

THE EMPLOYEE SUSTAINABILITY STRATEGY IN AUTOMATION

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ABSTRACT

Along with the development of existing technology, automation continues to advance rapidly. The implementation of automation implemented by many organizations encourages the emergence of problems, especially among employees. Employee sustainability policies must be considered by the organization. Thus, an in-depth understanding related to employee sustainability is necessary. In this paper, we seek to identify the contribution of employee sustainability for facing automation through a systematic literature review (SLR). Particularly, we systematically: i) the definitions of automation clearly provided, ii) the affect of automation to an organization that implemented automation, iii) the strategy for facing automation by using employee sustainability. The effects of automation could substitute for labor and task not a job. This automation that is implemented by the organization also could create a new job so that it needs a new skill, but the negative affect, it could reduce well-being too. There are two strategies for employee sustainability namely training and work adjustment (adjustments to the organizational environment, work adjustments, adjustments to work superiors, and adjustments to colleagues where employees work). Further, based on our finding for this systematic literature review SLR, we should involve various disciplines such as mechanical engineering, psychology, and human resource management so that the discussion given is more in-depth and comprehensive involving various fields of science.

Keywords: Automation, Systematic Literature Review, Employee Sustainability Strategy

ABSTRAK

Seiring dengan perkembangan teknologi yang ada, otomatisasi terus berkembang pesat. Penerapan otomatisasi yang diterapkan oleh banyak organisasi mendorong munculnya permasalahan terutama di kalangan karyawan. Kebijakan keberlanjutan karyawan harus diperhatikan oleh organisasi. Dengan demikian, diperlukan pemahaman yang mendalam terkait keberlangsungan karyawan. Dalam makalah ini, kami berusaha untuk mengidentifikasi kontribusi keberlanjutan karyawan dalam menghadapi otomatisasi melalui tinjauan literatur sistematis (SLR). Secara khusus, kami secara sistematis: i) definisi otomatisasi diberikan dengan jelas, ii) pengaruh otomatisasi terhadap organisasi yang menerapkan otomatisasi, iii) strategi untuk menghadapi otomatisasi dengan menggunakan keberlanjutan karyawan. Efek otomatisasi dapat menggantikan tenaga kerja dan tugas bukan pekerjaan. Otomatisasi yang diterapkan oleh organisasi ini juga dapat menciptakan lapangan kerja baru sehingga membutuhkan keterampilan baru, namun dampak negatifnya dapat menurunkan kesejahteraan juga. Ada dua strategi untuk keberlangsungan karyawan yaitu pelatihan dan penyesuaian kerja (penyesuaian lingkungan organisasi, penyesuaian kerja, penyesuaian atasan kerja, dan

penyesuaian rekan kerja tempat karyawan bekerja). Selanjutnya, berdasarkan temuan kami untuk SLR tinjauan literatur sistematis ini, kami harus melibatkan berbagai disiplin ilmu seperti teknik mesin, psikologi, dan manajemen sumber daya manusia sehingga pembahasan yang diberikan lebih mendalam dan komprehensif yang melibatkan berbagai bidang ilmu.

Kata kunci: Otomatisasi, Tinjauan Literatur Sistematis, Strategi Keberlanjutan Karyawan

1. INTRODUCTION

Organizational studies are a highly sought-after research topic. Existing scientific developments accompanied by phenomena that occur encourage the emergence of interesting research ideas to be studied more deeply. The link between technology and work organization is an interesting phenomenon. Previous studies conducted which have studied the automation of blue-collar workers by (Susman (1970; Colbert et al., 2016); De Bruyne & Gerritse, 2018). As new technologies continue to emerge and develop, there is a need for new assessors (Zammuto et al., 2007; Lammi, 2021).

Technological implications for employment are still a debate. This technology could increase the labor demand and also productivity of workers (Acemoglu & Restrepo, 2019). It means that increasing the number of machines will cause the termination of employment and labor redundant. The growth of the machine in manufacturing is called automation. Developments in automation have given the job more easily getting automation by the machine (Kozak et al., 2020). Automation will make room for workers to become less so creates job displacement (Stähler, 2021; Parschau & Hauge, 2020; P. Frey, 2021). There is a high risk for jobs in manufacturing in some developing countries such as Indonesia (C. Frey & Rahbari, 2016; Henry et al., 2022).

