



SETARA: Reformulating legal protection for women workers amid the evolution of artificial intelligence

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ABSTRACT

Background: The rapid development of Artificial Intelligence (AI) has reshaped the global labor market and poses significant challenges to female workers, who are more likely to be employed in repetitive and data-based sectors vulnerable to automation. This study aims to examine the urgency of legal protection and labor law reform in Indonesia to address the potential risk of unemployment, gender discrimination, and social inequality arising from AI-driven automation. Previous studies have highlighted that women face structural disadvantages in the labor market due to their concentration in low-wage sectors and limited access to digital skills, as also emphasized by UNESCO. However, existing Indonesian labor regulations, such as the Manpower Law and Job Creation Law, have not explicitly regulated the impact of AI in employment. **Methods:** The research applies a normative juridical method with a statutory, conceptual, and comparative approach, supported by literature reviews of international practices in Germany and Singapore, where governments have initiated reskilling and vocational education policies to mitigate the impact of AI. **Findings:** Findings reveal that the absence of specific legal provisions in Indonesia leads to legal uncertainty and weak protection for women workers facing layoffs due to automation. This study proposes the concept of SETARA (Strategy for Empowering and Transforming Women's Labor) as a strategic model to strengthen the role of female workers. The strategy consists of three core elements: reskilling, upskilling, and labor law literacy, implemented through a pentahelix collaboration involving government, businesses, society, academia, and mass media. **Conclusion:** The principal conclusion is that labor law reform in Indonesia must be adaptive to technological disruption and inclusive of gender perspectives to ensure sustainable and equitable labor protection. **Novelty/Originality of this article:** The novelty of this research lies in integrating gender-sensitive legal reform with AI governance through the SETARA model, which provides an innovative framework to balance technological advancement with social justice.

KEYWORDS: artificial intelligence; female labor; labor law reform; legal protection; SETARA.

1. Introduction

Het recht hinkt achter de feiten aan, the law has always limped after the changing times. Today, the development of Artificial Intelligence (AI) has significantly changed the pattern of life of society and government. Artificial Intelligence (AI) is a computer program that uses algorithms to learn from data and think and act like humans (Supriyadi & Asih, 2020). These changes cover various aspects of life, such as social, cultural, economic, and environmental (Judijanto & Muhdiarta, 2025). The goal of AI is to facilitate human activities, saving time and energy. Artificial Intelligence can be defined as an area of research, application, and instruction focused on programming computers to perform tasks that, from a human perspective, are intelligent. Artificial intelligence (AI) is supposed to help humans, not

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replace them. However, this development has created serious challenges in the labor sector. Discrimination against women workers is becoming an increasingly urgent and relevant issue. Women workers are vulnerable to layoffs due to the evolution of AI (Harahap, 2020).

Philosophically, the community's right to obtain employment has been mandated in the Constitution. Article 27, paragraph (2) of the 1945 Constitution reads: "Every citizen has the right to employment and a decent livelihood befitting of humanity." The article has implications for realizing citizens' rights to employment and a decent life. The provision is reaffirmed in Article 28D, which states that everyone has the right to work and to receive compensation and justice in the course of employment relationships. Pancasila, as the philosophical basis of the Indonesian nation, provides a comprehensive value framework for regulating various aspects of social life, including employment. Each of the precepts in Pancasila has a deep relevance to industrial relations, workers' rights, and equitable economic development. Based on the description of the precepts of Pancasila, there is a humanist, democratic, and social-justice system at both the national and international levels, but the Bloomberg Intelligence Survey predicts that at least 200,000 workers on Wall Street will disappear over the next three to five years. This is because AI has encroached on tasks currently performed by human workers (Shaw, 2025).

On a practical level, the development of AI is replacing human roles in the workforce. According to the World Economic Forum, AI is automating faster than expected, replacing 85 million jobs worldwide (World Economic Forum, 2020). However, one issue that requires special attention is the impact of automation on gender. Reporting from the International Labor Organization (ILO) data, it is known that the female workforce is twice as likely to be affected by AI automation (Gmyrek et al., 2023)

Philosophically, the community's right to obtain employment has been mandated in the Constitution. Article 27, paragraph (2) of the 1945 Constitution states that "Every citizen has the right to employment and a decent livelihood befitting of humanity." This constitutional guarantee reflects the state's fundamental obligation to ensure that every individual has access to meaningful and dignified work. However, this ideal faces a growing challenge in the modern era. Based on sociological studies, there is a paradox: AI, which was developed to improve productivity, has become a significant threat to workers—particularly those in companies that have adopted AI-based technologies. According to Prof. Dr. Sri Herianingrum, SE., M.Si., an economics expert at Airlangga University, the threat of AI implementation will disproportionately target low-skilled workers, as their repetitive and routine tasks can be easily automated by robots, ultimately reducing the overall workforce (Nurdiansyarani, 2024).

