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Preparation Of Competent Human Resources For The Industrial Revolution 4.0

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Abstract

The Industrial Revolution 4.0 has occurred since 2011 at the Hannover Fair in Germany, where it has received high attention from scholars. Although Industry 4.0 originated in Germany, internationally it has become a motivation and guide for humans. The country's manufacturing industry. The adoption of new technology greatly affects several parties, such as employees who carry out daily activities in the Industry, as well as influencing the Organization so that it can realize its full potential and adopt flexible strategic decision-making and problem-solving roles.

With the Industrial Revolution 4.0, it is hoped that Human Resource Management must adapt to change. The Industrial Revolution is the most profound revolution in human history because of its far-reaching impact on the daily life of people. The mission of Transdisciplinary Education and Learning is to create a learning community, accommodate lifelong learning, competency-based learning, transdisciplinary, education systems and transdisciplinary learning are designed and implemented using system management. Continuous development of practical competencies, basic competencies and reflective competencies will provide an increase in practice standards so that they develop from minimum competency standards to higher competency standards, also known as having capabilities.

Keywords: Industrial Revolution 4.0, Human Resources, Competence.

INTRODUCTION

Since 2011 at the Hannover Fair in Germany there has been an Industrial Revolution, which has received high attention from scholars (Bartevyan, 2015). Even though it comes from Germany, internationally it has become a motivation and guide for humans. Where, in the literature the term Industrial Revolution 4.0 is generally known and used among the State and Industry (Wan et al., 2015).

The concept of Industrial Revolution 4.0, there are six philosophies that must be followed, namely Decentralization, Modularity, Service Orientation, Interoperability, Real-time Capability, and Virtualization (Hermann et al., 2016). The main objective of the Industrial Revolution 4.0 is to increase the efficiency

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and effectiveness of operations by embedding automation technology (Ślusarczyk, 2018).

It is also known as the era in which automation technology and strong data encryption are used. Revision of Manus cript was received on October 15, 2019. However, it is expected that productivity, quality and efficiency in the industry will further increase due to the help of advanced technology with automation and machinery (Thames & Schaefer, 2016), so that there are change between machines and humans to collaborate and work together in manufacturing and creating products in Industry (Maksumic, 2017).

Therefore, to create and realize a good environment in the Industrial area, the application of this new technology is very useful and important, where the Industry can conduct information and manage operations in a smarter and faster way and also the gap between the real and digital world is getting smaller (Weyer et al., 2015)

Furthermore, by interacting with artificial intelligence between machines and humans, the German Government stated that the Manufacturing Industry in the future will be better by utilizing the Internet of Things (IoT) in the Industrial Revolution 4.0 (Zhou et al., 2015). The application of new technology greatly affects several things, such as employees who carry out daily activities in the Industry and affect the Organization so as to realize their full potential and adopt flexible strategic decision-making and problem-solving roles (Erol et al., 2016).

With success in the Industrial Revolution 4.0 depends on the company's innovation capabilities, such as whether it is about Cyber Physical Systems, Product reengineering, Differentiation, or Some supply chain issues. Thus, it is necessary to develop capabilities in various dimensions within the Organization, so that the practice of Human Resources is recognized as a vital aspect (Shamim et al., 2016a).

In addition, to create an environment and climate that is suitable for learning new skills knowledge to adapt and face the challenges of the Industrial Revolution 4.0., Knowledge Management is to improve and develop the abilities and skills of employees to be more creative and innovative, so that the problem of resource practice is stated. Humans create obstacles and barriers to digitization, so they can affect the performance value and effectiveness of the Industry (Nagy et al., 2018).

Employee qualifications are difficult to detect and become complicated, therefore it is very important and necessary for Human Resources to monitor and know in assessing employee competencies. To achieve the goals of the Industrial Revolution 4.0, various countries have taken steps and initiatives to improve Human Resources through education and training (Silva et al., 2019).

Although it has involved most of the automation of technology, the operation process still relies on humans, especially valuable judgment and experience in the decision-making process (Omar et al., 2017). Therefore, in the Industrial Revolution 4.0, that humans still have an important role based on statements from respondents as much as 60.2% in empirical studies (Gabriel & Pessl, 2016). Meanwhile, employee competence is a foundation for success in this era (Pratiwi & Rusman, 2018).

