



WORKERS AND AUTOMATION

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Photo courtesy of a garment worker in Bangladesh

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SUMMARY

Automation of manufacturing processes is a topic of interest in the study of the global apparel industry. Like so many innovations, it is a factor once introduced to a system that has the potential to impact stakeholders across the entire supply chain. The respondents in our study are just such stakeholders, and we believe that adding their voices to the automation conversation is a necessary broadening of the communication channel that connects brand executives, factory owners, workers and consumers.

MFO spent a few weeks in February and March 2022 researching what has recently been written about automation in the apparel industry. We also researched questionnaires that had been presented to other workers in other types of manufacturing industries and who are encountering automated or computerized processes in their own trades.

We then devised our own automation questionnaire and on April 1st presented it to the garment workers in our study as part of the regular weekly survey. What follows are the results of these interviews in which garment workers were allowed to share with us their own experiences with automation (within the context of the introduction of new machines to their assembly lines) and their feelings about these experiences. In brief, we found that:

- Not many garment workers, but some (one in four) have personal or anecdotal experience with automation.
- Those who have had experience with automation are likely to say that the introduction of it made their work go faster and that it produces better quality products—in other words, their experience of automation is not of “disruptive” automation that changes how they work but the improvement of existing production tasks.
- Almost all workers were able to learn how to use their new machines (either immediately or after a bit of effort).
- Most workers felt their educations prepared them sufficiently to use the new machines.
- Most workers stated that it is their employer’s responsibility to train them to use new machines.

Before we get to the results, we first provide a short background of automation in the apparel industry and then our methodology behind the automation survey.

INTRODUCTION

Background

The continual introduction of innovative automation processes to manufacturing plants and assembly lines is not at all unique to the garment industry. Nor is it new (Bárcia de Mattos, F., Dasgupta, et al, 2020, p. 3). Nor is there conclusive evidence or agreement that more automation is a good thing or a bad thing, neither or both: one's vantage point seems to be a crucial element. Automation is certainly often regarded as a threat to the workers in possession of the types of low-wage jobs the fast-fashion industry has produced over the past 50 years.

Bangladesh has many of these types of jobs. Recent news articles there talk about robots being able to perform all of a garment worker's tasks free from error and ten times more swiftly. Robots such as these and the developments they herald "pose a severe threat of mass unemployment in this sector" (Kabir, S. A., 2022). Other news pieces have headlines proclaiming: "Automation is not hurting RMG employment... yet" (Behtarín, J., Rashid, S., & Basher, S., 2020). In another news article, which discusses garment factories cleaning up their environmental impact, the complexity of the situation is impossible to avoid. More efficient and environmentally friendly machines and processes "could lead to an increase in factory automation" suppliers interviewed for the piece said, and, as an example of what automation could entail, "the arrival of energy-efficient machines that cut threads sprouting from finished clothes could make workers now responsible for that task redundant". Still other suppliers suggested that automation would decrease the physical demand on workers, and even a worker rights activist quoted for the piece said factories have no choice but to go green: "Energy from fossil fuels is hurting our environment and wildlife ... also nobody can stop automation" (Karim, N., 2021)

A concept related to automation is reshoring, which is the reversal of the offshoring process. The theory is that once developed nations have been able to refine automated systems to the point where their efficiency is capable of undercutting the originally cheap labor plentiful in developing nations, industries such as apparel manufacturing will be brought back to the home countries (Kucera, D., & Bárcia de Mattos, F., 2020, p. 1). In this scenario, a garment worker in Bangladesh might lose her job not because she was replaced by a machine in her own factory, but replaced by a machine far away. This scenario has been playing out among blue-collar workers in developed countries for decades, but only recently has it been feasible that the cycle would reverse. Of course, in the reshoring model, only machines, factory owners and highly skilled workers, capable of operating these newly efficient machines, would benefit; low-skilled workers would still most likely be left out of the equation to a great extent.

An example of a scene like this for Bangladesh to consider involves the opening of an automated sewing factory in the United States. The case study comes from a paper on automation in the garment sector of Vietnam, but the lesson could apply anywhere. The details are laid out nicely and seem very straightforward: in 2018 a Chinese garment company invested \$20 million in the construction of a sewing factory in Little Rock, Arkansas. One of the main motivators behind this reshoring (technically it might not be considered a reshoring because the United States was not bringing its own manufacturing base back, but the case is still relevant) was to allow the Chinese firm to have its final product completed in a geographical setting much closer to its customer base, saving money on transportation expenses. The automated machines inside the factory are called "Sewbots", purchased

from an Atlanta software company. Engineers control the production lines, and the Sewbots have an estimated ability to complete the fabrication of one shirt by anywhere between 18 to 33 times faster than a human (Lan, 2020, p. 14).