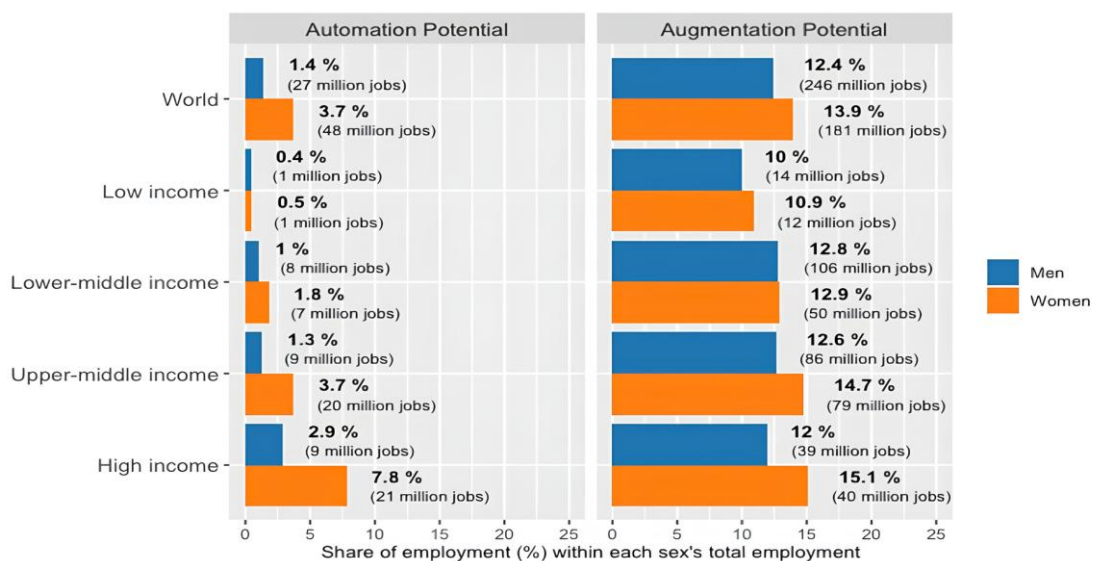


Fig. 1. Comparison chart of the impact of gender-based AI (ILO, 2023)

Based on the figure above, it is known that 3.7 percent of all women's jobs in the world are in jobs that can potentially be automated with AI technology, compared to only 1.4 percent of male workers (Nurdiansyarani, 2024). Sri Mulyani Indrawati, Minister of Finance, stated that 60% of the female workforce in Indonesia work in the informal sector which lacks social protection and low wages (Kristianus, 2023). This statement is supported by data from the Central Statistics Agency (BPS) in 2021, that women workers in the informal sector include sales workers, agricultural workers, laborers, production workers, professional workers, service workers, administrative workers, and leadership and management workers (Zulfiyandi, 2021). More than 60% of jobs in the manufacturing and agricultural sectors are at risk of being replaced by automated technology (Arief, 2025).

The impact of Artificial Intelligence (AI) on the female workforce is a complex issue that carries significant social, economic, and legal implications. One of the most concerning consequences is the potential for increased gender discrimination in the workplace, particularly as the integration of AI may reinforce existing biases in recruitment, promotion, and task allocation. Furthermore, the rise of automation and AI-driven technologies has led to a surge in unemployment due to large-scale layoffs, disproportionately affecting women who often occupy positions most vulnerable to automation. This trend contributes to a significant reduction in employment opportunities for women, thereby widening the gender gap in the labor market.

Several previous studies have shown that AI has varying impacts on the world of work, depending on the industrial sector affected. The manufacturing and transportation sectors are two fields most impacted by this automation. This is because previously workers in the manufacturing and transportation sectors worked manually, but are now being replaced by robots and autonomous vehicles (Sulianta, F., 2025). Artificial intelligence has the potential to automate repetitive work and improve efficiency. However, behind these advantages, there are concerns that artificial intelligence can replace the role of human workers (Afandi & Kurnia, 2023). In addition, sectors vulnerable to being replaced by AI are jobs in the administrative field, such as data and document processing, because they can be replaced by machine systems and due to their repetitive nature (Siti Masrichah, 2023).

The use of AI in the workplace comes in many forms, such as industrial robots on manufacturing production lines, chatbots in customer service, and predictive algorithms in financial analysis. However, this phenomenon also poses new challenges for workers, especially in terms of adapting to technological changes and improving skills in line with the evolving needs of the industry. In the Indonesian context, these challenges are further exacerbated by the absence of specific regulations that govern the use of AI in the employment sector. While general labor laws exist, they do not yet address the unique risks posed by technological disruption, particularly in safeguarding the rights of women workers. This regulatory vacuum raises a critical legal question: *quo vadis* legal certainty in the protection of workers, especially women, who are adversely affected by layoffs resulting from AI automation? Without a clear legal framework, women workers remain highly vulnerable to economic instability and social inequality, underscoring the urgent need for comprehensive policies that balance technological progress with social justice and gender equality.

Indonesia does not yet have specific regulations governing the use of artificial intelligence (AI), especially in labor law. Additional regulations are necessary concerning the transfer or change of technology from This includes restrictions and accountability for the use of AI in cases of error, as well as the transfer of technology from human labor to AI. Regulations on the use of AI do not limit innovation and technological development. Instead, they aim to strike a balance between technological progress and the protection of basic human rights. These regulations allow humans and technology to work together and complement each other. Article 1 paragraph 3 of the Constitution of the Republic of Indonesia states that Indonesia, as a country based on the rule of law, has an obligation to provide legal certainty for its people in various aspects, one of which is labor law. This must be provided fairly and equally to all people, especially female workers.

