

Dominique Virgil, 2019

Volume 5 Issue 1, pp. 01-16

Date of Publication: 15th March 2019

DOI-<https://dx.doi.org/10.20319/pijss.2019.51.0116>

This paper can be cited as: Virgil, D., (2019). The Impact of Automation towards Female Labor Force in Indonesia and the Attempts to Establish Better Protection Mechanism. PEOPLE: International Journal of Social Sciences, 5(1), 01-16.

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THE IMPACT OF AUTOMATION TOWARDS FEMALE LABOR FORCE IN INDONESIA AND THE ATTEMPTS TO ESTABLISH BETTER PROTECTION MECHANISM

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Abstract

In the current era of disruption, automation is considered as the answer of the problem of the decreasing number of workforces which can't meet the demand of increased productivity for greater growth. Despite the benefit resulted from automation, rapid adaptation of automated technology in various sectors has put thousands of workers under threat on losing their jobs, without any guarantee of a definite substitute job once they have been replaced, especially female workers. The potential of female workers for economic advancement are currently being undermined with less attention given. This paper will discuss whether or not the enhancement of female labor force participation can contribute significantly to the increase of productivity and growth in the disruption era. This paper will also discuss whether or not the existing protection mechanism for female workers is adequate to optimize their potential and at the same time extenuate the adverse effects of automation from a legal and socio-cultural perspectives.

Keywords

Automation, Women, Workforce, Protection

1. Introduction

The era of disruption affects almost all aspects of society, including occupations and workforces, due to the significant pace of technology advancement. People can't deny that the usage of enhanced technology will increase productivity and efficiency, especially in industries, triggering companies to start substituting human labor to machine and technology, in a process called 'automation'. It is inevitable that automation is proven to become a powerful method to boost productivity and growth, especially in industries. However, it is still debatable whether or not automation is the only method to achieve these productivity and growth maintenance target. Isn't there any other method to be utilized?

The ongoing issue that needs our attention is the participation of women and girls in labor market. Studies have shown the significant contribution that women and girls can give to growth and development through their enhanced participation in labor market. One of the benefits is the increasing number of valuable and skillful workers as the answer of shrinking number of productive workforces. Nevertheless, the position of female workers is threatened in the current disruption era. All across the globe, women with inadequate educational background are employed as hard-labors, which are at disadvantaged position due to the trend of automation. Women are also concentrated only in several sectors, with big percentage gap, and these sectors fall under the category of most likely being impacted with automation.

The persisting gender gaps with only insignificant improvement cost countries great losses in potential growth, including GDP. On the other hand, the demand of enhancing economic growth also push countries to take a rapid step to adopt automation. Indonesia, as a country with young emerging economy and rising number of women in productive age is also faced with this threat. Implications caused by taking wrong decisions in regards to automation with uncaredful consideration will result in so many jobs losses, women becoming more vulnerable to unemployment and poverty, and downgrade of productions quality.

To solve this issue, the government need to find a proper response towards this phenomenon: how can the progress of automation be maximized without harming the process of enhancing women's participation in labor market? How can automation bring benefits to eliminate gender gaps in the labor market, instead of cutting women off from their jobs? What are certain limitations that should be determined to ensure that automation and the enhancement of female labor force participation would still go hand-in-hand?

2. Research Issues

The issue of automation has been growing in ASEAN region, especially Indonesia, leaving a lot of workers worry about the future of their job. The different level of enrollment of workers in specific areas make it more interesting for the writer to analyze whether or not automation impacts the workers differently, depending on the jobs they are doing. The ambition of companies to accelerate the productivity lead us to the big question on whether or not automation is the only way to enhance the pace of productivity growth.

This research is guided by three main questions, which are: 1) The positions of women in the labor force in Indonesia as well as their position in the regulations; 2) The status of regulations in facing the challenges of automation; and 3) how automation impacts female labor workers in Indonesia in each stage, whether automation can significantly contribute to the enhancement of women's participation in the labor market to enhance productivity or impact women in a very harmful way. At the end of this paper, a set of proper solutions are provided to respond to the issue.

