
LITERATURE REVIEW: HUMAN RESOURCE CHALLENGES IN FACING THE INDUSTRY 4.0 ERA

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ABSTRACT

Human Resources (HR) are workers who work in an organization and have a strategic role in achieving organizational goals. HR includes individuals with the qualifications, knowledge, skills and attitudes needed to support company performance. The role of HR in the Industry 4.0 era is becoming increasingly strategic. According to research, HR management needs to evolve to be able to support the achievement of organizational goals amidst this rapid and complex change. Idrus et al. (2023) emphasize the importance of HR as a strategic partner in aligning the new business culture with individual and organizational learning processes to face the challenges of the Industrial Revolution 4.0. The aim of this research is to identify human resource challenges in facing the industrial era 4.0 based on a literature review. Systematic literature review is the method used in the following research using a review of 5 research articles. Searching for articles is carried out using search engines, including Google Scholar, Garuda Portal, Pubmed. The conclusion of this research is that the main challenges facing HR in this era include increasing technological competence, adapting to rapid change, and developing new skills that are relevant to the needs of modern industry. Overall, these challenges require a strategic and proactive approach from HR management to ensure that organizations can adapt well to the changes brought by the Industrial Revolution 4.0. With the right investments in training, skills development and change management, HR can become a powerful asset in facing the challenges and exploiting the opportunities offered by this new era.

Keywords: Revolution Industry 4.0, HR Management, HR Challenges

ABSTRAK

Sumber Daya Manusia (SDM) adalah para pekerja yang bekerja dalam sebuah organisasi dan memiliki peran strategis dalam mencapai tujuan organisasi. SDM meliputi individu-individu dengan kualifikasi, pengetahuan, keterampilan, dan sikap yang dibutuhkan untuk mendukung kinerja perusahaan. Peran SDM dalam era Industri 4.0 semakin menjadi strategis. Menurut penelitian, manajemen SDM perlu berkembang untuk dapat mendukung pencapaian tujuan organisasi di tengah perubahan yang cepat dan kompleks ini. Idrus dkk. (2023) menekankan pentingnya SDM sebagai mitra strategis dalam menyelaraskan budaya bisnis baru dengan proses pembelajaran individu dan organisasi untuk menghadapi tantangan Revolusi Industri 4.0. Tujuan dari penelitian ini adalah untuk mengidentifikasi tantangan sumber daya manusia dalam menghadapi era industri 4.0 berdasarkan tinjauan pustaka. Tinjauan pustaka sistematis adalah metode yang digunakan dalam penelitian ini dengan meninjau 5 artikel penelitian. Pencarian artikel dilakukan menggunakan mesin pencari, termasuk Google Scholar, Portal Garuda, Pubmed. Kesimpulan dari penelitian ini adalah bahwa



tantangan utama yang dihadapi SDM dalam era ini termasuk peningkatan kompetensi teknologi, beradaptasi dengan perubahan yang cepat, dan mengembangkan keterampilan baru yang relevan dengan kebutuhan industri modern. Secara keseluruhan, tantangan-tantangan ini memerlukan pendekatan strategis dan proaktif dari manajemen SDM untuk memastikan bahwa organisasi dapat beradaptasi dengan baik terhadap perubahan yang dibawa oleh Revolusi Industri 4.0. Dengan investasi yang tepat dalam pelatihan, pengembangan keterampilan, dan manajemen perubahan, SDM dapat menjadi aset yang kuat dalam menghadapi tantangan dan memanfaatkan peluang yang ditawarkan oleh era baru ini.

Kata Kunci: Revolusi Industri 4.0, Manajemen SDM, Tantangan SDM

INTRODUCTION

Industrial Revolution 4.0 has fundamentally changed various aspects of life, especially in the industrial and business sectors. This transformation is characterized by the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data, and cyber-physical systems in production and operations processes. In this context, human resources (HR) play a very crucial role as the main driver of innovation and adaptation to rapid technological change.

The role of HR in the Industry 4.0 era is becoming increasingly strategic. According to research, HR management needs to evolve to be able to support the achievement of organizational goals amidst this rapid and complex change. Idrus et al. (2023) emphasize the importance of HR as a strategic partner in aligning the new business culture with individual and organizational learning processes to face the challenges of the Industrial Revolution 4.0 (Idrus et al., 2023).