In addition to clear and detailed regulations, strategic actions are needed to support the development and improvement of workers' skills, especially female workers. These strategic actions are a form of implementation of worker skill improvement. Through these strategic actions, competent workers in their fields will be produced, so that the presence of AI does not result in their work being displaced by automation. Instead, AI becomes a helper and enhances work. This way, workers, including female workers, will not easily lose their jobs. These strategic actions are designed to adapt to workers' abilities and not burden them. In this case, strategic actions can be realized with the assistance of stakeholders who are able to support these actions. Strategic actions provided to workers can include: Reskilling, Upskilling, and Employment Law Literacy.

2. Methods

2.1 Research design

This study employs a normative juridical research method. This approach focuses on examining applicable laws and regulations as the primary basis for analysis. It is doctrinal in nature, meaning that the research emphasizes the internal consistency of positive law in addressing legal issues (Benuf & Azhar, 2020). Rather than investigating empirical phenomena, this design aims to construct legal arguments by analyzing norms, principles, and doctrines embedded in the legal system.

2.2 Research approach

To ensure a comprehensive and systematic legal analysis, this study adopts three main approaches: the statutory, comparative, and conceptual approaches. The statute approach is used to examine relevant laws and regulations governing employment. The comparative approach enables the analysis of similarities and differences across legal systems or regulatory frameworks. Meanwhile, the conceptual approach is employed to explore legal doctrines and principles that underpin the issue under study. The combination of these approaches provides a strong analytical and conceptual foundation for developing coherent legal arguments.

2.3 Data sources

This research relies on a literature review of legal materials, categorized as primary, secondary, and tertiary sources. Primary legal materials include authoritative sources, such as employment laws and regulations (Marzuki, 2022). Secondary legal materials include scholarly works such as journal articles, books, expert opinions, and previous research findings that support and interpret primary sources. Tertiary legal materials are used to complement and clarify the other materials, including general references and relevant information obtained from credible online sources.

2.4 Data analysis

The analysis of legal materials in this study employs an interpretative method to construct coherent and systematic legal arguments. This process begins with the identification and collection of relevant legal sources, including statutes, regulations, and supporting literature that directly relate to the research problem. These materials are then critically examined to uncover the underlying legal principles, norms, and doctrines embedded within the texts. The interpretative process does not merely restate legal provisions but seeks to analyze their meaning, scope, and implications in addressing the issues under study. In doing so, the researcher applies logical reasoning to connect various legal sources and to resolve potential inconsistencies or ambiguities within the legal framework. The

analysis ultimately focuses on identifying key elements essential to answering the research questions, ensuring that the resulting arguments are not only systematic but also grounded in a clear and defensible interpretation of the law.

3. Results and Discussion

In practical terms, the use of AI in Indonesia is widespread and rapid. AI has played an important role in driving innovation across sectors and strengthening Indonesia's economy, making it stronger and more recognized worldwide. Launching Mckinsey Research in 2024, the use of AI has created the opportunity to increase the value of the global economy by US\$ 11-18 trillion per year. Meanwhile, the Secretary General of the Ministry of Communication and Information in 2023, explained the results of the Kearney report that the use of AI could contribute US \$ 366 billion to GDP or the equivalent of Rp. 5.81 quadrillion (Natalia, 2024). On the other hand, the global application of AI shows that its use is increasingly widespread and recognized as an important part of business operations across various sectors.

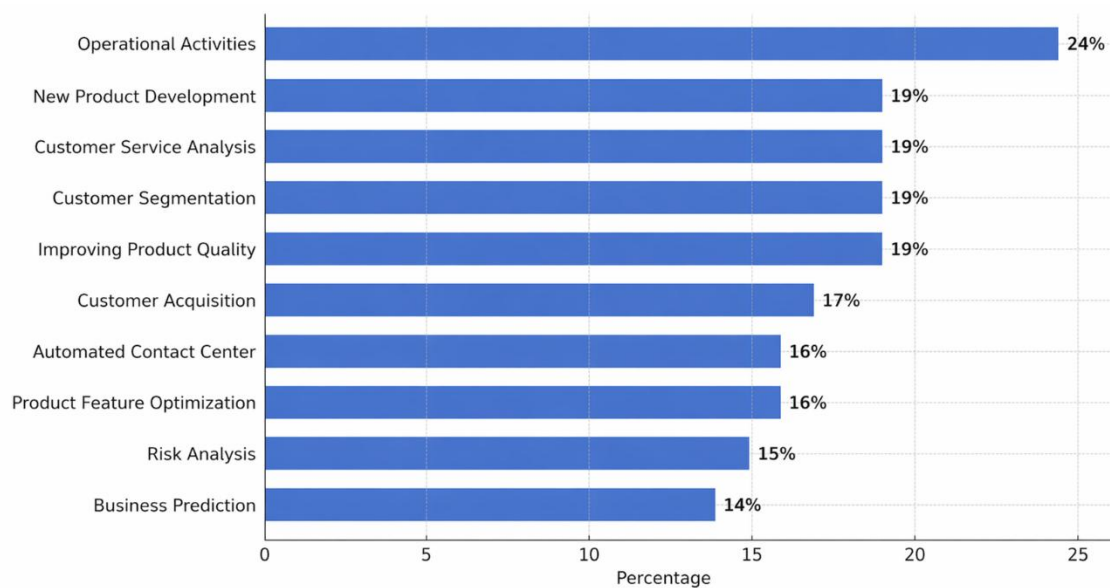


Fig. 2. Utilization of AI in Economics (Katadata, 2022)

