

# FRAGMENTATION IN THE FUTURE OF WORK

Nine trends that may shape the future of work and what they mean for vulnerable workers



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Please direct questions and reprint requests to:

Institute for Work & Health  
400 University Ave., Suite 1800  
Toronto, Ontario M5G 1S5

info@iwh.on.ca  
www.iwh.on.ca

*Fragmentation in the future of work: Nine trends that may shape the future of work and what they mean for vulnerable workers*

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# INTRODUCTION

In two decades' time, the world of work in Canada and other industrialized countries will look very different than it does today.

A major force driving that change is the rapid development and adoption of new digital technologies in all parts of our lives. Artificial intelligence, smart sensors, advanced robotics, 5G technology and the Internet of Things are examples of digital technologies that are leading to a makeover of almost every industry.

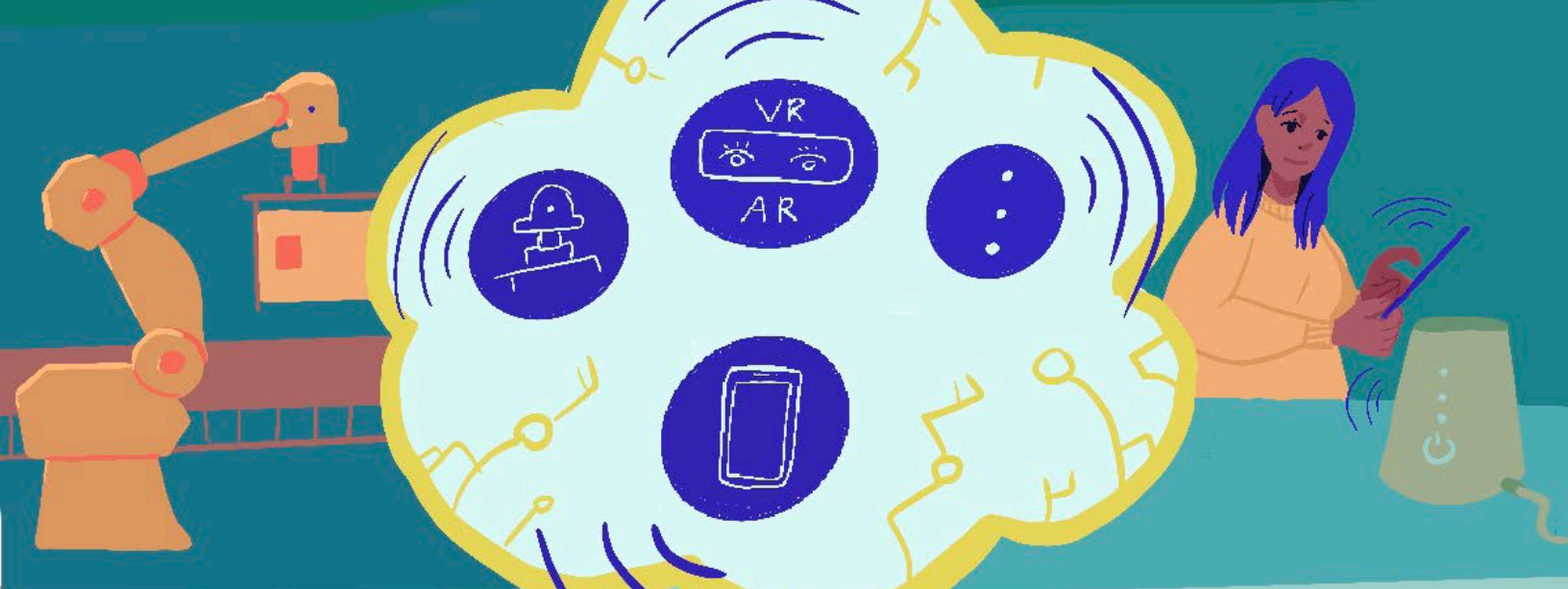
Other major forces are also causing disruption. Climate change is top among them. As well, the last of the baby boomers are heading into retirement, representing a significant demographic shift within the workforce. And potential changes in economic and cultural power across the globe—or even changes in political sentiments here at home—may also disrupt the working world we know today.

