risk jobs, Greater Minnesota appears to be in far worse shape when it comes to jobs that are at a very high risk, with the share of workers in this category more than double that in the Twin Cities. Interestingly, a similar pattern appears for computerization, suggesting that workers in Greater Minnesota are more vulnerable to all forms of technological change when compared to working Minnesotans in the Twin Cities Metro Area.[14]

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14 Here, our analysis diverges from the recent state analysis by Greiner and Macht (see footnote 10) which found that AI will have a greater impact on jobs in metro counties. While this difference highlights the sensitivity of models for estimating AI's impact, it should not distract from the agreement between our two reports that AI will alter a large number of jobs in Minnesota. That area of alignment points to the importance of policymakers taking decisive action to address AI, as will be discussed in greater detail in the final section of this report.

FIGURE 6. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY GEOGRAPHIC AREA
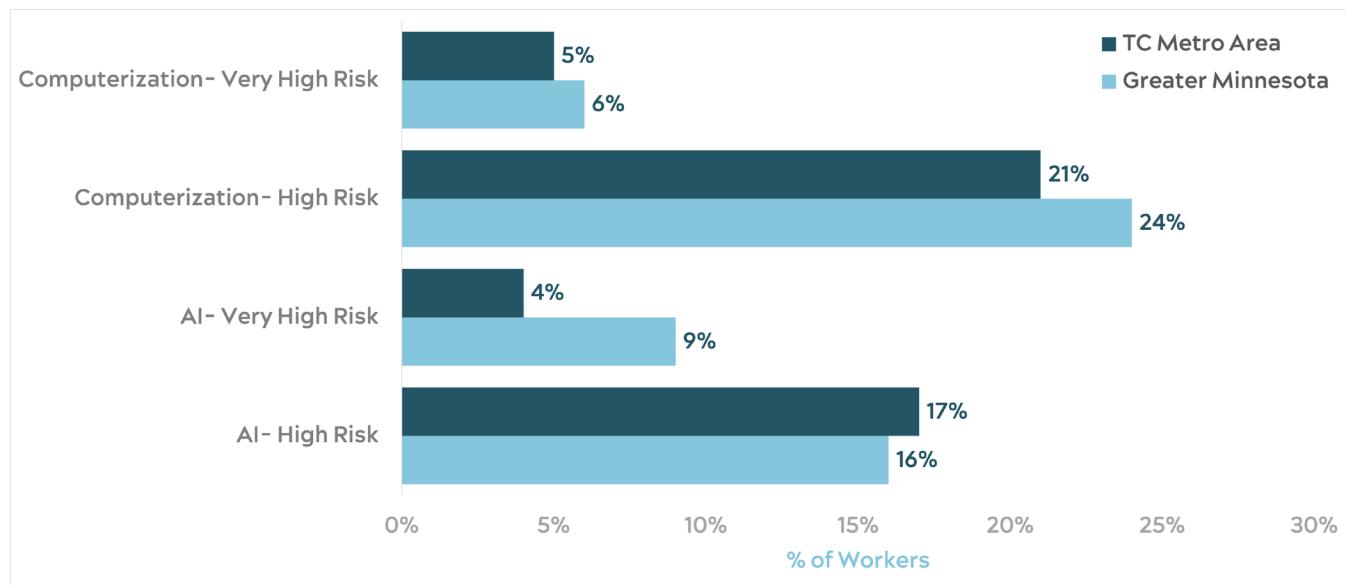

Figure source: Author's analysis of 2022 American Community Survey Data.

EDUCATION

The divergence between computerization and AI continues when examining impacted workers across levels of educational attainment. Figure 7 displays the influence of AI, showing that workers with advanced degrees are at the greatest risk of AI changing their jobs, with this impact declining as educational levels decrease. The figure further reveals the opposite relationship for computerization, where risk increases as educational attainment levels decrease.

This finding for computerization is more in line with Minnesota's 2018 analysis of automation, which similarly found greater risks for jobs that required lower levels of education.[15] By contrast, the type of tasks AI is capable of replicating, including more creative and learning-intensive tasks, are a greater threat to jobs that are generally filled by people who have college and post-collegiate degrees. Brookings and the 2024 state analyses find something similar, noting that AI is likely to have a bigger impact on jobs that tend to require more education.[16] That the impact of AI is so distinct reinforces the value of analyzing this technology on its own, as it suggests both a different at-risk population and a different set of remedies to protect this set of workers.

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15 Luke Greiner 2018.

16 Molly Kinder et al. 2024. Greiner and Macht 2024.

FIGURE 7. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY EDUCATION
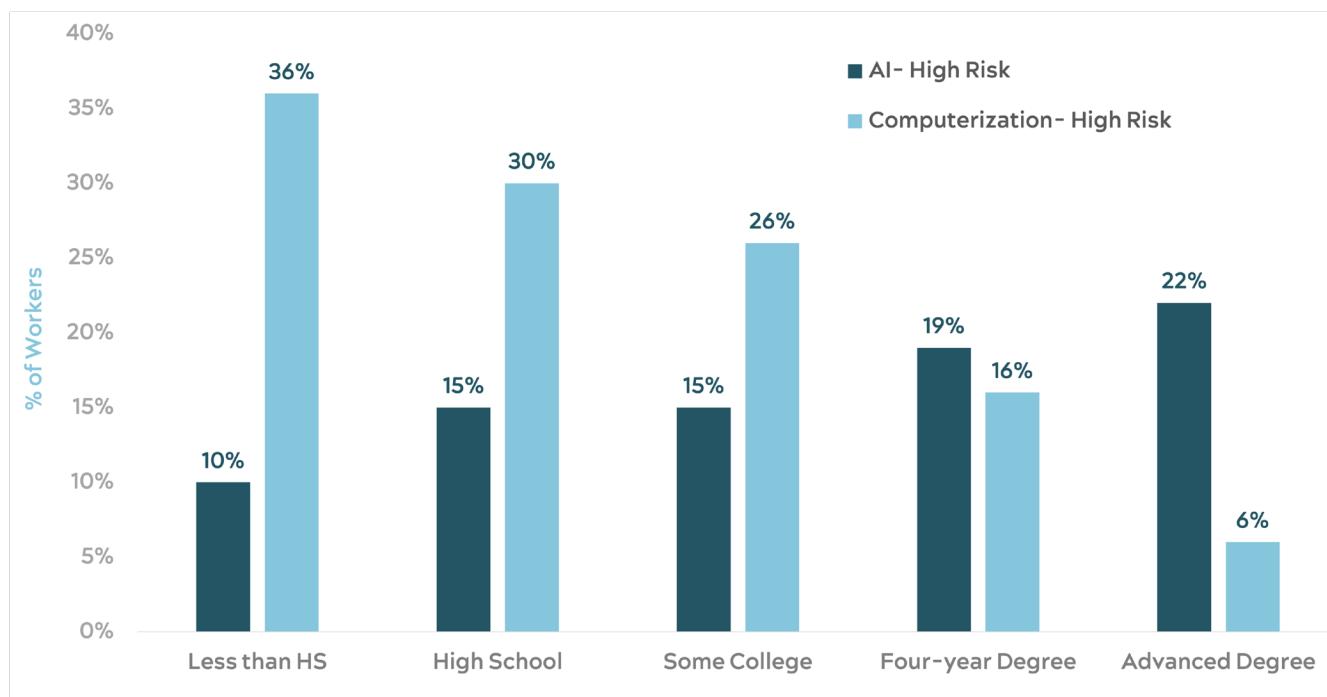

Figure source: Author's analysis of 2022 American Community Survey Data.

SEX

Looking at the impact of AI and computerization across sex reveals a similar pattern to educational levels. As seen in Figure 8, men make up a substantially greater share of workers impacted by AI. Nearly a quarter of all male Minnesota workers are at high-risk of AI changing their job, while just 10% of female workers fall into this high-risk group. The results flip when turning to computerization, with a greater share of female workers in the high and very high-risk categories, though this disparity across the sexes is notably smaller in computerization than it is for AI.