Automation refers to the machines that being used in production activities as an alternative to human labour (Acemoglu & Restrepo, 2019). In some manufacturing organizations, this automation aims to replace existing work in the production department. Automation is a form of digitization. There are some examples of work that replaced by automation by evolution industry. By using the automation, the manufacture could led to cost saving in the production process, thus could make production cost savings (Colombo et al., 2019).

There is a complex effect of automation in employment. This complexity creates positive and negative effects on employees. Now the industry needs more skill employed than less skilled ones (Hoyt & Matuszek, 2001). Besides that, technology makes job changes (Autor et al., 2016). Job that was originally done manually and is still traditional now has to be carried out with technology (Goos & Manning, 2007; Graetz & Michaels, 2015). The shifting of jobs from manual to technology caused job polarization. This shift encourages changes in both job structure and skills possessed by employees.

The implementation of robot will increase manufacturing productivity in which could create new employment although this is not for unskilled labor. The impact of technological innovations applied to employees becomes a complex interaction between organizational capabilities and in creating new jobs. Performing the new job are need new skill requirements (Colombo et al., 2019). This has prompted many employees to question what skill should they have to deal with? How do you keep it working? Many employees are afraid of losing their own jobs in organization due to the effect of process automation because the less skill that they have (Koster & Brunori, 2021). Employee feeling of the

insecurity of losing job in automation caused job insecurity. Many employees felt worry when the organization disqualify them because of these technological transformation (Eickemeyer et al., 2021).

Work in organizations must be able to explore sustainability within the organization to ensure employees remain in the organization today, now and then in the future (Van Dam et al., 2017). Employee sustainability can reduced by employee worries related to job loss. Reveals that the employee sustainability creates a sustainable working lives (Ruiz-Pérez et al., 2021). So organizations should notice how to make a sustainable employment in automation.

For this special research, we review the current literature that provided on automation to 1) systematically analysis the effect of automation for manufacture industry especially for employees; 2) identify strategy for achieve employee sustainability in automation era. Findings from the research would 1) enhance the understanding of manufacturing industry regarding the impact of automation on employees; (2) provide the strategy for manufacture industry to maintain employee sustainability. Besides that, the manufacture industry could be able to strengthen the employee sustainability for achieving the industry goal.

2. RESEARCH METHODOLOGY

For this SLR research, we follow the system literature review guidelines that proposed by (Kitchenham et al., 2010) . There are three steps of systematic literature review (SLR) namely: 1) planning the review literature; 2) starting to conduct the review; 3) notify the review.

Planning The Review Literature

This systematic literature review has main purpose which is to gather a through understanding of automation, including for the current state of automation SLR research and any effect for employee that caused by the automation. Therefore, there are two questions that we provide for this research have been formulated for achieving our purposed.

1) How does automation affect employees?

Answering RQ1 could help us to identify the positive and also negative effect of the automation process implementation for employees

2) What are the strategies to maintain employee sustainability?

Answering RQ2 could help the manufacturing industry maintain the employee sustainability

Instead of analyzing an research collection of the journals the numerous perspectives about automation, we determine to focus that were related closely to the research questions that we provided. For these purpose, the literature search strategy was done by this following steps.

First, related to online journal database sources using emerald, sciencedirect, wiley, sage journal, and taylor. The journal databases were chosen because they have a reputation and credibility in academic circles around the world. Furthermore, we check the journal references that we have managed to collect to ensure that no journals have been overlooked. Secondly, its very important to determine the scope of the study to be discussed and the key concepts to be identified. The combination searches to identity relevant literature reviews on topic such as

“Automation versus employees”

“Employee sustainability”

Third, there are several criteria that we use to screen for articles which has credibility that we refer to in our review. We divide these criteria into two types, namely inclusion and exclusion. Inclusion criteria consist of:

- 1) The papers should be chosen from books, journal, and also conference proceedings
- 2) The papers should be published between 2000, but last 10 years is preferred.
- 3) The paper should be related to the research questions which have been proposed by the researcher.