The actions of Chinese companies are an important consideration for Bangladesh because Bangladesh is the second largest garment exporter in the world (although Vietnam might have overtaken it (Berg et al, 2021)), behind only China. Furthermore, Chinese investment in the Bangladesh garment sector has provided a lot of economic growth (Hossain, 2018, pp. 8-9). As production costs in China have increased, Chinese garment manufacturers have increasingly been looking to offshore their own production to Bangladesh (Asia News, 2019). However, if China can find a way to make Sewbots more efficient and profitable in Arkansas, then they might start to overlook the low-wage human laborers in Bangladesh.

Of course, if Bangladesh is able to implement efficient enough automation systems, and train enough workers up to the necessary skill level to operate the machines of the future, then Bangladesh might maintain its edge as a global competitor. In a recent BetterWork blog, titled “Is automation a threat to women garment workers? Industry experts say it doesn’t have to be”, the hope is that through BetterWork’s Gender Equality and Returns (GEAR) program it can help workers (particularly women) avoid redundancy through “upskilling” (BetterWork, 2021).

But does Bangladesh owe anything to its low-skilled garment workers, or to those garment workers who won’t be able to upskill in time? And what have garment workers themselves brought to the table? Within the context of Bangladesh, apparel exports made by low-wage laborers have been a commanding force behind the country’s economic growth. It is difficult to name precisely the key figures involved, but common citations indicate that the apparel industry in Bangladesh makes up over \$30 billion (11%) of Bangladesh’s GDP (Dwyer et al, 2021, p. 1), likely accounts for more than 80% of its export income (Berg et al, 2021), and employs one in nine or about 11% of all working women in the country. And within the broader context of South Asia, garment workers in that region make up a slightly larger share of all employed persons than the neighboring regions of Southeast and East Asia (Jackson et al, 2020, p. 2). It stands to reason that Bangladesh and its garment workers have a lot to lose if the worst fears about automation and reshoring come true.

Automation of garment workers’ jobs in Bangladesh is of course already underway and might be causing the share of female workers in the industry to decline (Ullah, M.S. & Akhter, R., 2021). A report on emerging skills and automation in Bangladesh warns that women, particularly young adult women with little education in lower-wage jobs, are at greatest risk of redundancy due to automation (Ahmed, A. U. et al, 2019, p. 18). The GWD initiative has acquired anecdotal evidence that over the past four years the quantity of workers in assembly lines has been either remaining steady or decreasing (80% of workers told us that there are either the same amount or fewer helpers working on the line, and 78% said the same for operators).

In an IFC report from 2020, the author says that in the IFC’s Better Work initiative factories that “segments of the manufacturing process, such as ginning, spinning, weaving and knitting have been largely automated”. But the author also says that cost and technical matters are holding back some factories from being able to fully automate and specifically singles out sewing as one task that is still performed by human hands (Hertveldt, 2020).

The relative threat to any particular Bangladeshi garment worker that her job will be replaced by automation is a complex subject. It is also difficult to assess the benefits and risks of automation adoption. Who wins, who losses? Would it be better for Bangladesh's garment workers if they kept their low-wage, low-skill jobs, if it meant more garment workers could remain employed? Or would it be better if Bangladesh automated more of its garment factories, allowing only upskilled workers to remain?

Purpose of the Report

These are very large questions and we cannot answer them here. So, what can we do? As a joint paper from the IFC and ILO (via their Better Work initiative) recently phrased it: "Relatively absent in these discussions is a sense of how automation is playing out at the shop-floor level" (Bárcia de Mattos, F., Eisenbraun et al, 2020, p. 4). The authors of that paper conducted interviews with "four leading brands in the apparel and footwear industry and a supply chain management company" (Bárcia de Mattos, F., Eisenbraun et al, 2020, p. 9). Here is one of the conclusions the paper reached: "The interviews suggest that automation is perceived by brands as a means for the quick delivery of reasonably priced goods" (Bárcia de Mattos, F., Eisenbraun et al, 2020, p. 12). This is good information to have, but it still lacks a worker's perspective on how automation is perceived.