In this case, our findings run counter to those from Brookings' recent analysis which found women are more likely to be impacted by AI.[17] While it is difficult to pinpoint the reason for this disjuncture, it may come from Brookings' more specific focus on generative AI, meaning technology like ChatGPT, as opposed to AI more broadly. Through this narrower analytic lens, the Brookings analysis highlights the role of generative AI in altering clerical jobs that are disproportionately held by women, while downplaying the impact of AI on manual jobs, such as agriculture, that are identified as at-risk in Webb's methodology. As generative AI becomes a more broadly incorporated workplace technology, this larger impact on jobs held by women must be taken seriously.

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17   Molly Kinder et al. 2024..

FIGURE 8. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY SEX
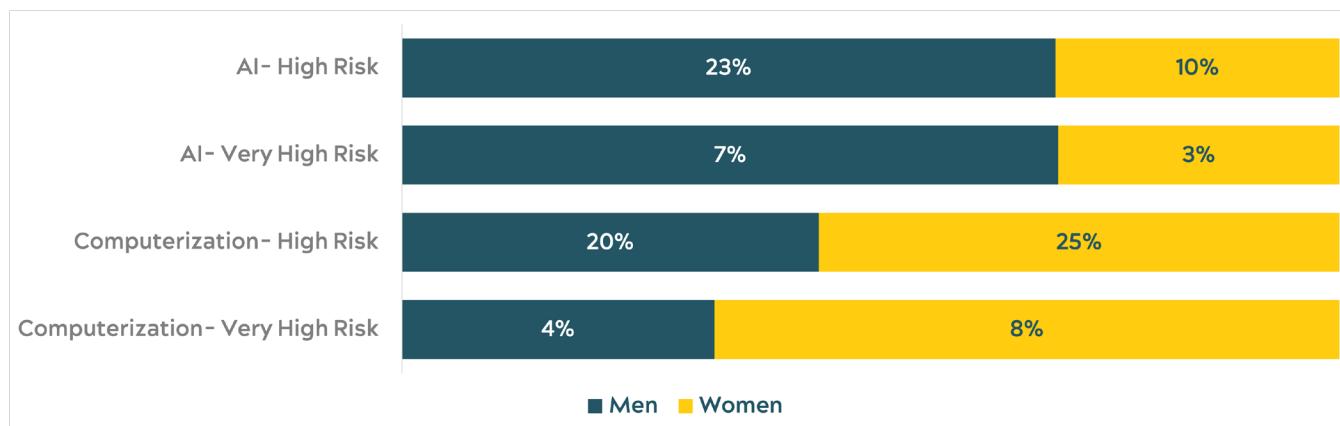
Figure source: Author's analysis of 2022 American Community Survey Data.

RACE

Following the pattern of historically oppressed groups being more impacted by computerization, an analysis across racial groups reveals that people of color are more likely than white people to be in jobs placed at risk by broader technological change.

When examining AI in isolation, it is white and Asian Minnesotans who find themselves in the most at-risk occupations. These results also highlight the precarious position of Asian Minnesotans, who appear to be uniquely likely to be heavily impacted by both computerization and AI.

FIGURE 9. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY RACE
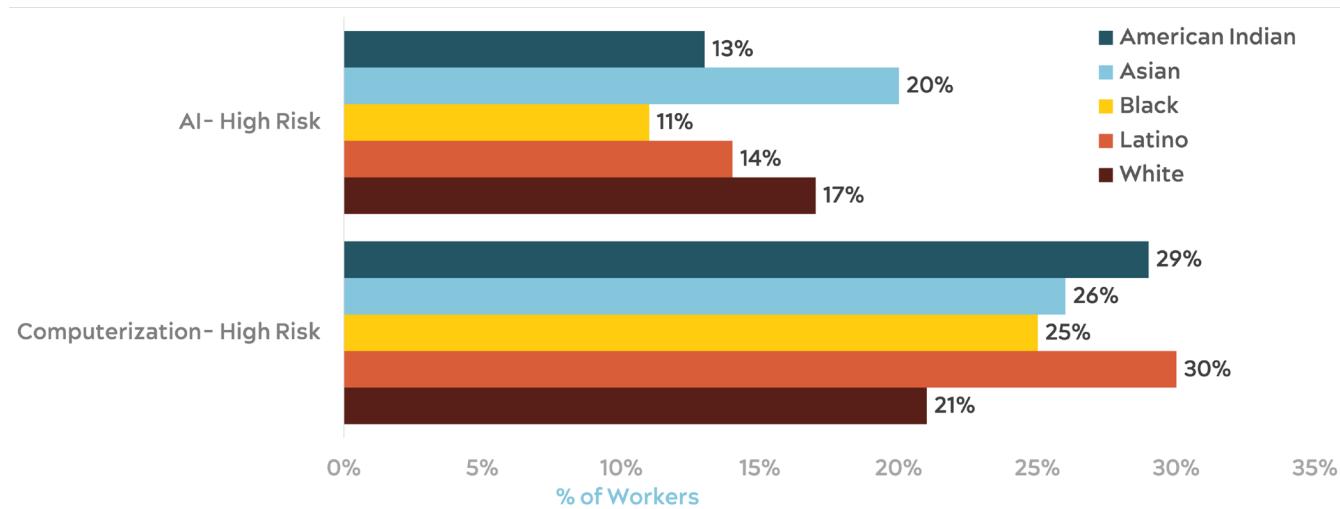
Figure source: Author's analysis of 2022 American Community Survey Data.

RACE-SEX

Combining these two social dimensions together reveals a somewhat more complicated picture, especially as it relates to the impact of computerization. In general, women are more likely to be impacted by computerization than men, with Black Minnesotans serving as the lone exception. Here, Black men are at greater risk than Black women, with Black men being the second most impacted race-sex group after Latina women. On the AI side, men of all races see a greater impact than their female counterparts, with the share of impacted men generally being between two and three times larger. Asian men stand out as the group most affected by AI.

FIGURE 10. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY RACE–SEX
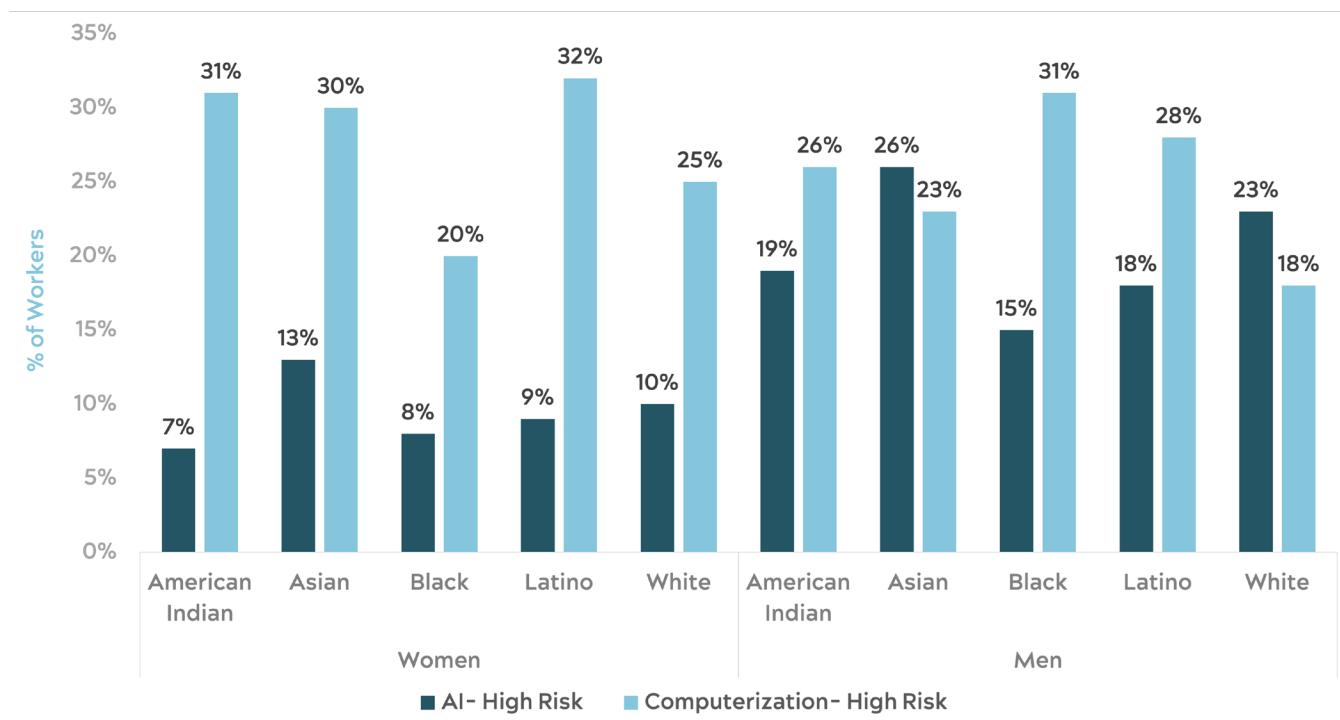
Figure source: Author's analysis of 2022 American Community Survey Data.