While for the exclusion criteria were:

- 1) The papers that were not available for download will not be used in our review
- 2) The papers that do not use a recognized international language, namely English, will not be included

There are several criteria that we apply in the literature evaluation process which aims to obtain the quality of the literature such as:

- 1) The findings from the literature review should be able to make an important contribution in answering research questions, namely providing detailed explanations regarding the impact on employees of the automation process applied by the manufacturing industry; provide strategies for maintaining employee sustainability in the automation process.
- 2) The contents of this paper must contain benefits and also remain relevant to the issue of implementing automation for employees and changes in human resource strategies.
- 3) The paper must not contain bias so that the validity and reliability of a literature review by showing strong supporting evidence as a basis for arguments and clearly stating the context accompanied by limitations in the literature review presented.

For example, in their paper 17 years ago, investigated automation in small and medium enterprises (Calabrese, 1995). The result of these articles showed that the implementation of automation has not shown an effect on the employee. However, the increasingly intense automation being carried out by the industry today will have a big impact on employees in the organization. These results of those research are no longer applicable for this research. Therefore, this article was excluded. Different from what is happening now, as research shows that employees have concerns with automation conducted by (Coupe, 2019).

Conducting the Review

The database search for this research was conducted on 17 September 2022. The combinations of strings in articles were searched by the title, abstract, and also keywords of all the academic articles in the five online available databases that have been identified above. These searches led to the identification of 250 articles which were entered into Microsoft Excel. Next. We applied the inclusion and also exclusion criteria for the article, resulting in a remainder of this research of 127 articles. There were 94 articles which have been removed based on the criteria that we decided for these systematic literature reviews for ensuring the quality control in this SLR. In the end, 53 papers were identified as the final set of articles that we used for this SLR study.

Report The Review

The distribution of previous research that we use comes from journals. Very few research outputs come from books or encyclopedias, so the main source that we use is journals. The overview of the citation was obtained through google scholar, springer, researchgate, and also Scopus. Nevertheless, the number of citations used in this article will increase as research on automation and employees develops.

3. RESULT AND DISCUSSION

Automation effects the employees

Currently, the number of manufacturing companies implementing automation has increased. The policy was taken to make it easier for the company to achieve the predetermined goals. However, manufacturing companies also need to pay attention to the effect of the implementation of automation on employees. There are several effects that occur as a result of automation.

Automation substitutes for labor in organizations.

There are fundamental purposes for the implementation of workplace technology. Machines could do the task who currently done by humans. The task which is done by the machine will be faster, more accurate, efficient, and also low cost in their implementation (Muro et al., 2019). But, there are limitations to the ongoing substitution process. For example, due to technological limitations and price adjustment factors that are made. Machine power will not be able to complete all the tasks, of course, there are limitations that are owned and require human power as a driver. In addition, with automation, the wages received by employees will decrease, therefore it can lead competitive conditions (Domini et al., 2022).

Machine substitute for the task not a job.

A Collection of tasks is called a job. In a task, there must be a division between human work and machine work. No matter how sophisticated the machine is, it is unlikely to be able to replace all tasks. This shows that human labor is still needed even though the percentage of automation has decreased but because basically machines cannot do all tasks, human will also still be needed (Muro et al., 2019).

Automation can create new job

The employees believe that automation could eliminate a lot of jobs but its also could create a lot of new job. By automation will reduce the amount of demand for labor but at the same time will also create new jobs (Acemoglu & Restrepo, 2019); Badet, 2021; Atkinson & Wu, 2017). Automation gives birth to artificial intelligence which will drive the creation of new jobs.

Automation will replace jobs that require low educational and skill specifications. However, through automation, new jobs will emerge that require high educational and skill specifications, which are known as smart jobs.

Automation need a new skill

Automation will bring new jobs. The new job requires new skills possessed by

employees. Automation requires special specifications, namely high skills. Therefore, many companies are targeting workers with high skills so they can train other workers to be able to do new tasks. But in reality there is a mismatch between skills and technology because workers need to master the use of new technologies in the industry but often they do not have the skills to perform these tasks. These new skills often require higher education or experience, which workers do not yet possess (Morrison et al., 2011).