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With the Industrial Revolution 4.0, it is hoped that Human Resource Management must adapt to change (Stachová et al., 2019). It is therefore proposed that the Company should plan a good cooperation with the Department of Human Resources to overcome the shortage of skilled workers in realizing and achieving the Industrial Revolution 4.0 (Festing & Schäfer, 2014). However, the uncertainty with this matter, so that Human Resources practitioners are very worried and pay attention to the Recruitment, Developing, and Retaining procedures for skilled employees (Moayedi & Vaseghi, 2016).

Along with digitalization for Human Resources practices, it is expected to increase the efficiency of the entire Human Resources Team and keep the team solid (Angrave et al., 2016). Human Resources in Industry 4.0 are prioritized to focus on Automation, Interoperability and Flexibility in new practices, so that their implementation is more effective and efficient for short or long term results (Wilkesmann & Wilkesmann, 2018).

Intelligent Human Resources is striving to realize and achieve the Industrial Revolution 4.0, then the functions of Human Resources are digitized, such as the recruitment process, training and development, reward system, and knowledge management (Sivathanu & Pillai, 2018). Therefore, it is expected to involve and use high technology, such as Artificial Intelligence, Internet of Things, and Big Data Analytics in implementing Human Resources practices (Wolf et al., 2018).

In addition, with the increasing complexity of work activities, the Company faces a big challenge in obtaining qualified and skilled employees for the operation and maintenance of high-tech machines (Marope et al., 2017), thereby categorizing employee competencies, such as Literacy, Problem solving, Creativity, Critical Thinking and Character quality (Agolla, 2018).

So, a well-planned competent Human Resources preparation strategy must be embedded in the Industrial Revolution 4.0 to increase employee competitiveness by prioritizing employee development and Knowledge Management that can improve the Company's sustainability (Agolla, 2018). Therefore, this paper intends to discuss strategies for preparing Competent Human Resources that can provide a positive climate in the workplace and can effectively realize the Industrial Revolution 4.0.

RESEARCH METHODOLOGY

Research Approach and Type

In this type of research using library research or literature review, namely research on the method of collecting library data or research objects extracted from a variety of library information, namely books, encyclopedias, scientific journals, newspapers, magazines, and documents (Sukmadinata, 2009).

This study uses a descriptive analysis method approach, which describes a symptom, event, and event at this time, which tries to photograph the problem to be described properly (Sudjana, et.al., 1989).

Data collection technique

Data collection is carried out for the purpose of obtaining valid data, so data collection methods for various book sources are in the library room, such as

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newspapers, books, magazines, manuscripts, documents, in other words relevant to research. Literature techniques are very important in conducting research, this is because a study cannot be separated from scientific literature (Koentjaraningrat, 1983).

Data analysis technique

In literature research using data analysis model Miles and Huberman, as follows (Mestika, 2004):

a) Data reduction, selecting, focusing, simplifying, abstracting and transforming raw data in written records, with the aim of obtaining findings which then become the focus of the research.
b) Data reduction, selecting, focusing, simplifying, abstracting and transforming raw data in written records, with the aim of obtaining findings which then become the focus of the research.
c) Display data, the reduced data is then displayed to provide an understanding of the data in order to determine the next step.
d) Further conclusions are made to explain the new findings from the research. The results of this activity can still be carried out by repeating the Data Analysis, so that it is achieved and obtains maximum results.

DISCUSSION

Preparation of Competent Human Resources for the Industrial Revolution 4.0.

The Industrial Revolution is the most profound revolution in human history because of its far-reaching impact on people's daily lives. The term Industrial Revolution is abbreviated to describe the historical period beginning in the 18th century to describe the development of the British economy.

The Fourth Industrial Revolution, the ongoing phase of the Industrial Revolution that describes the high-tech strategy proposed by the German government. It refers to the emergence of various new digital Industrial technologies.

Fourth Industrial Revolution is a term coined and coined by the founder of the World Economic Forum, namely a former Professor named Klaus Schwab. Industry 4.0, the era of digitalization means opportunities and challenges. Businesses across all Industries face challenges to embrace digital transformation and certain steps must be ensured to address security challenges and move forward with the Industrial Revolution 4.0 (Shamim et al., 2017).