3. Method

The writer uses juridical-normative method, which is based on literature reviews and existing data which elaborates the issue of automation and its impact towards female workers in Indonesia, comparing existing statistics between the benefits resulted from automation as well as positive impacts of enhancing female labor force participation and narrowing the gaps with men. This paper will also analyze existing regulations and other non-legal measures that have been conducted by the government in regards to the issue. At the end of this paper, the writer will provide policy recommendations on how the Indonesian government can fully accommodate women to fully maximize their economic potentials while also equip them to be ready in facing the era of automation.

The type of data being used in this paper is secondary data obtained from books, scientific journals, news, articles, and other internet sources. The writer also obtained the data ... The legal material being used in the paper is primary legal material which includes Law No. 13 of 2003 on Manpower; Government Regulation No. 31 of 2006 on National Work Training System and the Regulation of the Minister of Manpower and Transmigration No. 7 of 2012 on Cooperation on Job Training Center Usage by Private Entities. The writer uses the qualitative approach, resulting in a problem solution that is elaborated by subsequent parts in this paper.

4. Present Status of Female Labor Force Participation and the Benefits of its Enhancement

Half of the world's population – and also the total population in most of the countries – are comprised of women, but their lack of participation in labor market contribute to significant macroeconomic consequences. ILO stated that women's labor participation rate worldwide is 48.5% in 2018, 26.5% below the rate of men's labor participation rate. On the other hand, global women unemployment rate in 2018 is 6%, approximately 0.8% higher than men unemployment rate, meaning that there are only six women who are employed in every 10 men who have jobs (International Labour Organization, 2018).

In Indonesia, based on the data established by the Central Agency on Statistics (*Badan Pusat Statistik*, abbreviated as BPS), in 2017, almost half of Indonesian population are comprised of women and girls, reaching the number of 130.31 million compared to 131.58 million male population. This means that in every 100 females, there are 100 males, and this ratio keeps persisting although the number of female and male population will be increasing in the subsequent years. However, based on the data by the World Bank, the rate of female labor force participation in Indonesia is only 51% in 2017, and it's only increasing by 7% from 1990.

The research conducted by IMF states that higher female labor force participation in countries with aging developed economies will be the solution towards the problem of shrinking workforce. This vital role played by women in boosting growth is significant in countries with emerging or developing economies (Elborgh-Woytek, et al., 2013). According to the data from the International Labor Organization (ILO), 812 of 865 million women worldwide with promising economic potentials live in countries with developing and emerging economies. In the Asia-Pacific region alone, they suffer the loss of \$42 until \$46 billion on their GDP due to the inability of women to fulfill their economic potential. In the Middle East and North Africa (MENA) region, enhancing the rate of female participation in labor market will increase household income by 25%, and if educated women in the region are employed in paid work, their GDP will be increased by 30% or \$363 billion (International Finance Corporation). When these women are employed, they will be more likely to supplement another household income, which would contribute to the efforts to escape poverty (International Labour Organization, 2018).

Another research by Elborgh-Woytek, et al. proves that the enhancement of female labor force participation will result to more skilled labor force, particularly if women have high education levels. Another research by Aguirre, et al. (2012) as cited by Elborg-Woytek, et al. (2013) also shows that if female labor force participation is enhanced, there will be “*higher expenditure on school enrollment for children, especially girls*” due to the tendency of women to invest their household income in the education of their children. This will increase the number of educated girls who will become female leaders in the future.

From the aforementioned statistics, it is seen that enhancing female labor force participation, especially in countries with young emerging economies, will accelerate the growth, and more employed women also mean more revenue for the government from taxes of personal income and payroll tax. Besides, the versatility that women have in mastering multiple skills at the same time should be utilized to fulfill their economic potentials. The potentials of women to have greater share in employment to overcome the problem of the decreasing number of workforces should receive further attention from all parts of the society.

5. The Progress of Automation and its Impacts in ASEAN and Indonesia

Based on the report established by McKinsey in 2017, titled “A Future That Works: Automation, Employment, and Productivity,” automation is the answer of the demand in accelerating GDP growth and eliminating growth gap in various countries, particularly those countries which are facing the reduction of working-age populations. Research by the McKinsey Global Institute shows that there is no doubt that automation -- which substitute labor force on work activities -- will significantly increase productivity by 0.8 to 1.4 percent annually in 2065, which will contribute to the goal of per capita GDP growth (Manyika, et al., 2017).