AGE

Across age groups, young people are distinct, while individuals in their prime working years appear set to experience impacts that mirror the impact of people who might be closer to the end of their working lives. In computerization, the result is an acutely large impact for those starting their careers, with more than a third of young people working in high risk occupations. By contrast, young people are more protected from the impact of AI, with the share of AI-affected individuals above the age of 25 nearly doubling.

FIGURE 11. SHARE OF WORKERS AT HIGH RISK OF TECHNOLOGICAL IMPACT BY AGE

Legend:
- Less than 25
- 25 to 54
- 55 plus

AI- High Risk
- 10% (Less than 25)
- 18% (25 to 54)
- 17% (55 plus)

Computerization- High Risk
- 35% (Less than 25)
- 19% (25 to 54)
- 23% (55 plus)

% of Workers
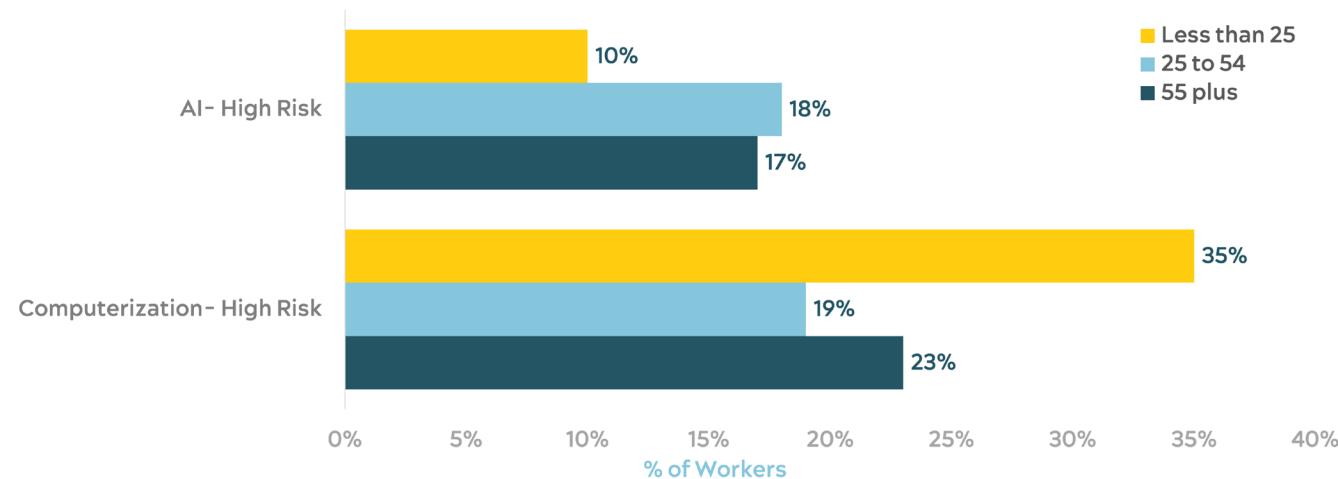
Figure source: Author's analysis of 2022 American Community Survey Data.

IMPACT ON FAST GROWING OCCUPATIONS

Looking forward, Table 2 provides a list of the ten occupations that are predicted to add the most jobs in Minnesota between 2020 and 2030.[18] Among these ten jobs, three are at high risk of computerization impact, while two are at-risk from AI. Taken together, these results suggest that half of the fastest growing occupations in Minnesota are set to be significantly changed by technological development, demonstrating the stakes of attending to these developments to help guide Minnesota's economic future.

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18 "Employment outlook, Long-term occupation projections," Minnesota Department of Employment and Economic Development, https://apps.deed.state.mn.us/lmi/projections/Results.aspx?dataset=1&geog=2701000000&code=.

Table 2. Impact of Computerization and AI on Fastest Growing Jobs in MN			
Occupation	Predicted Job Growth (2020-30)	Computerization High Risk	AI High Risk
Cooks, Restaurant	9,944		
Fast Food and Counter Workers	8,272	X	
Software Developers	7,710		X
Waiters and Waitresses	5,444	X	
Registered Nurses	4,756		
Passenger Vehicle Drivers	4,279	X	
Bartenders	3,851		
Market Research Analysts	3,251		X
General and Operations Managers	2,860		
Teaching Assistants	2,697		

ANALYZING AI'S IMPACT

The analysis above reveals that technological developments are likely to have a substantial, but varied impact on working Minnesotans. Where historically oppressed groups appear more susceptible to changes from computerization, AI appears likely to shift jobs disproportionately held by white and Asian men, as well as people with greater levels of education. To analyze this impact, it is helpful to consider how AI compares to previous technological advancements that have radically altered the workforce, such as the Industrial Revolution and the rising use of the Internet. The section below engages in this comparison, using it to highlight areas of concern, as well as opportunities opened up to workers and organized labor through the advent of AI.

AI: The New Industrial Revolution?

History suggests that large technological shifts are almost always accompanied by panic. People wonder how they will find work when new technologies seem to make so many jobs obsolete. That people working has endured through previous technological advancements suggests we should avoid complete doomsaying. With that said, it is also easy to fall into the trap of assuming technology critics are hysterical Luddites who lack valid concerns. Finding a middle ground between these two extremes requires assessing the substance of a specific technological innovation and a comparison of that substance to similar episodes in the past.

BOOSTING PRODUCTIVITY AND INEQUALITY

To start, the potential scale of AI's impact, as highlighted by the analysis above, puts it into a class with only the most significant economic shifts, such as the Industrial Revolution. Indeed, a recent quantitative analysis of AI's disruptive capacity specifically noted that it "may prove almost as transformative to the economy as the Industrial Revolution."[19] Carrying this similarity further, recent AI experts have referred to it as the steam engine of the mind, drawing a direct parallel to the technology that made the Industrial Revolution so influential.

As with the Industrial Revolution and the rising use of computers and the Internet, AI's impact is often framed through the productivity increase it is expected to generate. Similar to boosting crop yields through the use of steam-powered farm machinery, AI stands to increase the capacity of many workers by allowing them to complete tasks much faster, such as writing code for software developers or editing sound for film directors.[20]

As productivity increases, another potential similarity caused by the AI revolution may be a greater decline in labor's share of income. During the Industrial Revolution, labor lost between 5 and 15 percent of its income share.[21] More recently, productivity gains have been divorced from wage growth.[22] As seen in Figure 12, these two tended to track with each other until the early 1980s, at which point productivity continued to grow while wages stagnated. This divergence helps to explain rising inequality during this time, wherein productivity has increasingly lined the pockets of the wealthy while doing little to reach workers.

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19 Stephanie Walden, "Does the rise of AI compare to the Industrial Revolution? 'Almost,' research suggests," Columbia Business School, April 16, 2024, https://business.columbia.edu/research-brief/research-brief/ai-industrial-revolution.

20 For an example of coding, see: https://extendedstudies.ucsd.edu/news-and-events/division-of-extended-studies-blog/will-ai-replace-programmers-the-future-of-coding. For an example of sound editing, see: https://www.nytimes.com/2024/07/30/business/economy/artificial-intelligence-hollywood-unions.html

21 Stephanie Walden 2024.

22 "The productivity-pay gap," Economic Policy Institute, December 2024, https://www.epi.org/productivity-pay-gap/.