What we face, heading into the next two decades, may be a coming together of different types of pressures on our society. This may have far-reaching consequences for a generation of workers.

In 2019, a research team based at the Institute for Work & Health began work on a three-year project that aims to help prepare young people with disabilities for the future world of work.

The project began with an exploration of what the future may hold for workers and workplaces, with a focus on people who may be more likely to work in vulnerable conditions. These populations include youth and young adults, women, racialized groups, recent immigrants, people with disabilities, members of the LGBTQ2+ community, Indigenous peoples, and those with lower social and economic standing—that is, groups of people who are more likely to find themselves in lower-skilled jobs that require less education and offer lower income.

Through a scan of close to 5,000 documents conducted in 2020, we outline nine major trends that may have an impact on the future of work. Our scan builds on existing studies on the future of work by focusing on the trends that could disproportionately affect vulnerable workers, both negatively and positively.



# 1 DIGITAL TRANSFORMATION OF THE ECONOMY

Whether you are a nurse working in a hospital, a salesperson working in a retail store or a banker working in an office building, some of your job is already dependent on digital technologies.

You might have heard of 5G wireless technology, the Internet of Things (IoT), smart sensors, cloud computing, virtual reality, augmented reality, 3D printing, robotics, blockchain technology and cryptocurrency. These are all examples of digital technologies that are already in use and driving innovation in various sectors. The continued design and application of these and other new technologies may change work in unexpected ways and give rise to new jobs that don't currently exist.

One way that work will change as a result of digital technology has to do with what some call “hyperconnectivity.” Already, in some workplaces, computers, smart sensors or automated applications keep track of each task completed by a worker. Think of rideshare drivers logging in where and when they pick up and drop off passengers, or warehouse workers using scanners that track the orders they retrieve and the time they take to fulfil them. In the future, this way of working—people doing tasks in close integration with machines and data—will be commonplace in many types of jobs and work settings. For example, remote workers may be able to enhance their sensory experience of work using virtual reality (VR) or augmented reality (AR).

Another way work will change is related to work arrangements. The fast rise in recent years of gig work (for example, food delivery, home repairs and dog walking) was made possible because digital platforms can parcel out small contracts, one order at a time. In the future, we may see this practice taken to another level – with digital technologies contributing to online marketplaces of workers who bid for jobs. We may see a much larger variety of job tasks being contracted out as gig work or microwork. And workers from any part of the world will be able to compete for the contracts—a practice some call “advanced telepresence.” Workers will no longer have to be physically present at a work location—whether to operate machinery or take part in creative brainstorming sessions.

## Potential impact on vulnerable workers

- Job tasks that are routine or demand lower skill levels may be done by computers and machines, or be contracted out to gig workers, thus decreasing the availability of high-quality jobs. Workers who already face barriers in the labour market may face more competition. Some may be forced into gig work.
- Without job security and a steady paycheck, some people may feel they have no option but to take work in unsafe conditions.
- Gig work can help some groups of workers—for example, by making it easier to get a foothold in new jobs and careers.
- Gig work offers people a flexible work schedule. That may help some people with disabilities or people with family responsibilities.

# 2

## AUTOMATION OF WORK AND THE USE OF ARTIFICIAL INTELLIGENCE

“Artificial intelligence” refers to technology that can do tasks typically requiring human intelligence. Examples are already all around us. Think of apps that correct your grammar. Or chatbots interpreting and answering customers’ questions on websites. Or self-driving cars that can predict hazards on the roads. As this technology progresses in leaps and bounds, more and more jobs will be “automated”—done by machines—in the future.

Ten or 20 years ago, people studying the future of work believed that mainly routine and repetitive jobs would be automated. But major advances have been made in computers’ abilities. Computers can now understand language patterns, recognize voice and speech, and make sense of image data. The ability of computers to learn based on data that they collect and analyze in order to make predictions—known as “machine learning”—has also come a long way.