The problems faced by countries with shrinking number of full-time workforce and their ambition to maintain long-term growth create a trend to depend on automation, especially countries with aging developed economies and aging emerging economies. These countries have deficit on full-time equivalent (FTEs) for both medium-term (2030) and long-term (2065) period. However, research by McKinsey Global Institute once again displays that countries with young emerging economies, such as India, Indonesia, Mexico, Nigeria and South Africa will have surplus of full-time equivalent (FTEs) workforce in medium term (2030) and long-term period (2065).

Despite the positive implications that automation brings, there are several concerns on how this substitution will harm the existing labor force. The research done by McKinsey Global Institute in 2017 shows that sectors which incorporate physical work in a predictable environment as well as data collection and processing are most likely to be affected, such as production workers, building and ground cleaners, office supports like clerks and administrative assistants. However, doctors, health aides, care providers, engineers, and business specialists are less exposed to be substituted by automation.

In ASEAN, nearly three in five jobs face a high risk of automation (Hee-Chang & Huynh, 2016). The sectors that are most exposed to the impact of automation are jobs in hotel and restaurant, wholesale and retail trade, and construction and manufacturing industries. Meanwhile, the risk of automation in Indonesia is 56%, and the risk is even higher for self-employed or own-account workers in Indonesia, reaching 64%; the highest among all ASEAN-5 countries (Hee-Chang & Huynh, 2016). For wage workers, 56% of them are exposed to high-risk of automation. In various sectors, the number is even higher than 56%, such as 64% of garment wage workers and 60% of salaried workers in electrical and electronic sector, while 85% of retail wage workers and those in banking sectors, such as bank tellers and accountants, are in high-risk of automation (Hee-Chang & Huynh, 2016).

These statistics show that the trend to depend on automation begins when the demand for growth is increasing, but the labor force that can be utilized to achieve that target has been exhaustive. Countries with emerging economies with high number of workforces in productive age have more options rather than fully dependent on automation and technology. More workforces in productive age, balanced with the increasing rate of labor participation among them will be a better option rather than substituting the existing workforces with automation. The demographic bonus being experienced by most of the countries with young emerging economies shall be utilized better to the maximum potential that will enable countries to achieve the target of medium-term and long-term growth. Thus, there should be appropriate strategies to protect workers facing high-risk from automation.

6. The Impact of Automation towards Women

Women are more exposed to the bad impacts of automation due to the fact that women are only concentrated as employees in several sectors, and those sectors have highest risk of being automated. The data in 2018 by World Economic Forum stated that by 2026, 1.4 million

jobs will be lost to automation, and 57% of them will belong to women. The greater percentage of women being vulnerable to automation is caused by the uneven employment rates between men and women in several sectors, meaning that most women are employed in certain sectors with unequal distribution in other sectors.

In ASEAN, the fact that over 70% of workers in Textiles, Clothing and Footwear (TCF) industry are women can prove their vulnerability to be substituted by automation. In Indonesia, although the workers in TCF industry do not constitute most of the total employment in Indonesia – only 25% of total manufacturing workers – but higher percentage of women are employed in this sector. This happens because TCF industry requires workers with less skills and less educational requirement, which then attract low-skilled women with low education in productive age. Not only TCF industry, retail also becomes the sector which has the highest percentage of risk in regards to automation in Indonesia. The figure shows that 50% of the retail workforce are women, which once again displays how employed women in this sector are threatened if proper strategy is not made. Moreover, Robotic Process Automation (RPA) and Artificial Intelligence (AI) being used in financial sectors will also threaten women who currently hold a higher share of employment as technicians, or in roles providing clerical, sales, or administrative support (Ernst & Young, 2017).

Overall, most Indonesian women are employed in occupations who are at high risk of automation, with 1.5 times higher probability than their male counterparts (Chang, Rynhart, & Huynh, 2016). Not only that, employed women in Indonesia have higher percentage than employed men to be at high-risk of automation, which is 57.3% compared to 55.5% (Hee-Chang & Huynh, 2016). Globally, after most of the employed women experience massive job losses due to automation, they will have less job opportunities, as stated by the World Economic Forum's report in 2018. Without a proper additional training, women will have 12 job options while men will have 22 job options. Even with an additional training, women will only have 49 options while men will have 80 options.

