Future Trends Project Report

Based on the analysis of how the Fourth Industrial Revolution will affect middle-aged to elderly workers.

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Project Title: Robots over Humans?

With the rise of automation, the concern now is about how automation is going to affect workers. There are potential challenges for these workers to face, thus measures have to be put in place to help these workers adapt to these potential changes. In this report, we would look at the potential challenges that workers in Singapore will face when they face the impacts of the Fourth Industrial Revolution.

The challenges that workers face would not only be limited to job displacement, but also how their welfare might be affected.

Challenge 1:

Based on our research of how robots will potentially affect workers, we have found that robots are becoming more and more feasible and cheap to be implemented in various industries. Take the physical work industry for example, more and more robots are being implemented in those industries. The robots are efficient and quick in finishing tasks that will take quite a long time if being carried out by human workers. From our on-site interview with the director of operations from FoodRepublic, it is definite that companies are going to switch to automation in 2030 when it outweighs human workers.

While it is not definite that all jobs will be displaced, it is definite that some jobs will be replaced. For example, robotic arms can be used to produce cars, which will be quicker than if made by a human, however, the amount of workers needed to monitor those robots will greatly decline. This in turn creates higher unnecessary competition for jobs and will disadvantage workers. Workers will have to struggle to find jobs and some may even end up jobless and will be forced to look for alternatives.

According to the research carried out by the McKinsey Global Institute on an analysis on China, India, Germany, Japan, Mexico and the USA, the percentage of demand of jobs in the predictable physical work industry will decrease by around 20 percent.

Locally, a study done by the technological company Cisco and economic forecasting agency, Oxford Economics, shows that "some 85,000 existing roles will disappear, pushing workers into other industries and vocations."

A scholarly report by David Rotman from Massachusetts Institute of Technology also said that from a graph presented by Erik Brynjolfsson, it shows two lines-one representing Productivity and the other representing Total Employment. The two lines stuck closely to each other, with increases in jobs corresponding to increases in productivity. By 2011, there appeared a significant gap between the two lines. Technology is behind the healthy growth of productivity and weak growth in jobs. These reports show that job availability will be fragile in the future as workers will have to be limited more in job selections, in turn creating problems and potentially making workers jobless.

Challenge 2:

With the rise of automation, many companies will be switching to utilizing robots and artificial intelligence to increase the efficiency and effectiveness of their workload. Companies are going to switch to digital and implement the Internet of Things, which will benefit the company by helping the company achieve greater efficiency in their workloads, which therefore increases revenue. The number of working elderlies in Singapore is also growing significantly, and the older workers who are computer illiterate will need to be re-trained in order to improve their technological skills and adapt to the digital workload and they may be stressed with the imminent rise of technology.

Older workers that have been long accustomed to analogue work will find it hard, or even impossible, to adapt to the digital workforce as not all are computer literate. They will be less comfortable with handling digital

workloads because the basic concept of digital is different from analogue, and grasping it might be hard for these seniors. The elderlies will be marginalised by this as many have the risk of being retrenched with little help given to them. In 2030, we fear that elderly workers will be badly affected by the Fourth Industrial Revolution.

From a study compiled by the McKinsey Global Institute, it states that workers will have the opportunity to switch their carriers and the challenge is managing the transition of their jobs. It is also stated that individuals who are most likely going to change either jobs would not be the young but instead closer to the middle-aged and the elderlies, which suggests that mostly young people are comfortable with utilizing digital technologies and would not be greatly affected by the Fourth Industrial Revolution, but it is the middle-aged to older worker that will be affected the most.

A study shows that "One in four seniors are still working now in Singapore." This suggests that 25% of elderlies in Singapore are still working. According to Ministry of Manpower figures, just in 10 years from 2006 to 2016, the number of employed residents aged 70 and older has risen from about 16,000 to about 43,000. This number is going to rise in the future along with the rise of the amount of elderlies in Singapore. "Singapore is one of the fastest ageing societies in the world: by 2030, one in four people, or more than 900,000 people, will be aged 65 and above, double the number now." In 2030, we would expect that Singapore will have much more elderlies, which translates to much more working elderlies.

"With one of the highest life expectancies and lowest fertility rates in the world, Singapore is on the cusp of an extreme demographic shift." Singapore's workforce is getting older. Employment rate for older residents has surged over the last decade. In 2030, we would expect most companies to have already switched to digital and robotics. However, not all workers might be comfortable or fully capable of handling these systems.