Our goal has been to enrich the discussion about automation by asking our respondents questions directly. The questions' intent would be to measure workers' awareness of and feelings towards automation by asking them about any real or potential occurrences of new manufacturing machines being introduced to their factories.

Methodology

So, what are Bangladeshi garment workers' attitudes towards automation then? To help formulate the questions we'd be asking them¹, we first performed desk research on the internet to get a feeling for other similar types of surveys that have been posed to manufacturing workers, and to see what types of questions those workers were asked. We also conducted a brief literature review for recent (within the past five years) academic papers, news articles, blogs, and mission-driven thought-pieces to gauge the international attitude towards automation and the effects it might have on the garment industry.

Examples of published surveys we found in which respondents were asked about their feelings of and experience towards automation and/or computerized systems were varied in their source. We looked at questions from the Harvard Business Review, Parsable, the International Journal of Occupational Safety and Ergonomics, the Worcester Business Journal, SYKES, and Gallup, among others.

¹ While the threat of reshoring is real, and we wanted to ask workers about the subject, it would have been difficult to phrase such questions in ways which were not exceedingly theoretical. We decided to focus our questions on the tangible aspects of workers' real or potential interactions with new technology. Thus, we did not ask respondents questions which deal specifically with reshoring and their attitudes towards it, beyond asking them whether or not they think they might lose their job due to the introduction of new machines.

Our next step was to understand the language workers use when they think about automation. We did this by asking 130 of our worker leaders a simple question: “What, if any, changes in how you complete your work tasks have you experienced in the last two years?” Many worker leaders referenced the introduction of new machines to their line. As one worker leader said: “I am currently the senior operator. Earlier, I used to work on the Bangla machine to sew. Now I sew using the automatic machine.”

Using the motif of new machines, we ended up formulating 21 of our own questions, and we believe that the survey we eventually gave to these garment workers is the first of its kind at so great a scale. The complete automation survey can be found in [Annex 1](#).

In the future, “worker feedback dashboards” as described in a paper submitted to the 10th Nordic Conference on Human-Computer Interaction in 2018 might be able to help workers better understand their work relationships with their new robotic co-workers (Heikkilä et al, 2018). For now, let’s see what garment workers in March 2022 had to say about the real and prospective examples of the introduction of new machines to their workspaces.

RESULTS

To get an understanding of workers’ experiences with automation, we asked them the following question.

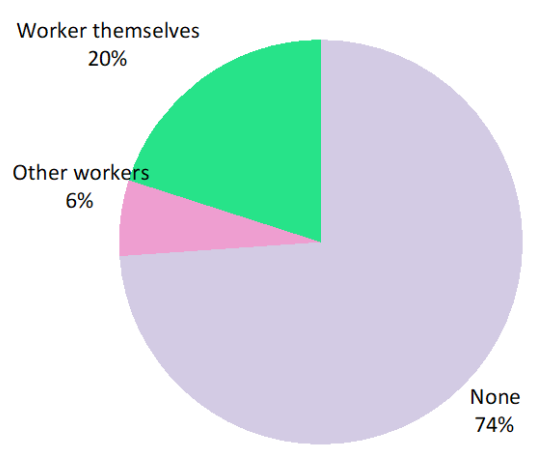
Have you ever had to change how you complete your work tasks because you were required to work on a new machine?

We asked about a “new machine” because this is the way worker leaders talked about changes they had experienced in the workplace that were related to automation. If workers did not respond “yes” to this first question we asked them the following:

Have you ever seen a change in how other people in your workplace complete their work tasks because they were required to work on a new machine?

About one quarter of workers (26%) had either experienced automation or observed colleagues experiencing it.