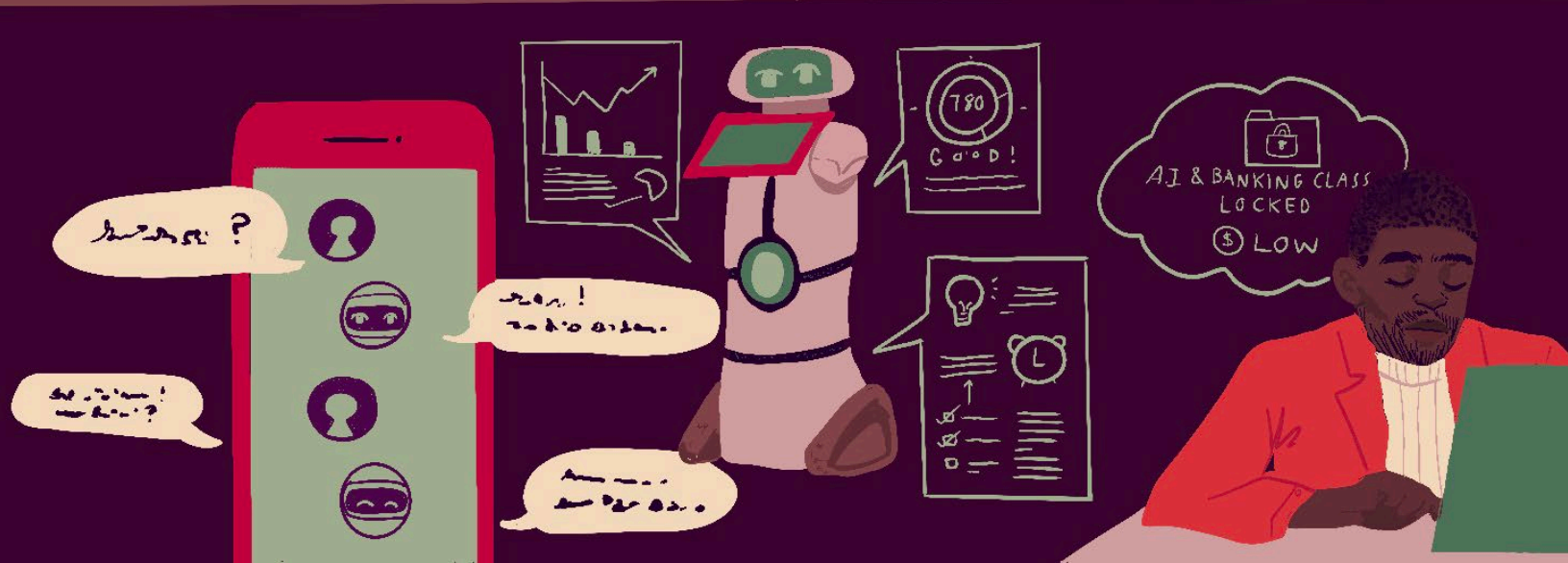
Now, some experts think that one out of three tasks currently done by people in most jobs has the potential to be at least partially replaced by machines. Some even say half of today’s jobs can be entirely automated. These include jobs that involve complex thinking, making decisions and offering advice based on experience.

For example, computers may be used to make decisions about buying or selling on the stock exchange, or to scan x-ray images to spot cancer. More jobs that involve working with the hands will be automated, too, as more and more manufacturing plants rely on smart robots to perform a number of human functions. Also, many jobs in the future will be done by humans working side by side with robots to do jobs faster or more accurately. Few industries will be untouched.

### Potential impact on vulnerable workers

- People in jobs that are repetitive or routine may lose their jobs or see their earnings stall.
- Some groups of workers, especially those on the margins of the workforce, will be at greater risk of losing their jobs or being forced to work in low-paying jobs.
- As artificial intelligence technology improves, more complex jobs that tend to require post-secondary training—such as being a lawyer, doctor or an accountant—may also be replaced by machines.
- People in jobs that involve “emotional intelligence”—jobs that use empathy and people skills—may be safer from automation for the time being. But with advances in machine learning, the people in these jobs, too, could be at risk of being displaced by machines.







## ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT SYSTEMS

Another way in which artificial intelligence may make a difference to people's career success is through its use in human resource (HR) systems. Take hiring, for example. It is becoming more common for companies to use computer apps to screen out résumés or rank them based on keywords or work history. Some programs try to find job candidates whose résumés closely match those of a company's star performers. Other apps use interview videos to find "ideal" candidates based on a digital analysis of their facial expressions, gestures and voice. Some companies use game-based apps to test the skills of job candidates before hiring.

Some say these apps make better decisions because they are not based on someone's gut feeling or personal biases. But there can be problems with these digital programs. They may have been designed with unconscious bias coded into the decision-making processes. They may discriminate against people who, according to their gender, race, age or other personal characteristics, are different from a mold. Job seekers may be rejected for reasons not related to the needs of the job. Also, these programs may collect information about job candidates that is intrusive, such as information about peoples' lifestyle, disability or age.

### Potential impact on vulnerable workers

- Digital programs that use artificial intelligence for hiring may be biased against people who do not fit a pre-determined mold and discriminate against people who may look or act differently.
- These programs may level the playing field by basing HR management decisions on objective metrics like job experience and output.

# 4

## SKILLS TRAINING NEEDS FOR THE FUTURE OF WORK



No matter how work changes in the coming decades, one thing is certain. People will need to learn new skills to do the jobs of the future. Across all industries, people will need advanced technical and digital skills, such as the ability to navigate different digital platforms within their workplaces. At the same time, skills that cannot be automated will also be important, including soft skills such as creativity, critical thinking, collaboration and empathy.

### Potential impact on vulnerable workers

- Some worker groups may face barriers obtaining higher levels of education, receiving on-the-job training or finding time outside of work to develop new competencies. These may be the same groups of workers who are already more likely to be excluded from science, technology, engineering and mathematics fields.
- If a skills shortage is widespread, companies may broaden their hiring searches to groups of previously overlooked workers. If that is the case, the future of work may bring new job opportunities for people who were traditionally sidelined from the workforce.
- Some groups of workers with diverse lived experience and soft skills may possess skills that employers are seeking.

# 5

## GLOBALIZATION 4.0

Globalization currently means we can buy fresh fruit shipped in from tropical countries in the winter. It means our clothing, household items and tech gadgets are made in countries where people work for lower wages and with fewer protections than our standards demand. It means the customer service calls we make are sometimes answered by call centre workers half a world away.

Given the anticipated technological changes as well as environmental and social shifts, future versions of globalization could be different. Some people expect to see more white-collar jobs being done by workers from other countries—virtually. Thanks to better virtual work technology, these workers might stay in their home countries (maybe while earning lower wages and not receiving access to social protection). Or they might bid for freelance work and take on contracts in any country, in what is called “telemigration.”

### Potential impact on vulnerable workers

- Globalization 4.0 may raise the risk of job loss for many people. This includes people in white-collar jobs, who may face more competition from telemigrants.
- Work conditions may get worse when people who work from afar have little say in their working conditions, such as hours of work, pay and benefits.





# 6 CLIMATE CHANGE AND THE GREEN ECONOMY

The effects of climate change – and how they may impact employment opportunities and job characteristics – can be hard to predict. Climate change and related extreme weather events such as wildfires, floods and droughts may significantly impact workplaces and workers, including the potential for displacement of workers and damage to worksites and infrastructure. As a result, climate change and extreme weather events have the potential to create difficult working conditions and interrupt employment. Climate change may also contribute to poor health and illness due to infectious diseases, air pollution, heat and other hazards.

Some industries such as oil and gas may be in decline as the economy turns away from carbon-based energy. Others will grow as society shifts toward a green economy, including industries such as renewable energy, bioengineering and biodesign.

## Potential impact on vulnerable workers

- People who face vulnerabilities in the labour market may experience the worst effects of climate change because the industries and jobs in which they work may be most affected. For example, high percentages of workers in construction and farming are casual, seasonal or temp workers, and they may be the hardest hit because these industries are highly susceptible to the effects of climate change.
- Some vulnerable workers may have less access to programs and policies that offer a safety net during a climate emergency (e.g. social supports, savings, insurance).
- Vulnerable groups may be more likely to face barriers getting the type of training needed to perform the new jobs created by the green economy.
- People who work outdoors and have little control over their working conditions are most likely to be affected. These include people working in industrial services (e.g. warehousing and transportation), agriculture, and travel and tourism.