Apart from that, this change requires increased competency, adaptation and skills of human resources. Gustiranda and Sukwika (2023) show that improving employee service quality is greatly influenced by the competence, adaptability and skills they have in dealing with new technology. (Gustiranda and Sukwika, 2023). This is also confirmed by research by Firmansyah et al. (2022) which highlights the need for a new strategic approach in HR management to leverage digital skills and face the challenges of the digital economy (Firmansyah et al., 2022).

Furthermore, research by Amanda et al. (2023) highlights the role of leadership in developing the quality of human resources through the integration of information technology in the education system. Effective leadership is expected to be able to improve the quality of human resources to face the Industrial Revolution 4.0 era (Amanda et al., 2023). Technological innovation in HR management is also an important driver of business growth in the Society 5.0 era, as explained by Sulistyarningsih 2022.

In this overall context, effective and adaptive HR management is the key to ensuring that organizations can innovate and compete effectively in the era of Industrial Revolution 4.0. Digital skills, adaptability and strong leadership strategies are critical elements that must be developed to achieve success in an increasingly complex and dynamic business environment.

The development of the Industrial Revolution, especially the Industrial 4.0 era, has had a significant impact on human resource management (HR). Research by Sulistyarningsih (2023) highlights the importance of improving the quality of human resources to face increasingly fierce global competition. Development of quality human resources is the main key in achieving national success and progress of Indonesian society (Sulistyarningsih, 2023). In the corporate context, research by Gustiranda and

Sukwika (2023) shows that HR competency, adaptation and skills greatly influence service performance in the Industrial Revolution 4.0 era.(Gustiranda and Sukwika, 2023).

The Industrial Era 4.0 has brought significant changes in human resource (HR) management in various organizations. In facing these challenges, research shows that HR management must evolve strategically to accommodate new needs in business culture and organizational performance. Idrus et al. (2023) highlight the importance of HR as a strategic partner in facing the Industrial Revolution 4.0, which includes behavioral development and organizational learning(Idrus et al., 2023). Meanwhile, other research emphasizes that this revolution brought changes in recruitment and training, which were the areas most affected. Firmansyah et al. (2022) emphasize the need for a new strategic approach to managing HR skills to face the challenges of the digital economy (Firmansyah et al., 2022).

The Industrial Revolution 4.0 does not only provide opportunities. However, this also raises various challenges faced by Human Resources (HR), such as a spike in unemployment, competition between humans and machines, and increasingly high demands for human resource competency, where the main challenge is the loss of jobs which are replaced by technology.

Hendriyadi (2019) stated that the challenge for human resources in the era of industrial revolution 4.0 is competence in integrating the use of the internet with production lines that utilize sophisticated technology and information. In implementing the industrial revolution 4.0, companies are expected to have human resources who have skills in collaborating with digital technology, robots and machines which include digitalization, optimization and customization of production, automation and adaptation, human-machine interaction, added value of services and business, automatic data exchange and communication, and the use of internet technology.

Effective change management and strong leadership are also important elements in facing the challenges of the Industrial Revolution 4.0. Leaders must be able to inspire and motivate teams to accept and adopt change, as well as provide the support necessary for a smooth transition to new ways of working. Visionary leadership and adaptive management strategies are needed to ensure organizations can survive and develop amidst rapidly changing dynamics.

Social and economic challenges, such as job reduction due to automation and job insecurity, are also a major concern in the Industrial Revolution 4.0. Organizations need to develop strategies to manage these social impacts, including through retraining programs and developing new skills for affected employees. Policies that support employee welfare and maintain a balance between technology and human aspects are very important.

Overall, HR challenges in facing the Industrial Revolution 4.0 require a holistic and strategic approach. Investment in training and skills development, the ability to adapt quickly, effective change management and strong leadership are key to ensuring that organizations can innovate and remain competitive in this new era. By overcoming these challenges proactively, HR can become the main driver in creating success and growth in the era of Industrial Revolution 4.0.

Based on the results of the studies above, it is necessary to conduct a literature review to analyze more deeply the challenges of human resources in the industrial era 4.0. It is hoped that the results of this research can help human resources to be better prepared to face industry 4.0.

METHOD



This research uses a type of library research or literature review, namely a series of research relating to library or research data collection methods whose research objects are explored through a variety of library information, including books, encyclopedias, scientific journals, newspapers, magazines, , and documents (Sukmadinata, 2009). The reason the author uses the library research research method is because it suits the problem being researched, namely reviewing and discovering various theories, laws, postulates, principles or ideas contained in the body of academic-oriented literature which is used to analyze and solve questions The research formulated is in the form of human resource challenges in facing the industrial era 4.0.