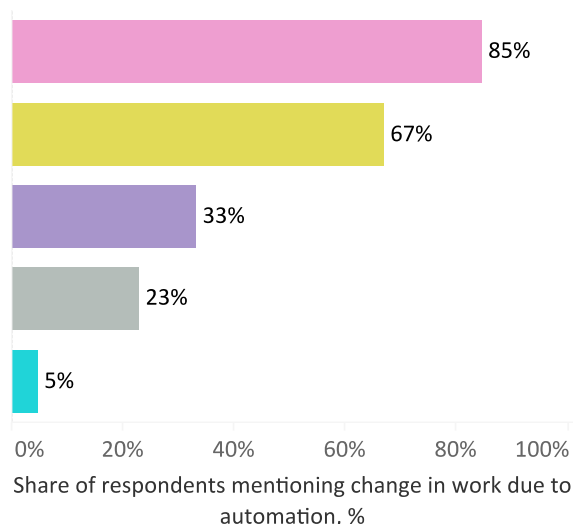
Figure 1: Workers experiencing or observing automation



Our survey then dug into the experiences of workers who had experienced automation themselves—a sub-sample of 215 workers of whom 169 (79%) are women and 46 are men. We looked at the data on a gender disaggregated basis and saw few differences between men and women in their responses. With this in mind, we will be reporting results for both men and women, to take advantage of the full sub-sample.

We asked workers whether the new machine changed how they worked and included a list of options that they could choose from, allowing them to choose multiple options. The most common response from workers was that the new machine allowed them to do the same task more quickly (85% of workers selected this option). The second most common response was that the new machine allowed them to perform the same task but with better quality outcomes (67% of workers). The third most popular option—that the new machine enabled the worker to add a new task to their work—garnered one third of workers’ votes. These responses suggest that, at this time, the introduction of automation in Bangladeshi factories is predominantly automating existing tasks to increase productivity and quality, but there is some evidence that new machines have “disrupted” the way apparel items are manufactured by adding new tasks for workers to do, not simply automating existing tasks.

Figure 2: Changes in task due to automation

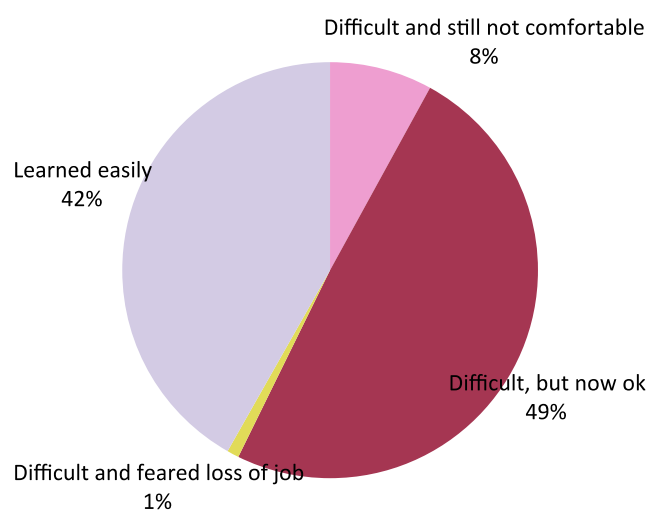


An important theme in the debate about the impact of automation on workers is the extent to which workers are able to learn how to use the new machines that are coming online. We asked workers who had experience with automation this question directly:

How would you describe your ability to learn how to use the new machine?

Almost half said they learned how to use the new machine easily, and 42% said they had difficulty at first but are now “ok”. This is not necessarily surprising given that the new machines the workers were given were largely automating existing tasks.

Figure 3: Ability to learn new machine

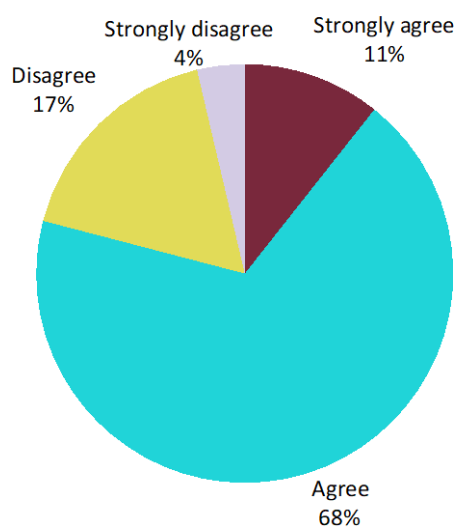


We also wanted to know from workers whether they felt prepared for automation, given the experiences they had had:

Do you think the general education you received at school or university prepared you to learn how to use a new machine?

Over three-quarters (79%) of the workers asked this question agreed or strongly agreed that their general education had prepared them to learn how to use a new machine. This confidence in their ability to learn how to use a new machine is likely colored by the fact that they did not, generally, have a disruptive automation experience.