According to the results of a McKinsey survey titled *The State of AI in 2022*, 50% of 1,492 respondents have adopted AI in their business units (Hidayat, 2023). In addition, McKinsey reported that companies with high performers in the effective application of AI increased profits by 5%. This shows that the use of AI has a significant impact on the Indonesian economy and competitiveness (Burhan, 2022). Juridically, labor protection in Indonesia has a fairly strong legal basis, mainly stipulated in Law Number 13 of 2003 concerning Manpower (Manpower Law), Law Number 6 of 2023 concerning Job Creation (Job Creation Law), and their implementing regulations. Legal protection is the protection of human rights that are harmed by other parties, so that people can enjoy the rights guaranteed by law (Harahap, 2019). With legal guarantees, workers have a stronger position in industrial relations, so that they are seen not only as a factor of production but also as a dignified legal subject. Article 4, letter c of the Labor Law reads: "Labor development aims to:... c. provide protection to workers in realizing their welfare; and ..."

Women workers generally tend to work in repetitive, administrative, and data-driven sectors, such as data entry, customer service, and routine work in manufacturing and office settings. These job characteristics have a high level of vulnerability to automation, as they are easily replaced by AI. The legal vacuum in Indonesia's labor system has implications for legal uncertainty, weak protection, and increased potential for labor discrimination, especially for women. Data shows that the Open Unemployment Rate (TPT) for women in

2024 will reach 4.92%, higher than that of men at 4.90% (Badan Pusat Statistik, 2024). This difference seems small in percentage terms, but reflects the structural vulnerability faced by women in the world of work. This is because women are still largely concentrated in low-wage and routine work sectors, such as office support staff, customer service, and other administrative work that is relatively easily replaced by AI. In addition, according to UNESCO data, women are 25% less likely than men to know how to operate digital technologies (UNESCO, 2025). This digital skills gap exacerbates women's bargaining position in the workforce, so as AI and automation become more widespread, women risk being further marginalized. Thus, the gender gap exists not only in terms of wages and job access, but also in digital technology mastery and adaptation to AI, which ultimately magnifies inequality in the modern labor market.

The doctrine of the rule of law is related to the concept of a welfare state. The implementation of the rule of law is expected to contribute to the creation of a prosperous country for all its citizens. It is very important for the Indonesian government to provide legal protection to labor, especially women. SETARA (Strategy for Empowering and Transforming Women's Labor). This concept emphasizes the importance of empowering women's labor through adaptive legal protection, increasing digital skills capacity, and guaranteeing equal access to employment opportunities in the era of automation. This idea is also in line with the Sustainable Development Goals (SDGs) agenda point 8: Decent Work and Economic Growth, which underlines the urgency of creating decent, inclusive and sustainable jobs (United Nations, n.d). Thus, the implementation of the SETARA strategy is expected to be a normative and practical basis in encouraging the transformation of Indonesian labor law towards a direction that is more responsive to technological developments as well as gender equality.

3.1 Reformulation of labor law in the face of AI implementation in the employment sector

"Law for humans, not humans for the law", Professor of Constitutional Law at Diponegoro University, Prof. Dr. Satjipto Rahardjo, through his progressive legal thinking emphasizes that the law must be oriented towards humans, not the other way around, humans are forced to submit to the law. This statement asserts that the law must be dynamic with the times (Rahardjo, 2006). The author recommends establishing a holistic and inclusive legal framework to mitigate the impact of AI automation. The rights of labor are currently regulated by the Manpower Law and Law Number 6 of 2023 on Job Creation (the Job Creation Law). However, the Constitutional Court Decision No. 168/PUU-XXI/2023 requested that lawmakers remove labor rules from the Job Creation Law and enact a new law. The Constitutional Court gave a maximum of 2 years to form a new Labor Law. Therefore, it is important to involve all stakeholders and communities (companies and workers) in a discussion on the new Labor Law (Hukumonline, 2024).

In the verdict, seven issues were discussed, including unlicensed foreign workers, fixed-term employment agreements (PKWT), outsourcing, leave, wages, severance pay, and termination of employment (PHK). Based on this decision, lawmakers must enact a new labor law within 2 years. Based on House Decision No. 64/DPR RI/I/2024-2025, the Bill on the Third Amendment to the Manpower Law is included in the 2025 Priority National Legislation Program (Prolegnas) (DPR RI, 2024). This revision shows the commitment of national law to protect the workforce. The effort is expected to address various labor issues arising in the digital era, including the risk of replacing human labor with artificial intelligence (AI) technology. Thus, the renewal of labor regulations is not only corrective to the weaknesses of previous laws but also anticipatory of the future challenges of the world of work (Marwala & Mpedi, 2024; De Stefano, 2019).

The author recommends reforming the new Labor Law to account for the use of AI and labor security. In comparison, Germany and Singapore have developed policies to deal with AI implementation in the labor sector. The German government and industry sector are working together to provide relevant training for workers at risk of losing their jobs due to

AI automation. The Singapore government also provides vocational education that matches the needs of the industry. Both countries show that collaboration between government, industry and educational institutions is key to maintaining job sustainability. Therefore, Indonesia also needs to formulate a similar strategy in order to protect workers, especially women, while ensuring the readiness of the workforce to face digital transformation (Lestari et al., 2025).