# GEN Z WORKERS AND THE WORK ENVIRONMENT

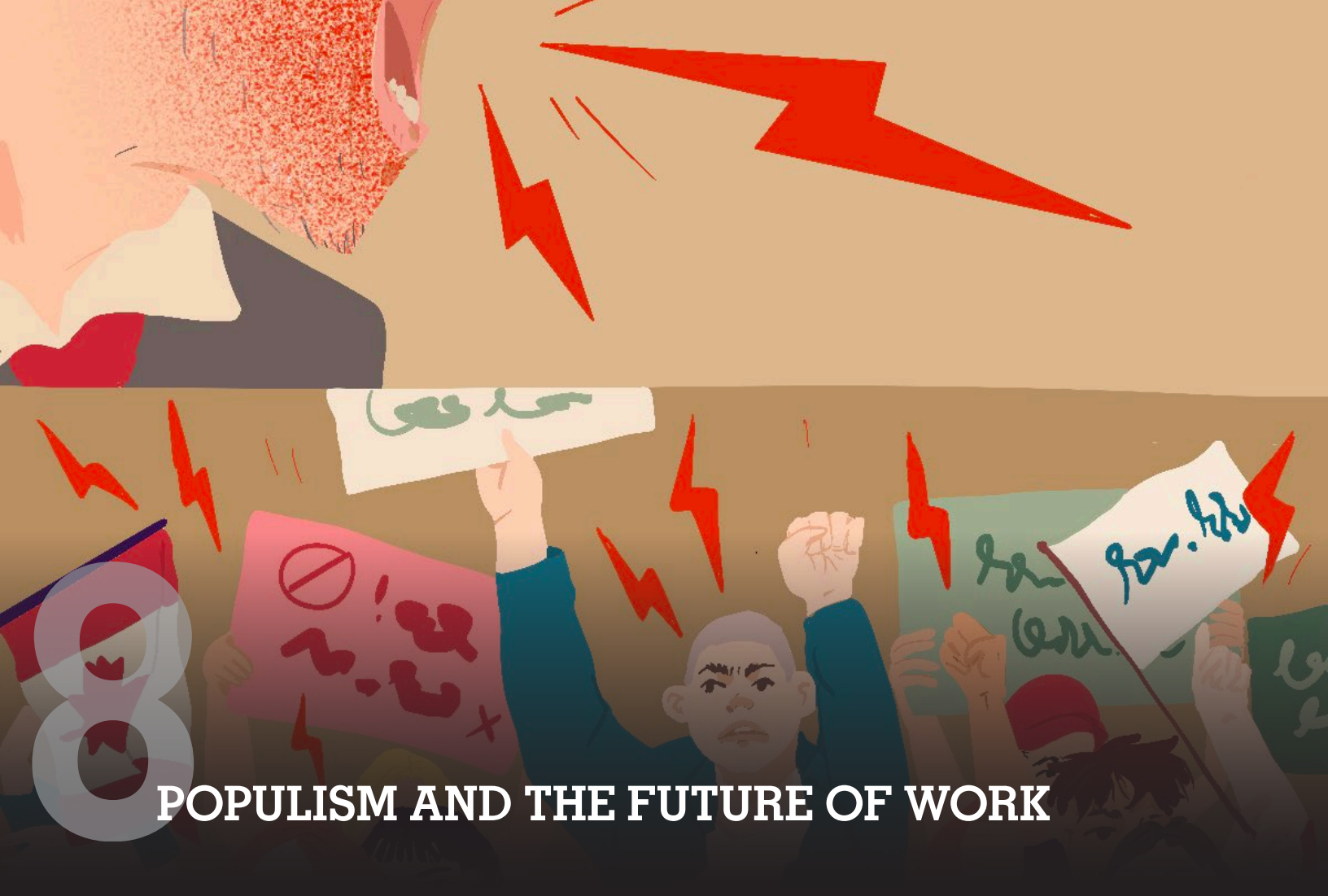
People born between 1995 and 2005—a generation called “Gen Z”—now make up about a third of the workforce. Gen Zs are part of the most educated and diverse generation yet. As their numbers grow, their values and priorities are likely to reshape workplace cultures.