Figure 4: General education and automation

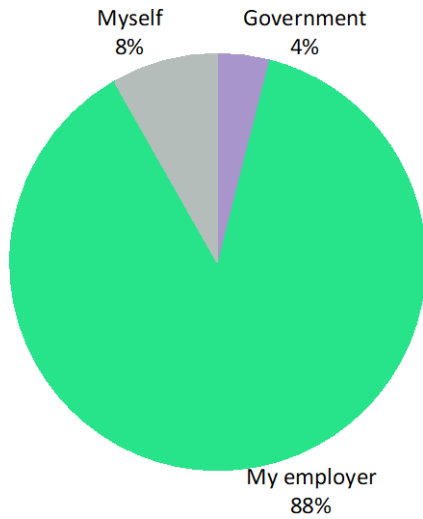


Last in our series of questions about workers' preparedness for automation, we asked them:

Whose responsibility is it to pay for the education and training necessary for you to stay employed at your current or a new workplace in the face of the introduction of new machines?

Overwhelmingly, workers see this as the responsibility of their employer.

Figure 5: Responsibility for training in the face of automation

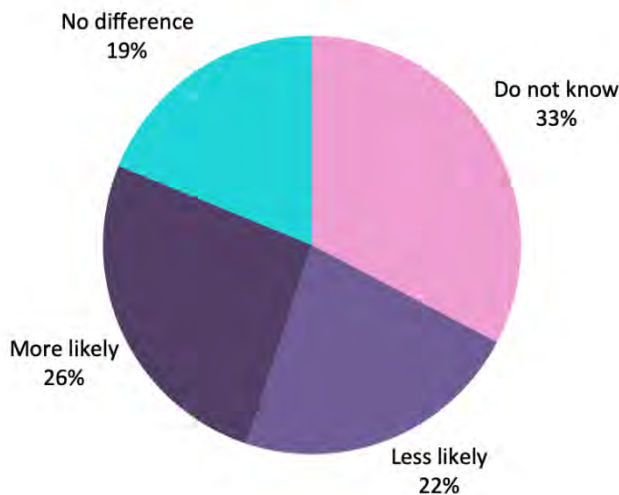


Finally, to get a sense of workers’ general attitude towards automation we asked them:

If you were looking for a new job, would a company investing in new machines make you more or less likely to apply there?

A third of workers did not know how to answer this question, while another fifth stated that the company’s behavior would make no difference. Of the remaining half who expressed an opinion, there was an almost even split between those saying that they would be more likely to seek employment with a company investing in new machines and those saying they would be less likely to do so.

Figure 6: Likelihood of seeking a job in a company investing in automation



CONCLUSION

While not a great deal of garment workers in our study sample reported experience with automation, it is inspiring to see that among the ones who did, there was mainly positive feedback. If we assume that the rest of the workers would report similar results upon encountering automation, this goes a long way to suggest that garment workers in Bangladesh are open to the introduction of new machines and that not only do they feel capable of learning how to operate new machines, they *do* learn how to operate them, even if it takes some workers a bit longer. The one *caveat* to this positive conclusion is that much of the automation workers have experienced has simply been the automation of existing tasks, not the disruption of their work and a whole way of doing things. That is likely to be the nature of automation in the future, and it is unclear how well prepared workers are for a more disruptive type of automation.

Framing this within the larger conversation, we see that stakeholders with power should take a measured approach to automation, and should include workers in their strategic planning. While the BetterWork piece referenced above characterizes brand executives as interested primarily in the “quick delivery of reasonably priced goods”, perhaps there is a compromise to be reached. Bangladeshi garment workers do not need to be immediately replaced by Sewbots. They *can* be upskilled and they *can* help brands make better clothes quicker. But as the worker rights activist in the new article above also says, we can’t stop automation. Garment workers should be eased into a future world where their coworkers are no longer humans but computers.

The best way to ease workers into this world is to first understand their feelings and their needs, to understand how best they learn new skills and what they are lacking. This first automation survey likely will not be our last. In the future, we will ensure to center workers’ experiences by continuing to ask them whether the newly automated processes they are encountering are a help, a hindrance, or maybe even a hope.

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ANNEX 1: AUTOMATION SURVEY QUESTIONS

Below are the questions we asked garment workers to measure their experiences with and feelings towards automation.