However, hope is still there for female workers. Research conducted by PwC shows that there are different waves of automation which covers three periods. The first wave is called “algorithmic”, covering short-term period that has been ongoing to early 2020s. The second wave, “augmentation”, is expected to range until late 2020s, while the third wave, “autonomy” will be happening until mid-2030s. The first and second wave will impact the jobs of which women have greater share on employment, such as clerical and administrative functions. On the

other hand, the third wave will affect jobs where men have greater share of employment, such as vehicles and transportation manufacturing (PwC United Kingdom, 2017). Therefore, from the statistics above, although female workers will be the most affected by automation over the next decade, male jobs will face higher risk in the longer term. In a broader context, women are employed in sectors which are less impacted by automation, such as health and education sectors, due to the nature of those sectors which need more personal and social skills that belong to most women workers.

The statistics above portrays both the importance and the possibility of creating a proper strategy to address the optimization of the advantage of automation without exposing women workers to the harmful effect of automation (Nelson, 2018). Appropriate measures to protect women against the harmful effect of automation while at the same time advance their lives through employment in more diverse sectors shall be initiated by countries adapting to automation, including Indonesia.

7. Analysis of Related Regulations on Automation in Indonesia and Government's Responses towards Automation

Since the law that contains the implementation of automation as well as the obligations and rights for employers and employees in the era of automation is still unavailable, reference to Indonesian labor law needs to be analyzed. Labor forces in Indonesia are governed by Law No. 13 of 2003 on Manpower. The main provisions that are crucial in relation to automation are regarding termination of employment.

The termination of employment is governed in Chapter XII, Article 150 – 172. It is stipulated in Article 151 that the entrepreneur, the worker and/or the labor union, and the government should prevent termination of employment from taking place. If the termination of employment still needs to be done despite all efforts being made, the intention to carry out the termination of employment shall be negotiated between the employers and the labor union or between the employers and the workers themselves. If the negotiations fail to result in an agreement, the termination of employment would only happen after the institute for the settlement of industrial relation disputes issue a decision that permit the termination of employment to happen.

The reasons of terminating an employment are strictly regulated within the labor law, as stipulated in Article 153, and any reason to terminate an employment other than the ones stipulated in Article 153 will be declared null and void. Besides, if the employers still terminate the workers from their jobs without any final decision from the institute for the settlement of industrial relation disputes – following the failure of negotiation between the employers and the workers or the labor union – that termination of employment will also be considered null and void by the law. This means that the employers are obliged to reemploy the affected workers.

After the termination of employment is initiated, the employers have the obligation to pay the workers with severance pay or service rewards as well as compensation pay for rights or entitlements that the dismissed workers have not utilized. Indonesian labor law regulates specific payment for the workers based on the duration of their employment.

By connecting such provision to automation, the employers are still obliged to do all necessary attempts to prevent the termination of employment to take place, although the automated technology are most likely to replace the workers in certain jobs. In addition, if the employers decide to terminate the workers from their jobs, the employers are obliged to negotiate with labor union and/or with the workers themselves. If the negotiation fails to result in any agreement, the matter should be brought upon the institute for the settlement of industrial relation disputes for final decision. If the employers still terminate the workers only with the basis of replacing them with certain technology, or without any decision from the institute for the settlement of industrial relation disputes, the termination of employment will be regarded as null and void by the law, and the workers still have the rights to work.

Another challenge that remains problematical and need effective approach is education and training. Research shows that workers without secondary education are most likely to be highly affected by automation. This is because they are employed in sectors which require fewer professional skills, such as manufacturing and transportation that are most vulnerable to be affected by automation. Such condition also exists in Indonesia. To overcome that challenge, the government has initiated several training programs for workers, such as through job training center under the supervision of the Ministry of Manpower. On the other hand, the Ministry of Education and Culture also works hand in hand with the Ministry of Manpower, in assessing the performance of training providers. The certification is accredited by the Professional Certification Coordinating Board (BAN-PNF).

Despite a good initiative by the government, there are several obstacles that remain a challenge. First, in regards to the supervision of the job training centers that spread all over Indonesia in several districts. The standards are already established, but to ensure that these job training centers fulfill the established standards, good scheme of monitoring also needs to be initiated. The problem lies on how the Ministry of Manpower possess no direct control towards the job training centers; it depends on regional and/or local authorities (Skjaerlund & Loop, 2015). The second problem is in regards to the private training providers. Although the government has engaged with private institutions to provide trainings for the workers, these training providers are not assisted and monitored by the government, resulting in the absence of updated information on the status of the training providers – whether they are still active or not – and the scope of training given. The last problem in regards to training is the inadequacy of equipment and facilities used to conduct the training optimally (Skjaerlund & Loop, 2015).