Automation reduces well being

In addition to the positive impacts that can be generated by the automation implementation process, negative impacts can also be generated. Workers who are affected by high automation tend to experience low stress. However, they have a history of poor health and experience low job satisfaction. With automation, work becomes more complicated and stressful for workers who do not have the ability to operate technology in a qualified manner (Nazareno & Schiff, 2021).

Employees must be considered as a valuable asset that must be managed properly in order to be able to provide the best performance for the organization. The management carried out must be based on various considerations and the involvement of all parties in the organization. The current organization must consider related to employee sustainability policies through employee sustainability can make employees able and willing to continue to carry out current and future work (Van Dam et al., 2017)

4. STRATEGY FOR EMPLOYEE SUSTAINABILITY

Training

One of the strategies that can be carried out by companies to maintain the continuity of employees is training. The existence of rapid technological changes requires special skills needed in carrying out work. Workplace learning is a strategy used by many companies to be able to convey the special skills needed. There are several companies that ask for help from experienced and skilled workers to provide training to inexperienced employees (Chirgwin, 2021; Docherty et al., 2008). Organizations must have a long-term plan to foster rather than exploit their workforce. One of the strategies that can be carried out by companies to maintain the continuity of employees is training.

The type of training conducted can be on the job training, off the job, mentoring, coaching. All types of training require awareness from the individual who will be given the training and a willingness to learn better (Chirgwin, 2021; Nazir et al., 2014). New tasks created by the automation process encourage employees to renew their abilities. Therefore, attending training is very important so that employees are able to renew and improve their abilities to be able to work using new technology (Moreira & Rocha, 2017; Chicu et al., 2014).

The existence of rapid technological changes requires special skills needed in carry out work. Workplace learning is a strategy used by many companies to be able to convey the special skills needed. There are several companies that ask for help from experienced and skilled workers to provide training to inexperienced employees (Chirgwin, 2021). The training carried out becomes an investment (Koster & Brunori, 2021).

Companies provide digital and coding skills training because future training will focus more on new technological knowledge (Badet, 2021). In order to benefit from the implementation of automation there must be self-preparation made by the organization. Carrying out training activities will encourage employees to easily carry out new tasks.

Work Adjustment

Besides training, the organization could make work adjustment for making the employee survive in the organization. Bretz & Judge (1994) became the founders of employee regulation theory. The theory found explains the relationship between the individual and the existing work environment. Employees will easily adapt to the work environment so that employees can maximize the potential possessed by employees (Nicholson, 1984).

Work adjustment can serve to reduce stress and frustration due to work and adjustments made by automation implementation situations. By making work arrangements, it can encourage individual employees to easily achieve goals within the company. new and more effective work arrangements will allow employees to interact more with other employees and the new environment thereby improving interpersonal relationships. the feelings that employees have regarding the workplace environment are definitions of work adjustment (Na-Nan & Pukkeeree, 2013).

There are three dimensions of work adjustment (Black, 1975; Black & Gregersen, 1991). First, work adjustments related to work assignment responsibilities, supervision, and employee expectations regarding the work performed; cooperation between individuals in the organization; and the last is adjustment with the rewards obtained which are used for the necessities of life.

There are four aspects that must be carried out by organizations in implementing employee adjustments including adjustments to the organizational environment, work adjustments, adjustments to work superiors and adjustments to colleagues where employees work (Na-Nan, 2019).

Adjustment to the environment is a capability that must be owned by individual employees through the form of acceptance and adaptation to the rules, systems, culture, and structures that exist within the organization that are faced by employees (Shimoni et al., 2005). Every organization must have its own rules that are applied where sometimes the existing rules conflict with the individual employee concerned. New employees already have the knowledge and experience which both can shape mindsets and ways of adapting to the new work environment. With the implementation process, some employees easily adapt to the new environment, but some employees find it difficult to adjust to the new environment. It will even appear the term culture shock that occurs in employees. This leads to feelings of depression, confusion, and stress. Employees need time to be able to adjust to the new environment by learning related to environmental adjustment policies related to the automation carried out. In addition, employees must also think that the decisions and policies taken are the best so as to encourage employees to change their behavior and way of thinking in adapting to new environmental situations.