Challenge 3:

As technology is advancing with the Fourth Industrial Revolution, workers in unskilled labour will be trained to do professional jobs such as data management, or clerical work. People that are already in these kinds of occupations will be temporarily secure in the current society, yet that may not be completely true in the near future.

Though professional jobs require more skill than manual labour, advancement in technology may lead to these jobs still getting replaced regardless due to leaps in technology allowing machine and AI learning to manage such tasks, automating them and reducing the need for human workers, increasing competition for such job sectors. This heightened competition for jobs will result in many workers potentially not getting jobs when they look for one. Workers' security might be at risk which will be a major problem in Singapore.

From a scholarly article:

"For example, the sector of sales and marketing has been impacted by advanced technologies and this impact will magnify significantly in the near future." Robots, automation, and software can replace people. Technologies like the Web, artificial intelligence, big data, and improved analytics—all made possible by the ever increasing availability of cheap computing power and storage capacity— are automating many routine tasks."

These improvements in technology being utilized in these professional sectors will ease the job or reduce the human counterparts needed in a specific professional work sector.

From another article from techrepublic.com, it is stated that 'However, in reality, a wide array of white collar jobs are already being impacted by the technology, according to a New York Times report. AI may soon replace millions of office workers worldwide, according to Kai-Fu Lee, CEO of Sinovation Ventures and former president of Google China. "This replacement is happening now, and it's happening in a true, complete decimation," Kai-Fu Lee told a conference at MIT in 2017. "In my opinion, the white-collar workforce gets challenged first--blue-collar work later."' This point is further proven by the article.

Challenge 4:

As the upper class are able to invest in Robots and AI, they will have less need for human workers, as robots are more productive and cost-efficient. These human workers are those in the lower class or the middle class who can't reap the benefits of the Fourth Industrial Revolution as much as those higher up.

These human workers might fall into a disadvantage as their bosses become unwilling to sustain their lower cost-efficiency and lower productivity levels. Thus, as the rich get richer, the poor might get poorer from having to accept lower pay or become unemployed, losing their jobs. This would make the two groups even more separated then they are already, resulting in shifts of power, or the powerful getting more power.

From an article from trailhead.salesforce.com, "But that doesn't necessarily pave the way for a more open, diverse, and inclusive global society. The lessons of previous industrial revolutions include the realization that technology and its wealth generation can serve the interests of small, powerful groups above the rest."

Also from the Weforum Global Risks Report 2017, "the Fourth Industrial Revolution has the potential to raise income levels and improve the quality of life for all people. But today, the economic benefits of the Fourth Industrial Revolution are becoming more concentrated among a small group." This increasing inequality may cause social fragmentation which leads to an unfair advantage of a small group of people over others.

The rich have the ability to control and use the Fourth Industrial Revolution to their benefit, however, it may not necessarily benefit the middle to poorer working classes when it revolves around gaining profit.

Challenge 5

Younger workers that are embracing the Fourth Industrial Revolution are generally higher valued assets to industries while older workers that cannot cope with it will be eliminated in the competition for jobs. Younger workers have stronger foundations in their digital literacy and the Fourth Industrial Revolution will not impact them as much as older workers as it will need workers to have strong digital skills in handling these technologies. Many older workers will find it difficult to function at ideal levels because their skills and abilities have not kept pace with the way business is done today.

This poses a threat to older workers as companies may retrench them with little compensation paid and replace them with younger workers. Older workers will be marginalized by these advancements. This affects the stability of the older workers' jobs and makes it fragile. These older workers might not be able to find another job as lesser companies will be looking for senior assets for there are compelling reasons why companies are unwilling to hire them. In the end, older workers might turn out jobless because of the competition with younger workers that companies are more willing to hire.

According to the Retirement and Re-employment Act from the Ministry of Manpower, "Employers still have the flexibility to transfer older staff to their subsidiaries or other companies, and may also terminate them with financial compensation." Furthermore, as long as there are no specific anti-discrimination laws in place, making official complaints will be a waste of time. From an article in the Straits Times, "Companies may see the displacement of mature workers as providing opportunities, removing obstacles to gainful employment."

Older workers might also have less energy, are slower and are more likely to have health problems compared to their younger colleagues. Companies will find it more expensive to insure their older workers if they provide insurance. When it comes to jobs needing technical skills, older workers are generally less flexible and more difficult to train in new vocations

For example, IBM, the leading company in the technology industry "has been pushing older employees out of the company and replacing them with younger staffers in the US". "Rather than appraise people on merit, managers instead judge underlings by their year of birth, it is claimed." (theregister.co.uk, 2018).