Studies about Gen Z have found that the 2008-09 recession, which disproportionately affected young workers, left a significant impression on this generation’s career preferences and choices. As a result, Gen Z workers may be particularly concerned about their income security and the gap between the rich and poor. They may be more interested in staying in jobs that offer good pay and benefits, and may also greatly value workplaces that are inclusive, diverse, accessible and socially responsible.

## Potential impact on vulnerable workers

- The importance that Gen Zs place on inclusion and social responsibility may make work environments more accessible for groups that have been traditionally disadvantaged.
- More Gen Zs in the workforce may encourage employers to adopt policies on work-life balance, work-from-home arrangements, on-the-job training and environmental sustainability. These practices may benefit all workers, but especially those who experience vulnerabilities.





## POPULISM AND THE FUTURE OF WORK

In countries around the world, a social and political movement called “populism” is on the rise. Broadly speaking, populism is shaped around a rejection of elites, experts and “the establishment.” It finds fault with liberal economics, globalization and technology – major forces that have shaped societies in recent decades.

Globalization may have brought many benefits, but it has also led to job loss and income insecurity in certain communities. The growth of digital technology and AI has already resulted in the loss of jobs for workers in some sectors. This, in turn, has added to a growing sense of frustration and anxiety about the future among people who may hold populist sentiments. The growth in populism could also mean that policies are implemented that restrict employment opportunities.

### Potential impact on vulnerable workers

- A rise in populism may result in some groups of workers being made into scapegoats and discriminated against or excluded from the labour market. These may include groups such as immigrants and certain racial/ethnic minorities.
- Populist ideas may mean greater advocacy for governments adopting laws and policies that could further limit work opportunities for vulnerable workers.

# 9

## EXTERNAL SHOCKS THAT SPEED UP THE PACE OF CHANGE

Work experiences can be significantly affected by economic shocks (e.g. recessions), natural disasters and global pandemics. In the past, these infrequent events have had a considerable impact on employment, especially for groups of workers who already faced disadvantages. Future major shock events may speed up the pace of change.

In just the first six months of the COVID-19 crisis, for example, we saw many of the trends outlined above unfold on a fast track. Employers increased their investment in digital technologies that, in the short-term, helped enable work to continue without disruption but, in the long-term, may result in more jobs being automated and fewer jobs being available for human workers. As situations emerge that result in economic, financial and other shocks, they could create unforeseen difficulties for different groups of workers.

### Potential impact on vulnerable workers

- The effects of the COVID-19 pandemic and the restrictions that governments put in place in response have been harder on some groups of workers than others; namely on workers who are traditionally considered vulnerable. These include low-wage temp workers, new immigrants, seasonal workers, temporary foreign workers, and people in certain racialized communities.
- In Canada and other industrialized countries, infections have been more widespread among vulnerable workers. These workers not only face a higher risk of being exposed to COVID-19 because of the type of work they do, but also tend to work in workplaces where health and safety protections are more likely to be lacking.
- Faster adoption of some forms of digital technology in workplaces during the pandemic may have drawbacks for vulnerable worker groups that face barriers finding training opportunities. As a result, some worker groups may fall further behind in learning the digital skills needed in the future. They may also be at greater risk of losing their jobs.
- Some studies also show that the economic shocks of the COVID-19 pandemic have led to a rise in populist sentiments. If people in power embrace these ideas, it could lead to fewer job opportunities for certain groups of workers.



## ABOUT THE STUDY

To identify the trends discussed above, a research team led by Institute for Work & Health Scientist Dr. Arif Jetha used a method from the field of strategic foresight called horizon scanning. Using this method, the team did a thorough search of all the available sources of evidence—including studies in academic journals, reports, news articles and social media posts. This horizon scan was conducted between December 2019 and January 2020. An update was carried out in August 2020 to capture the changes resulting from the COVID-19 pandemic.

## Acknowledgements

The team behind the creation of this resource includes:

- Arif Jetha PhD, Scientist
- Ali Shamaee MDes, Strategic Foresight Specialist

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