This revolution also involves more subtle practical improvements in various areas affecting Manpower, Production and Resources. In the twenty-first century, Industry 4.0 marks the innovation of smart business and smart Industry (Shamim et al., 2016).

The first preparation is Knowledge Management.

The seven pillars of digital transformation are (Newman & Blanchard, 2017), (Newman, 2019):

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a) Experience. The experience of customers (behavior, expectations, satisfaction) and employees (Organizational Culture, Efficiency, Technology support) are important factors when deciding to invest in new technologies and carry out the digital transformation process.
b) People. Expertise in the field is important, but all employees are valuable and technology must make their jobs easier and help them connect, learn, and share.
c) Change. Transformation is continuous change and all employees must know what to expect, accept it and be involved in the process.
d) Innovation. Transformation is fueled by innovation, which can be small, but it can also be big and disruptive.
e) Leadership. The success of the transformation depends on management, who must incorporate it into the business strategy, support it at all levels and communicate it effectively throughout the organization.
f) Technology. New innovative technologies are an important part of digital transformation, but must be implemented in line with other pillars to enable an organization's competitive advantage;
g) Culture. All of the above pillars create an organizational culture that must be open to digital change and transformation, with people at the center.

Effective knowledge management is very much needed in the development of Human Resources because Knowledge Management can increase employee innovation and learning comfort (Shamim et al., 2016). Knowledge Management is Acquiring, Organizing, Processing, Reusing, and Transferring knowledge among fellow employees (Festing & Schäfer, 2014). In addition, Knowledge Management can also help develop competencies for employees (Peinl, 2017).

Even though using sophisticated machines in the Industrial Revolution 4.0, the development of Knowledge Management still needs to be perfected (Ediz, 2018). Therefore, an increase in innovation and competitiveness for the long term for employees is very much needed by the Organization so that there needs to be an improvement in the Knowledge Management process (Donate & Pablo, 2015).

Human Resources Practitioners can adopt Knowledge Management 4.0, where Knowledge Management 4.0 focuses on Information accuracy, Relevance, Value of content, as well as Retrieving knowledge in real time without delay (Roblek et al., 2016). By doing this, it will get a higher sustainability of Knowledge Management in the practice of Human Resources and also the stronger the ability of the Organization to adapt to changes in the Industrial Revolution 4.0 (Mota et al., 2018).

The second preparation is the making of Human Resources policy.

In order to have excellent policy quality in the development of human resources, it is necessary to have qualified human resource practices and involve external assistance (Festing & Schäfer, 2014). It is hoped that Human Resources will be more open to external sources of knowledge in policy making, so that conformity is obtained to obtain new procedures in the face of the Industrial Revolution 4.0 (Thomas et al., 2017).

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However, it takes seriousness that the digitization of Human Resources 4.0 can be successfully launched if Human Resources collaborate with professional training in combining knowledge (Wilkesmann & Wilkesmann, 2018) Sharing information between Industry and Universities can be a vital element in the Industrial Revolution 4.0 and Human Resources 4.0 (Hub & Kozák, 2016). When the Human Resources 4.0 policy is adjusted to the University syllabus or vice versa, it can help to develop competitive human capabilities through training at the University.

With good cooperation between Industry and educational institutions, Human Resources policy makers can adjust a new set of competencies with institutions to have skilled Human Resources in the future to cope with the Industrial Revolution 4.0 (Iye, 2018).

Furthermore, Human Resources practitioners are also encouraged to work with education 4.0, where education 4.0 integrates real work information into the curriculum (Harkins, 2008). Through this effort, knowledge of Human Resources 4.0 practices will begin to be included in University teaching with the aim of preparing a talented pool of future employees (Pfeiffer, 2015).

The third preparation is training.

Training is known as the practice of developing Human Resources in order to cope with uncertainty (Lasi et al., 2014). In an uncertain work environment, trained employees will be able to adapt to changes in work characteristics and often occurs in the Industrial Revolution 4.0 (Festing & Schäfer, 2014). Human Resources should be trained because innovative employees tend to be able to work smart in dealing with uncertainty, and are more competitive (Shamim et al., 2016).