FIGURE 12. PRODUCTIVITY AND HOURLY COMPENSATION GROWTH, 1948 TO 2022
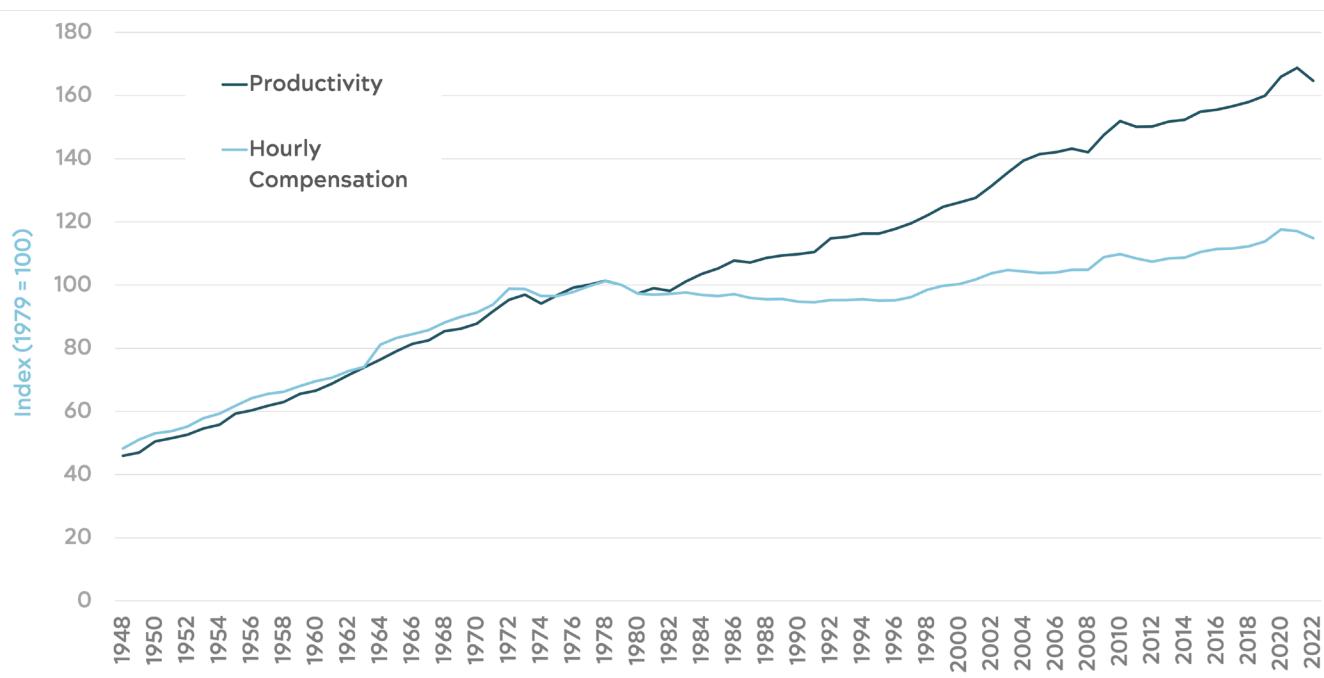
Figure source: "The Productivity-Pay Gap" Economic Policy Institute, https://www.epi.org/productivity-pay-gap/. The Productivity line measures Net Total Economic Productivity, meaning the growth of goods and services output minus depreciation per hour worked for the total economy. The Hourly Wages line captures compensation (wages and benefits) for nonsupervisory workers in the private sector.

Notably, AI holds the potential to accelerate this trend. Due to the large number of impacted jobs, as highlighted in the previous analysis, AI brings a clear capacity to drive labor costs down across a broader number of industries. In doing so, AI holds the capacity to intensify inequality, consolidating profits among an even smaller group of people who can accomplish more tasks with fewer workers. Sam Altman, CEO of OpenAI, recently predicted that AI could foster the world's first trillionaires.[23]

While inequality intensification under AI is plausible, it is by no means set. Indeed, the disruptive capacity of AI provides an important opening for workers and organized labor to change this dynamic and ensure the AI revolution does not follow the Industrial Revolution's playbook. To understand this opening, it is worth considering how AI differs from past technological changes.

23 "Sam Altman on the A.I. revolution, trillionaires and the future of political power," The Ezra Klein Show, June 11, 2021, https://www.nytimes.com/2021/06/11/opinion/ezra-klein-podcast-sam-altman.html.

A DIFFERENT PACE OF CHANGE AND ADOPTION

One novelty of AI development is its pace. Where the Industrial Revolution unfolded over a century, AI capabilities are improving at an exponential rate.[24] For example, where an AI model developed in the late 1990s took nearly 20 years to surpass human performance in handwriting recognition, it took less than a year for a model created in 2016 to beat out humans in reading comprehension.[25] And even that pace is slow compared to AI models being developed today.[26]

In addition to the rapid nature of AI technological improvement, the speed of AI adoption is also distinct. It took nearly 20 years for personal computers to move from market launch to near universal use. While smart phones took hold faster, it was still six to seven years between the iPhone's introduction and the widespread use of smart phones.[27] By contrast, ChatGPT reached 1 billion monthly visits four months after it was made publicly available, marking it as the fastest-growing tech platform in history.[28] Unlike computers and phones, AI adoption generally does not require a new hardware purchase and can often seamlessly integrate with existing technologies, fostering a substantially lower barrier to entry.

This speed of change and use has large implications for workers, as the faster AI develops the ability to outperform humans and the faster businesses implement these better performing systems, the less time society has to adjust to create new opportunities for people put out of work. In short, AI's uniquely rapid development suggests it may also be uniquely disruptive for workers. From this perspective, the present moment holds tremendous urgency for anyone seeking to direct the impact of AI's intervention.

AN OPPORTUNITY FOR WORKERS AND ORGANIZED LABOR

Beyond rate of change, AI differs from past technological advancements in the impacted population. The previous analysis demonstrated that the most at-risk jobs tend to require high levels of education and frequently involve white-collar work, such as software developers and computer support specialists. This differs quite dramatically from previous technological advancements, such as those in the Industrial Revolution, where disruption tended to occur most among the manual laborers who were to become the backbone of unions in America.

This newly impacted population offers a clear opportunity for organized labor in the age of AI. In spreading job insecurity to white-collar professions, people who previously did not see the value of workplace organizing or saw it as limited to industrial sectors may be reconsidering their view of unions. Indeed, there is already some evidence of this perspective shift, with increased organizing among tech workers.[29] For their part, some labor leaders have taken notice and

24 "People underestimate AI capabilities due to 'exponential growth bias,' study finds," KU News, April 17, 2024, https://news.ku.edu/news/article/people-underestimate-ai-capabilities-due-to-exponential-growth-bias-study-finds.

25 Will Henshall, "4 charts that show why AI progress is unlikely to slow down," Time, November 6, 2023, https://time.com/6300942/ai-progress-charts/.

26 Douwe Kiela, "Plotting progress in AI," Contextual AI, July 31, 2023, https://contextual.ai/plotting-progress-in-ai/.

27 Camille Ryan, "Computer and internet use in the United States: 2016," US Census Bureau, August 2018, https://www.census.gov/content/dam/Census/library/publications/2018/acs/ACS-39.pdf.

28 Molly Kinder et al. 2024.

29 Ina Fried, "Push to unionize tech industry makes advances," Axios, April 27, 2023, https://www.axios.com/2023/04/27/unions-tech-industry-labor-youtube-sega.

suggested that AI's growth provides an opportunity to reinvigorate organized labor in America after decades of decline.[30]

The timing of such a move aligns well with the growing popularity of unions, a surge that may stem from rising workplace precarity. In 2022, 71% of Americans indicated they support labor unions, the highest level in nearly 60 years.[31] While warmth towards labor has increased across all generations, it is particularly high among young people, with Gen Z standing out as the most union-friendly generation alive.[32]

This thriving labor support among individuals just beginning their careers provides a further opening for unions in the time of AI's growth. With many young workers looking for education in careers made possible by AI, as well as older workers looking for upskilling to work in these jobs, unions could grow their partnerships with higher education institutions that are offering AI-career training.[33]

Finally, the introduction of AI creates a new space for collective bargaining. In the past, technological innovation has been under the purview of management. However, the recent Writers Guild of America strike provides a possible precedent shift. Here, the writers placed AI in the center of their contract bargaining.[34] Through this expansion, the writers offered a blueprint for future workers concerned about AI. Furthering this cause, resources have recently been created to assist workers seeking to collectively bargain around technological concerns.[35]

If organized labor can seize on these opportunities, the rewards of AI for workers could be immense. Rather than replacing workers or creating lower paid and lower quality jobs, organized workplaces could ensure that AI provides an opportunity to expand skills and expertise among workers, allowing workers to take on advanced tasks that are accompanied by better pay.