The Fundamental Problem

Given that automation and the Internet of Things have been affecting the jobs of the general public negatively, especially the older workers between the age of 50-65, and might threaten their jobs, how might we improve their working circumstances so that they can benefit in their jobs and potentially work alongside robots and automation from the Fourth Industrial Revolution in 2030 in Singapore?

Solution 1:

Organization Workers Unite will lobby to the government and all companies, big or small, to educate all their workers about the Fourth Industrial Revolution and devise concise plans to protect their jobs even if they switch to a digital workforce, and will not demote their jobs in the year 2030. Workers will be educated about the Fourth Industrial Revolution which helps them prepare for the switch to digital so that the impact of the switch will be softened. Their jobs will also be guarded by the government so that the workers' jobs will not be easily taken away. Companies will also be incentivised by the government to carry out plans made by Organization Workers Unite. Eventually, most workers will be able to adapt to the new industrial revolution. This is a humanitarian solution to help workers embrace the future.

According to the Singapore Employment Act, companies can downsize their workers to reduce costs and increase efficiency. This may be seen as a disadvantage by low to middle-class workers as some might fear how companies may exploit this law in retrenching workers and replacing them with automation. With the government having some control over workers' jobs, it will help workers confidently embrace the new industrial revolution.

Thus through education within the company, it is easier for workers to learn.

The Straits Time states, "Persuading workers that they need to reskill when they are busy working and have not lost their jobs is also an uphill task" Thus, teaching workers in their companies will be a much easier task for both workers and companies.

Solution 2:

Organization Workers Unite can develop a mandatory assessment for workers above the age of 60 and collaborating with the government to implement a requirement by 2030 that workers above the age of 60 must undergo Workers Unite's government-funded tests to assess their level of digital literacy, and failure results in them having to go to Workers Unite's programmes to improve their skills, which makes sure every worker will receive an equal chance at adapting to the new types of workloads. The programmes would not be traditional theory courses but a simple course that allows workers to interact with simplified digital machines. Courses will also use simple languages that workers are familiar with, thus workers can understand concepts easily which will help them cope better with their digital workload when companies start switching to digital. Organization workers unite will also collaborate with companies to make this a requirement for their workers,

and would be incentivised by the government. This test will allow older workers to be better accustomed to the Fourth Industrial Revolution so that they will not be affected negatively by it.

According to research, the reason why most seniors shun new technologies is because they feel that they are too complicated and difficult to learn, thus not many workers will be comfortable in going to courses themselves. The way it is taught can also affect how senior workers look at technology. For example, if the courses are taught in languages familiar to them, they will be more likely to learn than if it is taught in one language that they are not familiar with.

Solution 3:

Tech companies in Singapore can implement a new smart device that helps workers readjust to the new working environment. The smart device can either be worn on the wrist or be a small dongle that can be out on the desks of workers. It includes a programme that can be downloaded onto their computers or phones. The smart device will have many features, such as a virtual assistant so that workers can ask the virtual assistant if they encounter any problems. The virtual assistant can also automatically guide the workers in their jobs. It can be used by workers in a certain company with Artificial Intelligence implemented in them, acting as a virtual assistant for the workers when a job is new to them. It is similar to virtual assistant in smart phones but rather the goal is to help workers adapt. The government can incentivise tech companies to manufacture these devices and also companies provide each of these that have been customised to the specific companies for workers that have switched careers. The reason for this is because this will be very convenient for workers to adjust to the new working environment. The virtual assistant will help workers when they do not know certain things, especially helping seniors adapt to Internet of Things services. These simple devices will be an ease for older workers to use. According to Business Insider, "As technology gets more advanced, prices drop and products get better." In 2030, these smart devices would be very easy to mass-produce, as technology becomes cheaper.

Solution 4:

Ministry of Manpower can implement a law that limits companies in their replacing human workers with automation or smart technologies. The Fourth Industrial Revolution will affect workers by replacing workers' jobs when companies implement smart technologies to boost efficiency for the company, therefore making some workers redundant. The law will require companies to keep at least 90 percent of their human workers in the year 2030. As the Fourth Industrial Revolution will have major effects on workers across many industries, we must implement a law to soften the sudden impact on these workers in order to prevent an uneven distribution of technology and workers, which may result in workers without jobs. Laws are also effective, seeing results in a short period of time. This law will allow time for the new industrial revolution to stabilise. After a period of time, when the effects of the Fourth Industrial Revolution and people's jobs have stabilised, this law can be altered for companies to explore new ways to implement the Fourth Industrial Revolution in their processes provided that workers do not get marginalised by it. This solution prevents for a potentially damaging sudden impact on workers' jobs.