Based on studies, in Indonesia, education and health sectors have lower risk of automation. Indonesia currently open up more government employees in education, health and infrastructure sector, which is in line with the long-term plan of the President of the Republic of Indonesia, Joko Widodo. It is specifically stated that the government need the workers to be positioned as technical staffs. Currently, the statistic in Indonesia shows that the government employees in administrative sectors reach 38% of all government employees, amounting for 1.6 million workers, while technical workers only compose of 8.6% of all government employees. This unbalanced statistic is trying to be accommodated, considering the capacity that is needed in local governments as well as other government's institutions (KlikSatu, 2018).

8. Recommendations

Since female workers are more vulnerable to the adverse effect of automation compared to men, with more possibility of increasing gender disparity in workplaces, a better protection mechanism for female workers as well as temporary special measures should be initiated. The first measure that should be done is regarding the modification towards the provisions on termination of employment. Second, standards of training for the female workers should also be established. Third, transparency in relocation of female workers as the result of automation. The last measure is diversification of sectors that are accessible for women to work as well as creating special quota for female workers in sectors that are most vulnerable to the impact of automation.

In regards to the termination of employment, some modifications need to be made in order for workers to be more protected in the era of automation. The recommended modifications are as follows:

- a. Addition of specific clauses regarding automation in the work agreement between the workers and the employers, which should include the obligations and rights of both employers and workers in accordance to Indonesian labor law. The work agreement should also state clearly the incentives that should be paid by the employers for the workers. This provision wouldn't be implemented in all sectors simultaneously, but will be prioritized in sectors that are the most vulnerable to be impacted by automation until 2030.
- b. Creation of a more specific indicator of "efforts" that need to be done by the employers to prevent the termination of employment to take place, such as the obligation for employers to give trainings for certain period of time for the workers who are most likely to be replaced by automated technology, and some kind of "probation period" for the workers to implement the skills gained from the trainings. Besides, an alternative sector or part of the business entity that is suitable for the workers should also be considered by the employers, so that instead of terminating the workers, they can be allocated to another sector, especially with the possibility that automation will create more jobs.
- c. Addition of the conditions which are not allowed to become the basis for termination of employment. One of the examples is if the employers terminate the workers only to replace them with automated technology without any training or work allocation alternative provided
- d. Addition to the compensation pay given to the workers being replaced by automated technology which should also consider the following circumstances:
 - If the initial contract hasn't been ended, the compensation should also include the remaining time of their initial contract multiplied by the pay they will receive per month or per day or per hour
 - Increase the rate of compensation and service fee given for the workers who are dismissed

The second measure is to establish a clearer and more specific standard for training, especially for female workers. The establishment of such standards aims to ensure that the training will be effective, and the female workers are able to implement the skills gained from the trainings. Besides, the same standards will apply to all employers, meaning that female workers that have passed the trainings are recognized by other employers or business entities within the same or similar sector, even in other sectors. The creation of the module for trainings shall also consider the level of education, technology literacy, and the work experience of the female workers. Currently, the conduct of the trainings for the workers is governed under the Government Regulation No. 31 of 2006 on National Work Training System and the Regulation of the Minister of Manpower and Transmigration No. 7 of 2012 on Cooperation on Job Training Center Usage by Private Entities. The trainings will still adhere to the relevant laws and regulations, with the enhancement that focuses on the method of delivering the training.

In regards to the training system, Indonesia with other countries with young and emerging economies as well as the developed countries can share best practices on the most suitable method for the training, particularly in terms of educating and training female workers. ILO or relevant regional organization shall be the facilitators. Besides, local government needs to provide data on the number of female workers that are at high risk to be automated and the automation-prone sectors in which more female workers are concentrated. This data will be the basis to conduct such training.