There is already evidence that providing workers with more voice over how AI is implemented ensures that it will improve job quality. For example, when customer service workers were able to utilize AI monitoring as a coach during their calls, in which they were provided with prompts such as suggesting they speak more slowly, they found it helpful. By contrast, when AI monitoring took the form of a performance metric, the workers were less enthusiastic.[36]

30   Tom McGrath, "Liz Shuler wants AI to reinvigorate the labor movement,"Politico, March 31, 2024, https://www.politico.com/news/magazine/2024/03/31/ai-labor-power-schuler-00144086.

31   Lydia Saad, "More in U.S. see unions strengthening and want it that way," Gallup, August 30, 2023, https://news.gallup.com/poll/510281/unions-strengthening.aspx.

32   Aurelia Glass, "What you need to know about Gen Z's support for unions," Center for American Politics, August 9, 2023, https://www.americanprogress.org/article/what-you-need-to-know-about-gen-zs-support-for-unions/.

33   Shalin Jyotishi, "Community college and labor union partnerships are a win-win in the AI area," New America, May 16, 2024, https://www.newamerica.org/education-policy/edcentral/in-the-ai-era-community-college-and-labor-union-partnerships-are-a-win-win/.

34   Adam Seth Litwin, "Hollywood's deal with screenwriters just rewrote the rules around A.I." The New York Times, September 29, 2023, https://www.nytimes.com/2023/09/29/opinion/wga-strike-deal-ai-jobs.html.

35   Lisa Kresge, "Union collective bargaining agreement strategies in response to technology," UC Berkeley Labor Center, November 2020, https://docs.google.com/viewer?url=https://laborcenter.berkeley.edu/wp-content/uploads/2020/12/Working-Paper-Union-Collective-Bargaining-Agreement-Strategies-in-Response-to-Technology.pdf.

36   Shalin Jyotishi, "How AI can improve job quality," Forbes, November 16, 2022, https://www.forbes.com/sites/shalinjyotishi/2022/11/16/how-ai-can-improve-job-quality/.

Giving workers the ability to shape how AI is utilized not only ensures that it will help them complete their job more satisfactorily, but it also ensures that the productivity gains from this job improvement will be widely shared rather than concentrated among the wealthy. Such a shift from status quo inequality is possible in this moment of disruption, but the speed of AI's spread suggests the window of opportunity may close soon.

Clearly, organized labor must step up to take advantage of this opening, but it must be recognized that they do so within labor relations structured by policymakers. In recent decades, these structures have shifted to make it more difficult for unions to operate, as exemplified by the rise of so-called "right-to-work" laws, helping to explain the nation's declining union density. At the same time, corporate profits have risen dramatically, significantly tilting power away from workers and towards employers.

If this dynamic holds, it seems likely that wealthy elites will ensure AI is incorporated in a way that suits their interests. By contrast, if unions are to succeed in using AI's disruption to benefit workers, a new policy framework must be created to facilitate their success. The section below turns to that framework.

Policy Guidelines for Supporting Workers and AI Innovation in Minnesota

A FOUNDATIONAL PRINCIPLE: BOOST WORKER POWER

The best and most comprehensive way lawmakers can promote AI innovation in a worker-centered manner is to make sure that workers have power.[37] Doing so requires labor protections that allow workers to organize and engage in collective bargaining. When workers are given this power, they can negotiate for AI development that supports their work. Moreover, as experts in their jobs, workers can inform AI advancements that increase productivity for their employer's and society's benefit. Indeed, recent analyses have shown that businesses are likely to benefit from a participatory design that draws on worker wisdom when adopting AI.[38]

This logic was central to a recent agreement between Microsoft and the AFL-CIO. Microsoft committed to sharing information on AI technology trends with labor leaders, along with "incorporating worker perspectives and expertise in the development of AI technology."[39] This pioneering agreement demonstrates how guidelines can be established to foster AI innovations that genuinely support worker welfare. Echoing much of this same sentiment, President Biden's recent Executive Order specifically stipulated that giving workers a seat at the table, including through collective bargaining, is necessary for responsible AI development.[40]

The benefits of such collaborations were on display during the recent writers' strike. With the power to collectively bargain, the writers negotiated a contract allowing them to use AI to aid in script construction. At the same time, studios are prevented from employing AI to replace writers.[41] The result is that writers can aid AI developments, knowing these advancements will only boost their productivity rather than putting them out of work. In the end, the studios can increase their profits through this increased productivity, while we all stand to benefit by getting more and better TV and movies.

One could easily imagine an alternative universe in which writers lacked this power and were transformed from creators into editors of AI-generated scripts, potentially creating bigger profits for studios by lowering writers' wages. The difference between this inequality-inducing scenario, and the productivity increase for a society-wide benefit scenario, is worker power.

37 Josh Bivens and Ben Zipperer, "Unbalanced labor market power is what makes technology-including AI-threatening to workers," Economic Policy Institute, March 28, 2024, https://www.epi.org/publication/ai-unbalanced-labor-markets/.

38 Thomas A. Kochan, Ben Armstrong, Julie Shah, Emilio J. Castilla, Ben Likis, and Martha E. Mangelsdorf, "Bringing worker voice into generative AI," December 2023, https://mitsloan.mit.edu/sites/default/files/2024-01/Bringing%20Worker%20Voice%20into%20Generative%20AI%2012%2021%202023.pdf.

39 "AFL-CIO and Microsoft announce new tech-labor partnership on AI and the future of the workforce," Microsoft, December 11, 2023, https://news.microsoft.com/2023/12/11/afl-cio-and-microsoft-announce-new-tech-labor-partnership-on-ai-and-the-future-of-the-workforce/.

40 "Executive Order on the safe, secure, and trustworthy development and use of artificial intelligence," The White House, October 30, 2023, https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/.

41 Will Bedingfield, "Hollywood writers reached an AI deal that will rewrite history," Wired, September 27, 2023, https://www.wired.com/story/us-writers-strike-ai-provisions-precedents/.

✓ **Provide workers with the capacity to bargain over technological innovation.**

As previously discussed, technological advancement has generally been the responsibility of management, leaving organized workplaces with little recourse to bargain over AI implementation. Fortunately, the Writers Guild of America strike has offered a new path.[42]

Governments can play an essential role in supporting this path. For example, California has introduced legislation that allows actors and artists to get out of vague contract provisions that give companies the ability to use AI to replicate their faces, voices, and bodies.[43] Such measures provide workers with greater contractual security amidst rapid technological advancements that may not have existed when their contracts were first signed.

✓ **Remove impediments to workplace organizing and increase the capacity for sectoral bargaining.**

Moving beyond AI-specific legislation, governments should create structures that make it easy for workers to organize and defend their interests. Minnesota has made crucial strides here, such as banning so-called "captive audience" meetings that employers use to combat workplace organizing.

Building on these changes through additional reforms can do more to keep workers at the table during future discussions on AI. For example, increasing the capacity for workers in whole sectors to bargain with employers has been shown to provide workers with voice in places where unions have traditionally struggled, such as among fast food and domestic workers.[44]

Again, Minnesota has made strides in this direction by providing sectoral bargaining power to nursing home workers,[45] but expanding this capacity out to other industries will be essential in giving all workers the ability to bargain over the implementation of AI.

✓ **Utilize government funding to incentivize worker-centered AI development.**

Governments are likely to encounter AI to a substantially greater degree in the future. When they do, they hold tremendous power to shape how AI is utilized. First, governments may soon be buying AI systems for use within their own operations. In this procurement process, they can set standards and evaluation criteria that incentivize the use of worker-centered AI systems. Similar efforts can be used when governments contract with, or provide funding to, other entities to deliver services. It is inevitable that these entities will be utilizing AI in their service provision, and governments can stipulate that they will only fund and contract with places that demonstrate worker-centered AI development.[46]

42 Adam Seth Litwin 2023.

43 Queenie Wong, "California lawmakers want to protect actors from being replaced by artificial intelligence," Los Angeles Times, September 13, 2023, https://www.latimes.com/politics/story/2023-09-13/california-bill-entertainment-workers-ai-digital-replicas.

44 Aurelia Glass and David Madland, "Momentum for worker standards boards continues to grow," Center for American Progress, September 7, 2023, https://www.americanprogress.org/article/momentum-for-worker-standards-boards-continues-to-grow/.