In addition, competency training for problem solving is urgently needed (Chen & Huang, 2009), so that some outdated positions will be replaced by machines and automation involving high technology, where retraining programs are needed (Benešová & Tupa, 2017). Therefore, Human Resources are advised to be able to develop the competence and quality of employees so that they can realize conformity with the Industrial Revolution 4.0 (Gehrke et al., 2015).

The fourth preparation is recruiting.

Propose a Human Resource management system based on Blockchain technology. Blockchain is a technology for the future Industry (Onik et al., 2018). Therefore, applying high technology in the recruitment process is very helpful for Human Resources to avoid overspending (Marvel et al., 2016). For example, verifying, storing recruitment and Human Resource Management related information, a low cost solution by eliminating middlemen. The proposed model performs better than the Human Resource Management system in terms of Safety, Cost, Time, and Quality of work (Onik et al., 2018).

Human Resources are expected to practice an automated process of screening applicants' resumes through Artificial intelligence and Big Data, where these technologies help filter disqualified applicants and reduce lengthy processing times (Sivathanu & Pillai, 2018). Next to Artificial Intelligence and

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Big Data, Internet of Thing is another technology that can assist recruitment by connecting people, systems and machines (Dai, 2018). The Internet of Thing assembles and distributes recruitment related information through a specific system, thereby speeding up the decision-making process and recruitment efficiency (Bosch, 2016).

The fifth preparation is the reward system.

Due to the minimal number of skilled workers in the Industrial Revolution 4.0, it is hoped that for Human Resources there will always be the development of an effective reward system to maintain and provide guidance to employees and provide opportunities for talented new employees (Alhajjar et al., 2018).

Therefore, it is hoped that learning and training can be encouraged through a reward system both within the Company (Chen & Huang, 2009). In addition, the award should be adjusted when the employee has the intention to leave the company. Human resources officers are advised to adopt the Smart Human Resource 4.0 approach to analyze Employee Performance, Years of Service, Joining Events, Boss Ratings, and Coworkers Ratings to predict the level of intention to leave. This technology is successful in reducing the turnover rate, as well as assisting the Organization in avoiding high turnover costs (Jalali & Singh, 2018).

The sixth preparation is job design.

In the Industrial Revolution 4.0, the emergence of high technology and machines can bring impacts and challenges to all Human Resources practices, including job design (Alhajjar et al., 2018). Given the principle of influencing job design among employees and procedures within the Organization (Dombrowski & Wagner, 2014), so job design in resources should focus on flexibility and openness due to continuous changes in the Industrial Revolution 4.0 (Gabriel & Pessl, 2016).

As the most important element when the Industrial Revolution 4.0 was introduced (Parker, 2014), the design of work to be effective in resource practices can be seen when the Organization successfully changes manual operations to automation with new procedures and systems (Bosch, 2016). However, the problem of job design in Human Resources is known as one of the factors that can hinder development, where empowerment is not given to employees (Shamim et al., 2017). Therefore, it is suggested that a job design approach, such as job enrichment should be considered as good job design in resources can help meet the principles of the Industrial Revolution 4.0 (Parker, 2014).

The seventh preparation is a change of mindset.

Facing the Industrial Revolution 4.0, demands that Human Resources must be able to immediately revolutionize themselves, regarding technical work and things that are more substantial, so that there is a change in mindset, where humans must think to be able to determine self-regulation before acting in

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decision making, so that quick decisions are produced. and right. The fixed mindset is easy to give up in the face of challenges, while the growth mindset is always open when it gets information and is able to adapt to any changes. Therefore, a developing mindset is very much needed in the preparation of competent Human Resources to face the challenges of the Industrial Revolution 4.0 (Kasali, 2018).

CONCLUSION

Preparation of Human Resources plays an important role is expected to be effective in improving the Company's Performance by complementing the competence of the updated workforce. Although previous studies have discussed the topic of the Industrial Revolution 4.0, there is a lack of studies discussing the role of resource practices in achieving the goals of the Industrial Revolution 4.0.

The discussion of this paper can be useful for practitioners of Human Resources in Industry, which can be a basic foundation in understanding the role of Human Resources. Future researchers are encouraged to conduct empirical studies to examine the Effect of Resource Practices on Organizational Performance in the Industrial Revolution 4.0

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