No.	Question	Answer choices	Instructions	Answer type
1	Have you ever had to change how you complete your work tasks because you were required to work on a new machine?	Yes No Don't know Refused	If no, don't know, refused, skip to 8	Single
2	What did you call the old machine that you used to work on when talking about it with your work colleagues?		If yes to 1	Open
3	What did you call the new machine that you work on when talking about it with your work colleagues?		If yes to 1	Open
4	Did the new machine change how you work to...? [Enumerator to read out all the options]	Perform the same tasks faster Perform the same tasks with better quality Add new tasks Make it less tiring to work for a full day Other change (specify) No change in how I work Don't know Refused to answer	If yes to 1	Multiple

No.	Question	Answer choices	Instructions	Answer type
5	How did you learn how to use the machine?	Got training in a separate room off the production line Production line was stopped for a period of time and we were trained on the new machines on the line Learned while working on my tasks after a short orientation from the line supervisor Other (specify) No change in how I work Don't know Refused to answer	If yes to 1	Single
6	How would you describe your ability to learn how to use the new machine?	I learned it easily, with no problem It was difficult at first, but now I can use it well It was difficult and I still do not feel comfortable using it It is difficult to use the machine and I fear I will lose my job if I am not able to use it properly Don't know Refused	If yes to 1	Single
7	Do you think the general education you received at school or university prepared you to learn how to use a new machine?	Yes No Don't know Refused	If yes to 1. Then go to 14	Single
8	Have you ever seen a change in how other people in your workplace complete their work tasks because they were	Yes No Don't know Refused	If no, don't know, refused to 1	

No.	Question	Answer choices	Instructions	Answer type
	required to work on a new machine?			
9	What did they call the old machine that they used to work on when talking about it with you?		If no, don't know, refused to 1, and yes to 8	Open
10	What did they call the new machine that they work on when talking about it with your work colleagues?		If no, don't know, refused to 1, and yes to 8	Open
11	From what you could see or what your colleagues told you, did the new machine change how they work to...? [Enumerator to read out all the options]	Perform the same tasks faster Perform the same tasks with better quality Add new tasks Make it less tiring to work for a full day Other change (specify) No change in how they worked Don't know Refused to answer	If no, don't know, refused to 1, and yes to 8	Multiple

No.	Question	Answer choices	Instructions	Answer type
12	How did they learn how to use the machine?	Got training in a separate room off the production line Production line was stopped for a period of time and we were trained on the new machines on the line Learned while working on my tasks after a short orientation from the line supervisor Other (specify) No change in how I work Don't know Refused to answer	If no, don't know, refused to 1, and yes to 8	Single
13	How would you describe your colleagues' ability to learn how to use the new machine?	They learned it easily, with no problem It was difficult at first, but now they can use it well It was difficult and they still do not feel comfortable using it It is difficult to use the machine and they fear they will lose my job if they are not able to use it properly Don't know Refused	If no, don't know, refused to 1, and yes to 8	Single
14	Have you or someone you know ever lost a job due to the introduction of a new machine in your workplace?	Yes No Don't know Refused	If no, don't know, refused go to 17	Single
15	What did people call the old machine that you used to work on when talking about it with your work colleagues?		If yes to 14	Open

No.	Question	Answer choices	Instructions	Answer type
16	What do people call the new machine?		If yes to 14	Open
17	Which statement best applies to you: [Enumerator to read out all the options]	I fear the introduction of a new machine related to my work tasks because I will lose my job I fear the introduction of a new machine related to my work tasks because it will make my job harder I neither like nor dislike new machines related to my work tasks I like the introduction of a new machine related to my work tasks because it makes my work easier I like the introduction of a new machine related to my work tasks because it forces me to learn new skills and expand my knowledge		Single
18	Consider the following statement: Within the next 5 years I will lose my job because of the introduction of a new machine. Do you...?	Strongly agree Agree Disagree Strongly disagree Don't know Refused		Single
19	My current level of education makes it possible for me to learn new work skills that will enable me to stay employed at my current or a new workplace. Do you...?	Strongly agree Agree Disagree Strongly disagree Don't know Refused		Single

No.	Question	Answer choices	Instructions	Answer type
20	Whose responsibility is it to pay for the education and training necessary for you to stay employed at your current or a new workplace in the face of the introduction of new machines?	Government My employer Myself Don't know Refused		Single
21	If you were looking for a new job, would a company investing in new machines make you more or less likely to apply there?	More likely No difference Less likely Don't know Refused		Single