45 For more information on the Nursing Home Workforce Standards Board, see: https://www.dli.mn.gov/about-department/boards-and-councils/nursing-home-workforce-standards-board

46 Annette Bernhardt and Sara Hinkley, "What workers and unions stand to gain from recent Executive Orders on artificial intelligence," UC Berkley Labor Center, January 18, 2024, https://laborcenter.berkeley.edu/what-workers-and-unions-stand-to-gain-from-recent-executive-orders-on-artificial-intelligence/.

✓ Create a model for AI adoption within the government

In addition to governments procuring AI systems, they are also faced with the task of implementing them. As governments incorporate AI for their own operations, they should be drawing on the expertise of government employees, creating an ideal for private sector actors to replicate in their own AI endeavors. Here, governments can draw on worker-centered standards that have already been created, such as the "Guidelines for AI and Shared Prosperity" crafted by the Partnership on AI[47] or the best practices on AI and worker well-being developed by the Department of Labor.[48] These protocols contain important policies that would make governments into model employers for AI-incorporation, such as ensuring AI systems are piloted before widely used.

✓ Increase protections that make it easier for workers to advocate for themselves.

When workers advocate for themselves, they know they are vulnerable to possible sanction and even job loss. Guaranteeing paid sick time and preventing noncompete agreements, as Minnesota has done, gives workers more protections from employer mistreatment, ensuring they can effectively advocate for themselves in all areas, including AI developments.[49] Building on these wins by providing workers with additional protections, such as Unemployment Insurance for striking workers, will give laborers a greater capacity to advocate for themselves without fear of economic disaster.[50]

AI innovation does not, and should not, imply worker harm, just as worker protections need not stifle technological progress. Properly designed measures to empower workers can ensure that the twin goals of advancing AI's capacity for good and promoting worker welfare are pursued simultaneously. Lacking these changes will ultimately create partial solutions, with workers unable to use their voice to shape AI's implementation and lawmakers left playing whack-a-mole as wealthy corporations draw on AI's rapid technological change to develop new modes of exploitation.[51]

With that said, we recognize that growing worker power is a longer-term project that must fight back against decades of organized labor erosion.[52] As this long-term project unfolds, legislators should also focus on addressing the immediate harm that AI poses to workers, as detailed in the sections that follow.

47 "Guidelines for AI and shared prosperity," Partnership on AI, June 7, 2023, https://partnershiponai.org/paper/shared-prosperity/.

48 "Artificial intelligence and worker well-being: Principles and best practices for developers and employers," U.S. Department of Labor, https://www.dol.gov/sites/dolgov/files/general/ai/AI-Principles-Best-Practices.pdf.

49 Max Nesternak, "Minnesota lawmakers approve 9 major worker-friendly changes," Minnesota Reformer, May 17, 2023, https://minnesotareformer.com/2023/05/17/labor-victory-minnesota-lawmakers-approve-9-major-worker-friendly-changes/.

50 Aaron Rosenthal and Daniel Perez, "Striking a balance: The role of unemployment insurance in supporting Minnesota workers," North Star Policy Action, May 11, 2024, https://northstarpolicy.org/striking-a-balance/

51 Patrick Oakford, Josh Bivens, and Celine McNicholas, "Federal AI legislation: An evaluation of existing proposal and a road map forward," Economic Policy Institute, September 25, 2024, https://www.epi.org/publication/federal-ai-legislation/.

52 "Union Members – 2023" Bureau of Labor Statistics, January 23, 2024, https://www.bls.gov/news.release/pdf/union2.pdf.

WORKER REPLACEMENT

The image that people often see when thinking about AI is a futuristic robot taking a job that once belonged to a human. Examples of this dystopic idea already abound. AI recently replaced one-third of customer service workers for the e-commerce company powering Nike.[53] Once seen as a distant possibility, self-driving trucks will be hitting the road at the end of 2024, with the goal of thousands of driverless trucks within the next three years.[54]

As noted earlier, while AI may look like prior cases of technological advancement, the speed and breadth of its impact suggest that it may be uniquely troubling for worker replacement and subsequent inequality. To respond appropriately, Minnesota lawmakers should look to legislative solutions that are similarly swift and expansive.

GUIDELINES FOR A POLICY RESPONSE TO WORKER REPLACEMENT

✓ **Give advanced notice to workers who are at risk of losing a job to AI and allow for collective bargaining in response.**

A key factor in mitigating the disruptive capacity of AI is providing existing workers with ample time to negotiate any transition. If workers are blindsided, they are more likely to fall out of the labor market completely and face subsequent financial hardship. By contrast, when workers are prepared, they can make decisions on what path they might want to take, whether that involves seeking new opportunities elsewhere or identifying ways to stay with the same employer.

California provides a template for this arrangement.[55] A bill introduced in October 2023 required public transit employers to provide affected unions at least 10 months' notice about any plans to utilize autonomous vehicles. In addition, the legislation stipulated that following a response from the employees, collective bargaining over the future course of action would have to begin within 30 days.[56]

✓ **Provide workers replaced by AI with options, including training opportunities, hiring preferences, and/or severance packages.**

If workers are replaced by AI, they must have the capacity to find new opportunities without facing significant economic distress. When such opportunities are absent, individual workers face strain from unemployment and the broader economy suffers due to fewer goods and services being purchased. Such consequences can be avoided and ultimately reversed when workers have the chance to train in positions made possible by automation, providing new skills that encourage upward mobility.

To incentivize this dynamic, Senator Sherrod Brown championed the Workers' Right to Training Act.[57] In this legislation, employers are required to give on-the-job training to

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53 Megan Cerullo, "Klarna CEO says AI can do the job of 700 workers. But job replacement isn't the biggest issue." CBS News, March 5, 2024, https://www.cbsnews.com/news/klarna-ceo-ai-chatbot-replacing-workers-sebastian-siemiatkowski/.

54 Associated Press, "Self-driving trucks are coming to U.S. highways this year," Inc., April 30, 2024, https://www.inc.com/self-driving-trucks-are-coming-to-us-highways-this-year.html.

55 For a more expansive list of tech and work policy being introduced across the nation, see: https://laborcenter.berkeley.edu/tech-and-work-policy-guide/.

56 California Assembly Bill 96, Session 2023-24, https://legiscan.com/CA/text/AB96/id/2844722.

57 S. 2468, 116th Congress, 1st Session, https://www.congress.gov/116/bills/s2468/BILLS-116s2468is.pdf.

workers who are in danger of having their jobs significantly changed or replaced due to technological advancement. The bill further stipulates that any workers who are replaced subsequently receive priority to be hired into new or open positions. Finally, for workers not interested in a new position, employers must offer six months' severance, ensuring financial stability during the worker's transition.

✓ **Retain workers in positions next to automated technologies, particularly when those technologies could jeopardize the safety of workers and the public.**

Driverless trucks and AI therapists are not only a cause for concern for truck drivers and mental health professionals, but also for all people on the road and anyone seeking therapy. As AI developments are rolled out, workers should play an important role in ensuring that technological gains do not come at the expense of public safety.

Once again, states are leading the way in responding to this concern. A bill in California stipulates that any large autonomous vehicle has a trained human operator present.[58]

Demonstrating the bipartisan nature of this issue, both Massachusetts and Texas have considered legislation that requires a licensed mental health professional to monitor any AI systems involved in mental health care.[59] Similarly, California has introduced legislation that gives healthcare workers the ability to override a hospital's automated algorithms if they believe it will help a patient. As shown in the next section, human management over algorithms is a crucial, if sometimes overlooked, way in which governments should regulate AI.

ALGORITHMIC MANAGEMENT

A key advantage offered by AI is the ability to process large amounts of information quickly and make a decision based on that information. Such operations are performed through algorithms, which put data through a set of rules to inform a choice. Many of us using online services see a version of these algorithms through Spotify or Netflix drawing on our listening and watching history to recommend a new song or show.

Unfortunately, these algorithms can foster more dangerous consequences than binge-watching when applied to the workplace. For example, a central use of algorithms is to help employers screen job applications, such that they can focus human efforts on a smaller subset of applicants. Worryingly, such algorithms have recently been used to scan social media accounts to predict if would-be employees will become whistleblowers.[60]

While the dangers of AI-supported algorithms take many forms, they tend to fall into two categories: surveillance and discrimination. Each of these areas is covered below.