Adjustment to work is carried out by considering the abilities, talents, and also the potential possessed to be able to carry out the duties, authorities, and responsibilities that will be carried out (Terry et al., 1996). New employees while working bring the knowledge, attitudes, and skills used in work to provide the best performance (Ilhami et al., 2020). Employees already have implicit knowledge that comes from employee experience that can be used in solving problems when working. With the adjustment of work due to this automation, employees are required to actively look for ways and methods to be able to provide the best performance by maximizing their abilities in completing work. In addition, the knowledge, skills and attitudes possessed must also be

easy to change and flexible in order to be able to adjust quickly. It is important to pay attention to adjusting work related to tasks with technological developments being carried out (Steinlechner et al., 2021; Nielsen & Yarker, 2020). Work scheduling is also included in the adjustment of the work being done so that it will encourage high work flexibility, especially when there is automation being carried out (Kiwanuka et al., 2021).

Adjustments with superiors who become our leaders in the organization. This arrangement can determine the ability possessed by employees to cooperate with superiors in carrying out work so that employees can also receive feedback in the form of information that they can use in increasing understanding regarding the work being carried out (Huo & Jiang, 2021; Gordon et al., 2019; Williams, 2019). If a new employee is employees must actively ask questions and seek information related to work methods and problem solving methods related to automation. Superiors who do not put excessive pressure on employees will encourage employees to make the adjustment process easier (Loi et al., 2014; Chiaburu, 2010). The boss must be able to position himself as an employee so that the explanations given can be more straightforward which will make employees better able to adjust to new assignments.

Adjustments with colleagues are also part of the adjustments that are important to do. Adjustments are made by considering the employee's individual abilities personally among other colleagues. There are common differences related to different backgrounds such as education, experience, age, and gender which can trigger conflict. Colleagues who are very supportive and provide information related to experience, abilities, job skills will also support the existing adjustment process (Mead et al., 2001). Colleagues can also provide motivation so that the adjustment process can be carried out more quickly (You, 2011).

5. CONCLUSION AND FURTHER THOUGHTS

In conclusion, we have provided a comprehensive review of current research about employee and automation. Particularly, we have coined the affect of automation for the employees and the strategies for employee sustainability in facing the automation. We have called the multi agency and multidisciplinary collaborations between practitioner and academy, in order to establish more accurate the explanation.

We have indicated that the correlation between employees and automation as a research is especially about employee sustainability less established in journal. These characteristics has naturally led to a number of challenges in terms of conducting research about employee and automation especially the lack of articles that clearly provided the information about correlation of employee and automation. Hence, for researchers first should be find the keyword, analysis the keyword, and discuss the keyword.

A clear correlation of employee and automation is needed to avoid misunderstandings, and thus the future research should clear these correlations. To this end, we have first explain the affect of automation for employees and the strategies for sustainability employee. Subsequently, based on our review above the affect of automation, we have identified five affects including 1) substitute for labor in organization; 2) substitute for the task not a job; 3) create a new job; 4) need a skill; and 5) reduce wellbeing. Not only that, there are two strategies that could be done by the organization for employee sustainability in facing the automation namely training and work adjustment.

Methodologically, our comprehensive Systematic Literature Review (SLR) with its robust strategy for collecting the literature which was needed since the literature across

multidiscipline such as human resource management, management strategy, and also technology. We have discovered that many proposed of theory about employee sustainability for facing automation either with no specific strategy for automation- the same strategy with another condition for making the sustainable employee is very likely to fail Kuo et al., 2018.

Thus, in the clause of future research, any research projects about employee and automation, especially in employee sustainability, would need to i) cover both the organization's need and the employee's fate; ii) consider determining the right employee sustainability policy so that employees can accept automation. Hence, collaborations between the researcher and practitioner are required to verify the correct strategy.

Therefore, we have considered more multidisciplinary research about employees and automation, especially for employee sustainability of an empirical nature, in order to test the existing theories widely practice to verify the findings and also insight. In fact, collaborative research are required to further research with involved various disciplines such as mechanical engineering, psychology, and human resource management.

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