Currently, the female workforce has difficulty finding employment. So, to ensure women's participation in the workforce, laws must support gender equality in the labor sector. Policies such as reskilling, upskilling, and legal literacy are very important for women workers, which are regulated in law. In addition, in the reformulation of the Manpower Law, it is important to include guarantees for the reasonable use of AI and remain under human supervision. It is necessary to involve stakeholders and the community (companies and workers), as well as experts in the field of information and technology in the formulation of AI regulations. This is so that the presence of technology not only increases efficiency, but also creates social justice in the world of work. Thus, the reformulation of the Labor Law must be directed towards the development of an inclusive and gender-equitable employment system. In the end, the law is expected to be an instrument that not only protects, but also empowers women to remain competitive in the era of automation. The stages of the formation of laws and regulations are as follows:



Fig 3. Flow of Stages of Regent Regulation Formation

The process of forming laws and regulations basically goes through several stages, namely planning, preparation, discussion, promulgation, and dissemination. At the planning stage, the regulation drafting agenda is included in the National Legislation Program (Prolegnas) as a priority for law formation. Furthermore, the drafting stage is carried out by the authorized institution or party by involving academics, practitioners, and related communities. Then, enter the discussion stage between the legislature and the executive to agree on the content material to be regulated. After approval, the regulation enters the promulgation stage, which is the official enactment of the law. Finally, the dissemination stage is carried out so that the regulations can be known, understood, and implemented by the wider community. By following this flow, the reconstruction of the Labor Law that includes issues of gender equality and the use of AI can be arranged in a systematic, transparent, and participatory manner. This is important so that the resulting legal product is not only responsive to technological developments, but also ensures the protection and empowerment of women workers.

The reformulation of the Labor Law in the face of AI implementation must also be based on the principle of progressive law, which views the law as a means of bringing justice and social welfare. According to Satjipto Rahardjo, the purpose of law is not only to maintain order, but also to humanize humans. Therefore, in the context of employment, the new law must ensure that automation and digitalization do not reduce the dignity of workers. Instead, the law should transform technological change into an opportunity to improve workers' quality of life. For example, AI should be positioned as a tool to support productivity rather than a justification for mass layoffs. Legal norms that regulate this balance must be explicitly stated, so that companies are obliged to prioritize reskilling programs before taking termination steps.

In comparative perspective, several countries have introduced AI-inclusive labor law frameworks that can serve as models for Indonesia. In Germany, the concept of Industry 4.0 has encouraged the government to strengthen vocational training through the dual system, where workers receive simultaneous education in schools and companies. This ensures that

when automation is implemented, workers are ready to adapt to new roles. Meanwhile, Singapore launched the SkillsFuture program, which gives every citizen access to continuous learning credits that can be used for vocational training relevant to digital industries. These two examples highlight the importance of positioning law not only as a protector, but also as a facilitator of lifelong learning. If adapted in Indonesia, the Labor Law can include articles mandating state responsibility in financing upskilling and reskilling for vulnerable groups, especially women workers.

In addition to the international models, the reformulation of the Labor Law must also emphasize gender-responsive protection. Women workers often face multiple burdens: lower wages, limited career opportunities, and vulnerability to layoffs. The implementation of AI risks widening this gap if not accompanied by affirmative policies. For instance, jobs dominated by women, such as clerical or retail work, are among the first to be automated. Therefore, the law should mandate gender-equality clauses that ensure reskilling and upskilling programs prioritize women workers in sectors at risk of automation. Furthermore, the law should also regulate digital harassment and discrimination that may arise in technology-based workplaces. This shows that the presence of AI requires a holistic view—not only of efficiency, but also of human rights in the digital era.

The process of drafting the new Labor Law also needs to adopt a participatory and transparent approach. According to the principle of democratic legislation, every stakeholder must be involved: government, employers, workers, academics, and civil society organizations. In this context, labor unions and women's organizations must be actively invited to contribute to policy formulation. This is important so that the law reflects real needs in the field, not just elite interests. The use of digital platforms for public consultation can also be an innovation in the drafting process, ensuring that the voices of grassroots workers are heard. By involving workers directly, the legitimacy and effectiveness of the new law will be stronger.

Furthermore, the reformulation of the Labor Law must consider the ethical dimension of AI. Several international frameworks, such as the EU AI Act, emphasize the principles of transparency, accountability, and human oversight in AI implementation. These principles can be adopted into Indonesian law by requiring companies to disclose the extent of AI use in the workplace, ensuring that final decisions affecting workers—such as recruitment or dismissal—remain under human authority, and establishing supervisory institutions to monitor compliance. With these mechanisms, workers will not be disadvantaged by opaque algorithms or discriminatory AI systems.

From an implementation perspective, the stages of lawmaking—planning, drafting, discussion, promulgation, and dissemination—must be carried out with a clear roadmap. At the planning stage, AI-related labor issues should be prioritized in the National Legislation Program. At the drafting stage, cross-sectoral teams need to be formed consisting of legal experts, IT specialists, economists, and gender specialists to ensure the law is comprehensive. At the discussion stage, open debates in parliament must be conducted with reference to empirical data from workers' experiences. At the promulgation stage, the law must be followed by derivative regulations that explain technical matters, such as the implementation of reskilling programs or procedures for AI audits in companies. Finally, at the dissemination stage, massive public campaigns should be conducted so that workers and employers understand their rights and obligations in the AI era.