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58   California Assembly Bill 316, Session 2023-24, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240AB316.

59   Bill H. 1974, 193rd General Court of the Commonwealth of Massachusetts, https://malegislature.gov/Bills/193/H1974/BillHistory. Texas H.B. No. 4695, 2023 https://custom.statenet.com/public/resources.cgi?id=ID:bill:TX2023000H4695&ciq=ncsl&client_md=9fb-606ce1283802386ff05fbd50d00de&mode=current_text.

60   Annette Bernhardt, Reem Suleiman, and Lisa Kresge, "Data and algorithms at work: The case for worker technology rights," UC Berkeley Labor Center, November 3, 2021, https://laborcenter.berkeley.edu/data-algorithms-at-work/.

ALGORITHMIC SURVEILLANCE

Worker surveillance is often combined with algorithms to inform performance metrics. Here, workers are monitored, with data automatically gathered and analyzed to see if they are hitting specific metrics. If workers do not hit these targets, they may be automatically disciplined or fired. Importantly, this can all happen via data being fed into an algorithm without any human intervention or quality control.

This form of algorithmic surveillance found new prominence during the rise of remote work in the early stages of the pandemic. With more people working from home and out of a supervisor's literal eyesight, companies sought techniques for checking if their workers were remaining productive. Workers soon found so-called "bossware" on their computers was being used to track how often they typed words or moved their mouse. Some even experienced their computer's built-in cameras being accessed by employers to physically watch them. All this information could then be fed into an algorithm to create "worker productivity" scores, which might be used to inform promotion and termination decisions.[61]

While the pandemic brought more people into contact with the confluence of surveillance and algorithms, many workers had been dealing with it for years. Amazon warehouse workers saw algorithmic productivity requirements that forced workers to scan 450 boxes an hour, leading employees to skip bathroom breaks and suffer mental and physical exhaustion. These efforts have been linked to workplace injuries among 4 in 10 Amazon workers, along with fueling the company's ongoing record profits, including $575 billion in revenue in 2023.[62]

In their monitoring, employers are relying on increasingly advanced and invasive technologies. Truck and delivery drivers have been subject to facial analysis software that identifies driver distractions to evaluate overall performance.[63] Instacart, an app that uses gig workers for grocery delivery, lets customers watch workers as they shop for each item. The platform also uses an algorithm to monitor the chat conversations workers have with customers to track how closely the worker stays to scripted language.[64] If workers do not meet quality and speed metrics, they can be removed from the platform, highlighting how algorithmic surveillance can further intensify the precarious nature of gig work.

Similar systems are now popping up across a plethora of industries, including call centers, cleaning services, construction sites, and home health services.[65] Put simply, the rising invasiveness of surveillance technology and the rising sophistication of AI-backed algorithms are combining to create new problems for workers.

61 Will Douglas Heaven, "This startup is using AI to give workers a 'productivity score'" MIT Technology Review, June 4, 2020, https://www.technologyreview.com/2020/06/04/1002671/startup-ai-workers-productivity-score-bias-machine-learning-business-covid/.

62 "41 percent of Amazon workers have been injured on the job, new report finds," University of Illinois Chicago Center for Urban Economic Development, October 25, 2023, https://cued.uic.edu/pain-points/.
Katrina Pham, "'It kind of feels like prison': Injured, burned out and under surveillance at Amazon," In These Times, October 26, 2023, https://inthesetimes.com/article/injury-burnout-surveillance-amazon-warehouse-workers-uic-report.

63 Paul Clinton, "Smarter video telematics wave arrives," Automotive Fleet, March 19, 2019, https://www.automotive-fleet.com/327438/wave-of-smarter-video-telematics-solutions-arrives.

64 Johana Bhuiyan, "Instacart shoppers say they face unforgiving metrics: 'It's a very easy job to lose,'" Los Angeles Times, August 27, 2020, https://www.latimes.com/business/technology/story/2020-08-27/shopping-for-instacart-metrics.

65 Annette Bernhardt et al. 2021.

ALGORITHMIC DISCRIMINATION

The promise of algorithms is often one of neutrality. If an algorithm is simply taking in information on workers and making a decision based on that information, it would seem like it could not discriminate against a particular worker.

Despite this promise, it is evident that algorithms can engage in discrimination. Much of this discrimination flows from the fact that it is humans who create these algorithms, and humans who feed the information into them. The result is that the discriminatory nature of human beings is imprinted onto the algorithms they create.

Consider the example of algorithms used to help companies sift through job applications to make hiring decisions. Firms utilized to help with hiring, such as HireRight, draw on huge swaths of data, including those related to immigration status and unsubstantiated allegations of shoplifting. Given the racial and ethnic biases of the immigration and criminal justice system, when this data is fed into an algorithm, it is not surprising that it provides racially and ethnically discriminatory hiring decisions.[66]

Workers not only need to be concerned about such algorithmic discrimination impacting their hiring or firing, but also how it shapes the choices they make at work. Employers are turning to algorithms to help automate parts of people's jobs, such as making decisions about the kind of care that patients will receive in hospitals. Notably, racial discrimination has been found within these algorithms too, leading to lower-quality care for Black patients.[67] Such issues raise complicated questions about the blame that workers may receive for enforcing discriminatory decisions made not by the individual worker but by an AI-supported algorithm.

GUIDELINES FOR A POLICY RESPONSE TO ALGORITHMIC MANAGEMENT

✓ **Provide transparency to workers around the use of algorithms.**

An important starting point is ensuring that workers are aware of any AI-based algorithms being used to track or influence their work. Lacking this knowledge, workers may face discipline or even termination due to tracking systems they did not know existed.

Minnesota has already taken a step in addressing this possibility. In the Warehouse Worker Protection Act, the state ensured that warehouse workers are told about any performance standards in their own language and cannot be disciplined for failing to meet a metric they were not told about.[68]

Other states have taken this reform further by extending similar protections to all workers. For example, Illinois and Maryland recently passed provisions that require job candidates to be made aware of any AI-driven facial expression analysis used to judge them in a video interview.[69] Such legislation recognizes that while warehouse workers may be particularly susceptible to physical injuries stemming from algorithmic-driven performance standards,

66 Ibid.

67 Heidi Ledford, "Millions of black people affected by racial bias in health-care algorithms," Nature, October 24, 2019, https://www.nature.com/articles/d41586-019-03228-6.

68 HF 36, 93rd Minnesota Legislature (2023-24), https://www.revisor.mn.gov/bills/text.php?number=HF36&version=1&session=ls93&session_year=2023&session_number=0&type=ue

69 HB 2557, 101st Illinois General Assembly, https://www.ilga.gov/legislation/fulltext.asp?DocName=&SessionId=108&GA=101&DocTypeId=HB&DocNum=2557&GAID=15&LegID=&SpecSess=&Session=.
House Bill 1202, Maryland 2020 Regular Session, https://mgaleg.maryland.gov/2020RS/bills/hb/hb1202T.pdf.

they are not unique in their need for transparency regarding AI tracking their professional life, particularly given the rise of computer surveillance to monitor remote office workers.

✓ **Limit the use of surveillance technologies and algorithms for performance evaluations, including restrictions on using algorithms for hiring, firing, discipline, and promotion decisions.**

While letting workers know about algorithms is a good first step, it does not prevent algorithmic surveillance from creating unrealistic and dangerous productivity metrics. Such metrics can lead workers to unhealthy outcomes, such as skipping bathroom breaks or suffering physical exhaustion. A simple solution here is to regulate these metrics to avoid such outcomes.

Again, Minnesota's Warehouse Worker Protection Act partially addresses this concern by ensuring that productivity quotas cannot be used to prevent warehouse workers from taking breaks. Unfortunately, no such assistance is extended to other sectors.[70] By contrast, legislation considered in California, Vermont, Massachusetts, and New York have all included limits on how employers can use algorithms to manage workers across the entire state.[71]

One central aspect of these policies is specifically restricting employers' ability to use algorithms to automatically make decisions about hiring, promotion, discipline, and termination. Lacking a human review of an algorithmic decision, it is too easy for new systems to commit errors that lead to workers being wrongly punished or discriminated against. An additional protection here is an evaluation of any workplace algorithms to ensure they are not committing discrimination, as will be discussed in greater detail below.