From our research, we have found that companies can replace older workers with technology and/or younger workers with small compensations paid to them. The Fourth Industrial Revolution is on the rise where its technologies improve efficiency and may be more appealing to companies than using older workers that are not as technologically inclined. This will be a problem to older workers as their jobs may be threatened unless a law is put in place by the government to soften the impacts of the Fourth Industrial Revolution over time.

Solution 5:

In 2030, the Ministry of Manpower can campaign nation-wide about them coming up with programmes that allow younger workers in industries to work alongside older workers which will guide the older workers in their industries, letting these older workers have a chance at adapting to the Fourth Industrial Revolution. As this is more of an interaction-based programme, it will be easier for older workers to learn as they primarily rely on interaction to learn, rather than plain retraining programmes that may cause confusion to these older workers that do not have strong foundations in smart technologies. Community clubs can also host these programmes. The Ministry of Education may also allow secondary school students who have went through some digital education to help guide the older generation in this modern world. These students will receive public volunteer hours from this. This it will positively benefit the elderly through the activity, bonding the student and the elderly, reducing the gaps between generations and help the elderly in the modern technologically driven world we live in today. This also allows students to refresh their skills, at the same time training our next generation to be better prepared for when they enter the workforce, allowing all to be more digitally capable. Combining the strengths of the young and old will potentially affect Singaporeans positively.

The young in 2030 will be more technologically inclined than the older workers. Research suggest that the Fourth Industrial Revolution will affect the older workers more as it is a major shift in the needs of skillsets. Thus having the young and old learn together will help these older workers gain confidence.

Criteria for solutions:

- Which solution will be the fastest to implement for workers and companies in Singapore so that more workers are able to reap the benefits of the Fourth Industrial Revolution?
- Which solution will be the least expensive to be implemented for workers and companies in Singapore so that it will be more feasible to be implemented?
- Which solution will be the greatest improvement over worker re-training programmes currently in Singapore for workers to improve their skills so that they can embrace the future?
- Which solution will be the most beneficial in protecting older worker's jobs so that they do not get marginalised by the Fourth Industrial Revolution?
- Which solution will be the most convenient for the older workers in 2030 to solve their challenges?

Decision Matrix

Criteria	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	
Weighting	4	2	5	3	1	Total
Solution 1	3	5	1	2	3	36
Solution 2	2	3	2	3	4	37
Solution 3	3	1	4	4	5	51
Solution 4	3	4	5	5	4	64
Solution 5	4	3	3	4	5	54

Action Plan

Phase 1:

- In the year 2030, a campaign will be carried out to raise awareness to middle-aged to older workers about a mandatory nation-wide test on their digital-literacy through television advertisements, newspaper and posters. Government implements this as a law. Creative use of the media may also aid in this campaign.

Phase 2:

- Companies then rolls the plan out, collaborating with the government to carry out the tests on their workers.

Phase 3:

- Companies now have a better understanding on their workers and how they will potentially adapt to the Fourth Industrial Revolution.
- Collaborate with government to plan how they can keep 90 percent of the older workers when the Fourth Industrial Revolution has just started to impact workers and also utilize it healthily to improve efficiency

Evaluation of action plan

Why is this action plan effective?

Some companies are purely profit-driven and workers' welfare is not their main concern. Older workers may not be as digitally-inclined as younger workers. As the Fourth Industrial Revolution will affect older workers quite hard, a law must be implemented to make sure these workers do not get marginalized because of companies looking to increasing their profits with the enhanced technologies of the Fourth Industrial Revolution.

Companies will be replacing these less digitally-inclined workers with younger workers, which poses a threat to the jobs of the older workers.

This solution allows for these older workers to benefit from the Fourth Industrial Revolution and also soften the impact of the Fourth Industrial Revolution on them, which protects their jobs.

Challenges of this action plan

- Resistance from companies that are solely profit-driven and do not care about workers' welfare
- Requires much funding

How do we overcome these challenges?

- Incentives from government
- Blacklisting of companies that do not cooperate

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