Furthermore, Ministry of Manpower, by working together with Ministry of Internal Affairs as well as the local governments shall initiate the establishment of new training and certification institutions, especially in rural or underprivileged areas with low number of training and certification institutions. Aside of that, this program should be based on the number of women and girls in productive age with no adequate education to work, as well as the sectors of business entities and/or companies existing in each region. This aims to create a system of training which is based on the skills needed and skills lacking. Thus, the government, led by the Ministry of Manpower by involving private entities and other related institutions shall conduct data collection on the level of education among women and girls with productive age, the sectors in which existing business entities and/or companies are operating, and the number of training institutions that have been operating. Afterwards, the government can give assistance towards the establishment of new training and certification institutions with women as the central target and priority.

The training conducted by job training centers should be monitored by the central government, which is the Ministry of Manpower itself. Centralized control is needed to ensure the fulfillment of standards on the training itself, so that there would not be any crucial gap of discrepancy between the trainings in different regions. Besides, the training providers from private entities shall be assisted in conducting the trainings, so that it will not deviate from the standards that are implemented by the government's job training centers. Better coordination between government's training centers and private training providers shall be initiated to prevent any redundancy and encourage more optimization of each institution.

Another measure, which is the transparency of jobs relocation for female workers should also be ensured by the employers, since different employers have different requirements and regulations, even different pay and working hours. Business entities, by involving the participation of the labor unions or the workers themselves, should ensure that female workers that are dismissed will obtain new occupations with the same quality. They also need to consider the household commitment that the female workers have.

The local government has the duty to monitor the implementation of such relocation, so that the relevant business entities will not deviate from the standards. Compliance mechanism shall be well-established, with continuous violations will result in the operational sanctions given under the authorization of the central government. Such mechanism will protect female workers from unfair termination by the business entities. The continuation of these practices will be a good precedence for the upcoming years on how business entities put more concerns on the lives of female workers, which – in the longer term – will encourage more women to work, which would further increase the female labor force participation in Indonesia.

The last measure is regarding diversification of sectors which accept more female workers and creating special quota for female workers in those sectors. As aforementioned, health and education sectors, as well as social works, have lower risk of automation compared to other sectors, thus the creation a special quota for women and girls in those sectors benefit most of the educated women in relevant sectors who are still seeking employment. The recruiters shall also be informed on the potentials and benefits that female workers can bring if their participation is enforced. The government can also encourage investors and private entities to diversify their works to accommodate more women to be employed in occupations at lower risk of automation, especially with the potentials of new jobs being created as the result of automation itself.

Other than such measures, the government also needs to keep tracking the readiness and the progress of business entities in regards to automation, as well as the possibility of new created jobs as the result of automation. The protection scheme that is going to be established should also be frequently monitored by the government to prevent any violation by the employers. Clearer flow to complain to the stakeholder or related government official in this matter also needs to be established, by accommodating trade or labor union to receive the complains and submit it to the authorized government official. In terms of education, the government can encourage schools and teachers to equip the students, especially female students, with skills and other requirements that can match the jobs in the future.

9. Conclusion

We may not be able to undo what already happened, but we are still able to prepare for the future. It's time for the government to acknowledge the potential of women and girls in development process. Enhancing female labor force participation by removing barriers in legislation, diversifying the sectors in which women can work with better pay, as well as encouraging women to be positioned as board members or the decision makers in the companies would boost economic growth in every country better than what automation can do. Since countries with young emerging economies have the surplus of Full-Time Equivalent (FTE) until 2035 and 2065, with women composed almost half of the total FTE, women can be the solution.

Although automation can be a solution towards the shrinking number of FTE in developed countries, the writer realizes that automation can only replace the human labor force in few sectors, while women and girls can work in almost all sectors. Considering this potential that women and girls can have, protection mechanisms as stipulated in the recommendation part of this paper have to be well-established, to ensure that automation wouldn't hamper the participation of women in labor market.

10. Further Research

Further research on the impact of automation towards female labor force in Indonesia shall focus on how women are progressing to become significant part of labor force with a more comparative analysis being done. Specific work sectors where women can contribute the most compared to automated technology, especially in Indonesia and other developing countries that

are competing with automation will also be identified, wishing that the research will be beneficial to assist the government in determining the best decision.

Further research will also analyze the gaps that hamper women to participate in the labor force, especially in the each region in Indonesia through regional or domestic-level regulations, enacted by provincial or district government. Aside of written laws and legislative products, further research will also cover the policy, commitment, and plan set up by the government in each level on how they can prepare women to face automation better.

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