In summary, the reformulation of the Labor Law in facing AI implementation must not only be corrective to past legal shortcomings, but also anticipatory of future technological challenges. By adopting progressive legal principles, comparative international practices, gender-responsive protection, participatory drafting, and ethical AI regulation, Indonesia can create a labor law that is both modern and just. Such a legal framework will not only protect workers from the negative impacts of automation but also empower them to seize opportunities in the digital economy, thereby realizing the vision of a sustainable, inclusive, and equitable workforce system in the Society 5.0 era.

3.2 SETARA (strategy for empowerment and transformation of the female workforce): Conceptualization of strengthening women's labor in the era of society 5.0

Based on the problems previously described, the author proposed strengthening the female workforce through the Women in Development (WID), Women and Development (WAD), and Gender and Development (GAD) approaches. This approach was chosen because it can provide a comprehensive perspective on the role of women, both as subjects and objects of development, thereby making the resulting policies more inclusive. Thus, the strategy offered not only focuses on legal protection but also on empowering and transforming the role of women in facing the challenges of the digital era. SETARA is broadly divided into 3 strategic steps, namely:

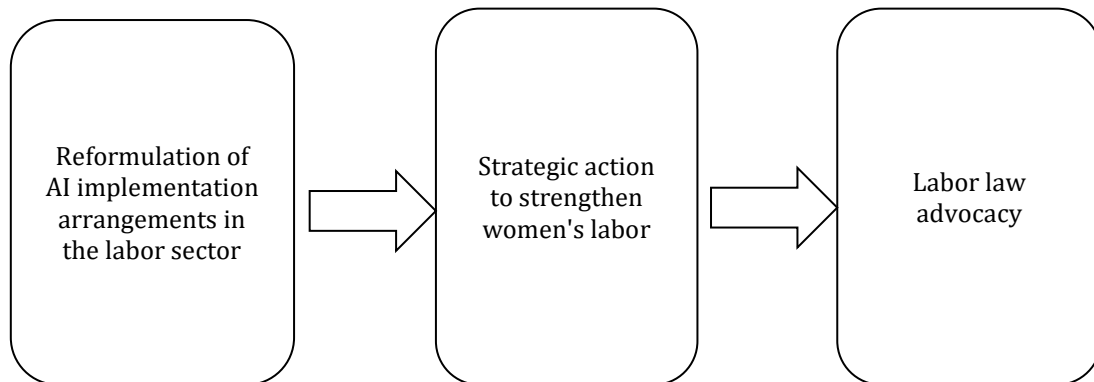


Fig 4. SETARA strategy construction flow

Prof. Dr. Sri Herianingrum, SE, M.Si., an economist from Universitas Airlangga, said that the threat of AI implementation in companies targets low-skilled workers. Low-skilled jobs can be automated by robots, thereby reducing the number of workers (Nurdiansyarani, 2024). The author conceptualizes strategic actions to transform women's workforce empowerment. The WID approach emphasizes equal opportunities and the role of women in development. The WAD approach emphasizes the relationship between women and the development process. Meanwhile, GAD emphasizes state participation to support women's emancipation (Harini, 2023). Through the integration of these three approaches, it is hoped that legal and policy strategies will be born that are not only protective but also transformative. This is important so that women workers are able to survive, be competitive, and adaptive in the era of automation. Thus, the roles of the state, the industrial sector, and civil society are key to achieving gender justice in the modern labor market. Strategic actions to strengthen the role of women workers need to be incorporated into the revision of the Manpower Law, because policies without a legal basis can create legal gaps and cause problems (Habibani et al., 2024).

The crisis in law enforcement in the labor sector due to AI automation suggests weak protection of labor rights. According to Prof. Dr. Rachmad Safa'at S.H., M.Si, advocacy is an organized and structured individual/group activity to influence the government in making policies in political, economic, and social institutions (Safa'at, 2023). Advocacy is carried out through the Participatory Action Research (PAR) method, which studies the condition of the community from, with, and by the community itself, through research, education, training, and action. Advocacy is a step to voice the needs of the workforce. Through advocacy, the voices of vulnerable groups such as women workers can be channeled more effectively to policy makers. Thus, advocacy serves as a bridge between the interests of the workforce and the regulations made by the government. If carried out consistently, advocacy can encourage the birth of policies that are more fair, inclusive and responsive to technological challenges. The following are strategic actions to strengthen women's labor, including:

Table 1. Strategic actions to strengthen women's labor

No.	Strategic action	Description
1	Reskilling	<p>Reskilling is the process of learning new skills that differ from those of the previous job to take on a different job than the current one. The author suggests training programs tailored to industry characteristics and labor market needs, such as: a) Digital marketing training for retail workers, so that they are able to utilize online platforms to expand sales reach. b) Software developer training for banking workers, so that they can develop digital systems that are more secure and efficient in financial services. c) Data analytics training for manufacturing workers, so they can process big data to improve productivity and production effectiveness.</p> <p>In addition to technical training, the government and companies also need to provide adaptive curriculum, certified instructors, and access to technology-based learning facilities. Thus, the reskilling program can be sustainable and measurable, and address employment challenges in the digital era.</p>
2	Upskilling	<p>Upskilling is the procedure of upgrading new skills or training to improve the competence of current workers in the same line of work. Through formal/informal training, workshops, online courses, and self-learning. The application of upskilling aims to ensure that the workforce is not left behind by rapid technological developments and can adapt to changes in an increasingly digital work environment. In addition, upskilling increases the bargaining power of workers in the labor market because their competencies are increasingly relevant to industry needs. Thus, women workers can strengthen their position and reduce the risk of being replaced by AI-based automation.</p>
3	Labor law literacy	<p>Women workers are vulnerable to discrimination in employment. It is important for women workers to understand labor regulations. Such as considering the rules in the employment agreement, the company's guaranteed rights, the needs of labor unions, and so on. Labor law literacy can be one of the government's programs in improving labor protection. By understanding the legal aspects, women workers can be more confident in demanding their rights and avoiding harmful work practices. This literacy program also serves as a preventive measure to prevent labor rights violations. In addition, legal literacy encourages the creation of a work environment that is fairer, more transparent, and in line with the principles of gender equality.</p>
4	Risk management system	<p>Every company that implements AI is required to conduct risk management through several steps, namely identifying and analyzing risks prior to AI implementation, including projecting the form and extent of the risks involved. After that, the company must develop measures to minimize and manage these risks in its company policy. Every activity related to risk management must be carried out with the involvement of experts in the field and in accordance with the principles of AI implementation. Furthermore, the AI implementation risk management procedures are as follows.</p>

The realization of the SETARA concept uses a pentahelix collaboration approach. In this case, the author chose the pentahelix collaboration approach because the conceptualization of the SETARA strategy is not based on a single party, namely the government. Other parties, such as businesspeople, communities, academics, and the mass media, do not have a role in addressing labor issues in Indonesia. The role of these parties is as important as the role of the government in realizing an equitable employment system in Indonesia.

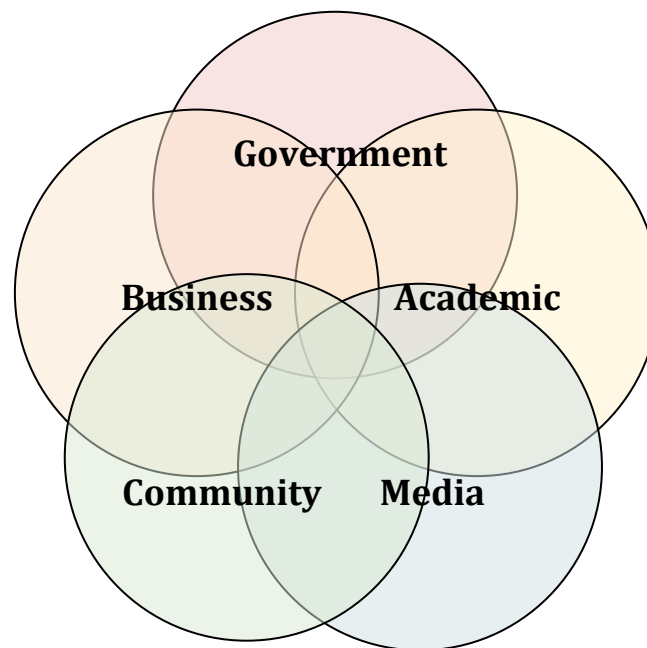


Fig. 5. Pentahelix

The Pentahelix approach is an innovation model developed from the Quadruple Helix theory. This concept is rooted in the Triplehelix theory proposed by Etzkowitz & Leydesdorff in 2000. The Triplehelix model itself refers to the interaction between government, academia, and business actors. In 2014, Lindberg developed the Quadruple Helix theory by adding society as a complement. The Pentahelix theory expands this concept by adding two important elements, namely society and the mass media, to create more comprehensive collaboration in achieving sustainable development goals. This concept was proposed by Riyanto in 2018 (Yusrodi, 2023). Each of these actors plays essential, interconnected roles in ensuring that the development of artificial intelligence remains aligned with gender equality. The government serves as both regulator and facilitator by formulating policies that are responsive to technological change while ensuring the provision of social protection, reskilling, and upskilling programs for women workers.

At the same time, the business sector, including industries and companies, is responsible for creating fair and inclusive employment practices and supporting digital transformation through non-discriminatory training opportunities and technological innovation. Complementing these roles, communities—such as civil society organizations and labor unions—function as watchdogs and advocates, ensuring that the rights of women workers are protected while fostering collective awareness of gender equality in the workplace. Meanwhile, academia contributes by providing a strong foundation of research, academic analysis, and evidence-based policy recommendations, in addition to facilitating digital skills training and certification programs tailored for women. The mass media further reinforces this ecosystem by disseminating information, raising public awareness, and shaping positive narratives about the importance of protecting women workers in the AI era, while also acting as a communication bridge between government, industry, and society.