✓ **Limit the data that employers can collect for algorithms and the technologies used to collect this data.**

Technological developments have made it substantially easier for employers to collect more data on their employees and job applicants. This includes a tremendous rise in biometric data (e.g., fingerprints and retina scans) as well as facial recognition and analysis. In addition to raising important concerns about workers' data privacy, such data collection is also troubling due to the untested nature of these technologies. For example, findings of racial bias in facial recognition software suggest that employers using this technology could be unwittingly engaging in racial discrimination.[72]

Multiple states, ranging from Texas to Washington, have responded to this issue by creating biometric data privacy laws that protect both consumers and workers.[73] California has introduced legislation that restricts employers' collection of worker data, including stipulating that surveillance data fed into algorithms can only be used for specific business purposes and cannot harm workers.[74]

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70 HF 36, 93rd Minnesota Legislature (2023-24).

71 AB 1651, California Assembly 2021-22, https://legiscan.com/CA/text/AB1651/id/2571012.
H. 114, Vermont House 2024, https://legislature.vermont.gov/Documents/2024/Docs/BILLS/H-0114/H-0114%20As%20Introduced.pdf.
H. 1873, 193rd General Court of the Commonwealth of Massachusetts, https://malegislature.gov/Bills/193/HD3051
S. 7623, 2023-24 New York Senate, https://legislation.nysenate.gov/pdf/bills/2023/S7623.

72 Rachel Fergus, "Biased technology: The automated discrimination of facial recognition," ACLU Minnesota, February 29, 2024, https://www.aclu-mn.org/en/news/biased-technology-automated-discrimination-facial-recognition.

73 Business and Commerce Code, Texas Title 11. https://statutes.capitol.texas.gov/DocViewer.
    aspx?DocKey=BC%2fBC.503&Phrases=biometric&HighlightType=1&ExactPhrase=False&QueryText=biometric.
Washington State Legislature, Title 19, Chapter 19.375, https://app.leg.wa.gov/RCW/default.aspx?cite=19.375&full=true.

74 AB 1651, California Assembly 2021-22, https://legiscan.com/CA/text/AB1651/id/2571012.

✓ **Ensure that algorithms and surveillance are not used to diminish workplace organizing.**

As noted earlier, workplace organizing provides the most important protection against AI technologies harming workers, so it is of vital importance that these technologies never be used to prevent that organizing in the first place. Algorithms that predict the likelihood of a job applicant trying to form a union and surveillance technologies that monitor worker conversations illuminate the capacity of these technologies to restrict worker power.

The National Labor Relations Board General Counsel recently put out a memo demonstrating that the National Labor Rights Act gives workers the right to organize and form unions free from any tampering by algorithms or surveillance.[75] This federal guidance provides states with a floor upon which they can build additional protections, as California did for public transit employees.[76]

✓ **Regularly test algorithms for discriminatory impacts and bad health consequences, and block their use if these outcomes are detected.**

Studies into algorithms have routinely turned up evidence of bias, including gender bias in hiring algorithms and racial bias in criminal justice algorithms.[77] These findings indicate the value of regularly evaluating algorithms to ensure they are not producing discriminatory outcomes. Doing so is particularly important in the workplace, as workers already have broad protections against discrimination, but cannot utilize these protections without evidence of that discrimination taking place.

At the federal level, the Algorithmic Accountability Act would mandate that algorithms used in certain areas, such health care and employment, be regularly assessed for bias.[78] New York and California have taken up similar propositions, with specific protections against algorithmic discrimination based on numerous dimensions, including race, sex, and disability.[79] Providing the most comprehensive protection to date, Colorado passed legislation that requires developers and deployers to take "reasonable care" to avoid algorithmic discrimination when AI is assigned to make "consequential decisions", including those related to employment.[80] These legislative efforts recognize that a problem can only be addressed to the extent that it is first recognized.

75   "NLRB General Counsel issues memo on unlawful electronic surveillance and automated management practices," National Labor Relations Board, October 31, 2022 https://www.nlrb.gov/news-outreach/news-story/nlrb-general-counsel-issues-memo-on-unlawful-electronic-surveillance-and.

76   AB 96, California Assembly 2023-24, https://legiscan.com/CA/text/AB96/id/2844722.

77   George Denison, "8 shocking AI bias examples," Prolific, October 24, 2023, https://www.prolific.com/resources/shocking-ai-bias.

78   H.R. 5628, 118th Congress, https://www.congress.gov/bill/118th-congress/house-bill/5628/text.

79   "Assemblymember Bauer-Kahan introduces bill to eliminate bias in AI decision-making," California State Assembly, https://a16.asmdc.org/press-releases/20240215-assemblymember-bauer-kahan-introduces-bill-eliminate-bias-ai-decision. S. 7623, 2023-24 New York Senate, https://legislation.nysenate.gov/pdf/bills/2023/S7623.

80   "Consumer protections for artificial intelligence," Colorado General Assembly, SB24-25, https://leg.colorado.gov/bills/sb24-205.

Conclusion: An Ongoing Effort

The story of technological innovation outpacing government regulation, to the benefit of the few and at the expense of the many, is frustratingly commonplace. The multiple harms inflicted by social media should serve as a recent reminder of what can happen when governments wait too long to intervene. And while social media has provided a strong warning, the analysis provided in this report suggests AI's damage could be far worse, particularly for workers, if action is delayed. As states around the country begin to act, Minnesota's strong labor history positions it as a possible leader in showing how AI innovation can work in tandem with worker welfare to reduce societal inequality.

The policy guidelines laid out above provide a skeleton upon which reasonable regulations can be built. As Minnesota puts these policies into place, one additional step is to create structures capable of analyzing these legislative changes alongside AI's development. Given the pace of technological change, new AI uses and tools are likely to appear rapidly and consistently, requiring ongoing governmental scrutiny to ensure that past reforms do not become antiquated. Moreover, Minnesota should ensure that agencies are properly resourced and staffed to identify when new regulations are violated and to hold actors accountable when such violations are detected.

Here again, there are state models for Minnesota to consider. Multiple states have mandated state studies regarding AI's impact on the economy and workforce.[81] Helping to inform such efforts, New Jersey has considered a bill that would require workers filing for Unemployment Insurance to indicate if their job loss occurred due to technological advances.[82] Finally, efforts can be undertaken to analyze if policies designed to train workers displaced by AI are effective, as seen in Texas.[83] Minnesota has already created the Transparent Artificial Intelligence Governance Alliance (TAIGA) with a mission to ensure AI development works for all. With workforce empowerment set as a guiding principle for TAIGA, folding an ongoing analysis of AI policies into their efforts is a logical next step.

Such efforts could also ensure that worker harms are considered alongside other potentially troubling aspects of AI development, such as the impact of AI on democracy. While Minnesota has made strides in addressing these concerns, including legislation prohibiting the use of AI-generated "deep fakes" to impact elections, more work is left to be done.[84] Given the pace of AI development, that work must be done now.

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81 No. 5112, New Jersey 218th Legislature, https://custom.statenet.com/public/resources. cgi?id=ID:bill:NJ2018000A5112&ciq=ncsl&client_md=b6dae4d85d58cbaf8b0ca6e375366732&mode=current_text. No. 5250, Commonwealth of Massachusetts, https://custom.statenet.com/public/resources.cgi?id=ID:bill:MA2019000H5250&ciq=ncsl&client_md=e67ebec3114b71c690ea9736d9b-084b1&mode=current_text No. 9885, New York, https://custom.statenet.com/public/resources.cgi?id=ID:bill:NY2021000A9885&ciq=ncsl&client_md=918c9a6a000220c5de74befa709cf-d63&mode=current_text

82 No. 5150, New Jersey 220th Legislature, https://custom.statenet.com/public/resources. cgi?id=ID:bill:NJ2022000A5150&ciq=ncsl&client_md=d15445db723aff8d4e546d6ef8e358ff&mode=current_text

83 No. 3633, Texas House, https://custom.statenet.com/public/resources.cgi?id=ID:bill:TX2023000H3633&ciq=ncsl&client_md=78e2f-75f36a7536332a3e03ad5d41cd5&mode=current_text

84 Caroline Cummings, "New Minnesota law regulates 'deepfakes' to curb influence on elections," CBS News, November 1, 2023, https://www.cbsnews.com/minnesota/news/new-minnesota-law-regulates-deepfakes-to-curb-influence-on-elections/.