The implementation of SETARA is not without challenges. One of the main obstacles lies in the digital divide between urban and rural areas. Women workers in rural areas often have limited access to internet connectivity, technological infrastructure, and digital literacy. Without bridging this gap, reskilling and upskilling programs may only benefit women in urban centers, leaving rural female workers marginalized. Therefore, the government needs to design targeted programs, such as mobile training centers or digital caravans, to reach marginalized groups. In addition, collaboration with local governments and community organizations is needed to ensure that training is relevant to local economic potential, such as agribusiness digitalization, eco-tourism, or small-scale handicraft

industries. By contextualizing training to local resources, the empowerment of women can run more effectively and sustainably.

Another important challenge is the cultural barrier that still places women in secondary positions within the labor market. In some regions, patriarchal values limit women's opportunities to access training, technology, or leadership positions in companies. Therefore, strengthening gender equality cannot only rely on structural changes but also requires cultural transformation through continuous awareness campaigns. The media, as part of the Pentahelix, can play a strategic role in deconstructing stereotypes by highlighting success stories of female workers in digital and technological fields. These narratives are crucial to inspire wider acceptance of women as key actors in innovation and national development.

From the business sector, the implementation of SETARA opens opportunities to create a gender-inclusive digital economy ecosystem. For example, companies can adopt gender-responsive corporate social responsibility (CSR) programs, such as scholarships for women in STEM fields, incubation programs for women-owned startups, and flexible working arrangements to support work-life balance. These practices not only enhance corporate reputation but also expand access to skilled female talent pools. Furthermore, businesses that actively support women's empowerment are more likely to foster innovation and long-term competitiveness in global markets. Academia also holds a central role in realizing SETARA by integrating gender perspectives into research and curriculum development. Universities can establish centers of excellence for women and technology, which focus on producing policy recommendations, providing training modules, and conducting participatory research with women workers. Through partnerships with industry, academia can ensure that the research produced is not only theoretical but also applicable to real workplace challenges. For instance, a collaborative research project between universities and e-commerce companies can develop training models for women micro-entrepreneurs to maximize digital platforms.

Meanwhile, civil society organizations act as a counterbalance to ensure that the interests of women workers are not neglected in policymaking. They can provide legal assistance to women affected by layoffs due to automation, organize grassroots campaigns to demand gender-responsive policies, and create peer-to-peer support networks for women entrepreneurs. With strong community engagement, SETARA can avoid being merely an elite-level discourse and instead become a movement that is felt at the grassroots. The media's role is no less important in ensuring the visibility and sustainability of SETARA. Beyond reporting, the media can initiate investigative journalism to reveal cases of gender discrimination in digital industries, or highlight best practices from companies that have successfully empowered female workers. Social media platforms can also be utilized as advocacy tools, enabling women workers themselves to share experiences, challenges, and aspirations. Thus, the media is not only a communication channel but also a catalyst for social change.

The integration of these five elements in the Pentahelix framework shows that the SETARA strategy is not only normative but also practical and collaborative. The goal is to create a future where women workers are not left behind by technological disruption but instead become agents of transformation in the Society 5.0 era. If implemented consistently, SETARA has the potential to reduce gender inequality, increase national productivity, and strengthen Indonesia's competitiveness in the global economy. In conclusion, the SETARA strategy emphasizes that empowering women workers in the era of Society 5.0 is not only about providing protection but also about preparing them to be active participants in transformation. By combining legal reforms, digital skill development, cultural change, and pentahelix collaboration, SETARA offers a holistic approach to addressing the dual challenges of gender inequality and automation. This concept illustrates that women are not merely passive victims of technological change, but can be empowered as innovators, leaders, and equal partners in building a sustainable and just future of work.

4. Conclusions

The presence of AI in the labor sector has had a significant impact on the workforce, especially women. The legal vacuum regulating AI in the labor sector is also a concern. The author designs the SETARA strategy as a solution to overcome these problems, and optimize the role of the female workforce. The SETARA strategy is actually based on the welfare of the people, as the classic adage 'salus populi suprema lex' where the welfare of the people is the highest law. However, in its implementation there are challenges such as the long process of revising laws, the lack of public legal awareness, and the uncontrolled development of AI. Overcoming this requires optimizing the role of stakeholders to encourage the realization of the SETARA strategy. Strategic actions to strengthen the role of women workers need to be accommodated in the revision of the Manpower Law, namely by increasing Reskilling, Upskilling, and labor law literacy. These efforts are made so that workers, especially women workers, are able to develop their abilities to improve the quality of human resources. With the improvement and training for workers, the quality of workers cannot be easily replaced by technology, but it is hoped that the presence of technology can be a solution to develop and optimize the ability of workers to be able to go hand in hand with the times.

The concept of strengthening women workers through SETARA does not mean abandoning the ability of technological development, but trying to optimize the development of existing AI by utilizing it through reformulation of the regulation of the application of AI in the employment sector by strengthening strategic actions to women workers whose final result can provide employment law advocacy to every woman worker. Reformulation of the Labor Law is important to contain guarantees for the reasonable use of AI and remain under human supervision. It is necessary to involve stakeholders and the community (companies and workers), as well as experts in the field of information and technology in the formulation of AI regulations.

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During the preparation of this work, the author(s) used ChatGPT to assist in generating initial drafts, refining academic phrasing, and improving the clarity of arguments, and Grammarly to assist in enhancing grammar, readability, and overall language quality. After using these tools, the author(s) carefully reviewed, revised, and validated all content to ensure accuracy and coherence, and take full responsibility for the content of the publication.

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