In analyzing the research results, the author used a descriptive analysis method approach. Descriptive research is research that attempts to describe symptoms, events and occurrences that are occurring at the present time where the author tries to photograph events and occurrences that are the center of attention and then describe them as they really are (Sudjana et al, 1989). The author chose the descriptive analysis method because this research analyzes and presents facts systematically, so that it is easier to understand and conclude events that are taking place and relate to current conditions.

Data collection techniques need to be carried out with the aim of obtaining valid data in research. The author uses bibliography and documentation techniques. Library techniques are a way of collecting data on various materials found in the library space, such as newspapers, books, magazines, manuscripts, documents, and so on that are relevant to research (Koentjaraningrat, 1983). Library techniques are very important in conducting research, this is because research cannot be separated from scientific literature (Sugiyono, 2012).

Documentation techniques are a method of collecting data by searching or digging up data from literature related to what is intended in the problem formulation. The data that has been obtained from various literature is collected as a single document that is used to answer the problems that have been formulated.

After the data is collected, data analysis is carried out by organizing the data, breaking it down into units, synthesizing it, arranging it into patterns, choosing what is important and what will be studied, and making conclusions. The data analysis technique uses the content analysis model from Lasswell. Content analysis is a technique for making conclusions by identifying the characteristics of certain messages objectively and systematically (Holsti, 1969).

RESULTS AND DISCUSSION

Table 1. Journal Synthesis Results

Journal	Author and Year	Name	Journal Index
Human Resource Challenges in Facing the Industrial Revolution 4.0	Harsono (2019)		Journal of Management and Entrepreneurship Vol. 21 No. 1
Human Resource Development in the Era of Industrial Revolution 4.0	Santoso (2021)		Journal of Management and Marketing, Vol. 14 No.1
Increasing the Competitiveness of Human Resources in the Era of Industrial Revolution 4.0.	Hidayat and Harahap (2020)		Journal of Accounting, Management and

		Economics, Vol. 22 No. 2
Strengthening Human Resources Through Vocational Education in the Industrial Era 4.0.	Daryanto and Kadir (2020)	Journal of Vocational Education, Vol. 10 No.1
Opportunities and Challenges for Human Resources in Implementing National Smart Ports during the Industrial Revolution 4.0.	Ricardianto, Nasution, Naiborhu, & Triantoro (2020)	Journal of Transportation Research News, Vol.32 No.1

DISCUSSION

According to Moeheriono, Human Resources (HR) is the totality of individuals who work in an organization, including employees, workers and other workers who have the skills, knowledge, experience and potential to contribute to organizational goals (Moeheriono, 2019). Riyanto stated that Human Resources (HR) are workers who work in an organization and have a strategic role in achieving organizational goals. HR includes individuals with the qualifications, knowledge, skills and attitudes needed to support company performance (Riyanto, 2021). HR management is a crucial element in the success and sustainability of an organization. With ever-evolving challenges, including globalization, technology, and changing demographics, organizations must adopt innovative and adaptive HR strategies. A focus on skill development, strong leadership, positive organizational culture, and utilization of modern technology will help organizations maximize their HR potential and achieve a competitive advantage in the global market.

Human resources in the era of "industrial revolution 4.0" need to increase competence in utilizing digital technology such as big data, internet of things, robots and Artificial Intelligence. It is very important to understand programs to improve these skills so that human resources are able to adapt to industry demands (Rohida, 2018). HR is an asset that must be improved effectively and efficiently so that optimal performance will be realized. To achieve organizational goals, it must be able to create situations and conditions that encourage and enable employees to develop abilities and skills optimally, especially in performance. Performance is the ability to achieve work targets that can be completed on time to support company goals (Sitinjak et al., 2021).

Harsono discusses the challenges faced by human resources in the Industrial Revolution 4.0 era, including changes in required skills, adaptation to technological changes, and the need to develop new skills to answer industrial demands (Harsono, 2019). Santoso discusses the importance of developing human resources in the Industrial Revolution 4.0 era, including changes in education and training paradigms, adaptation to digital technology, and developing skills relevant to industrial needs (Santoso, 2021). Moeheriono explains that Human Resources (HR) is the totality of individuals who work in an organization, including employees, workers and other workers who have the skills, knowledge, experience and potential to contribute to organizational goals (Moeheriono, 2019).

Hidayat and Harahap discussed efforts to increase the competitiveness of human resources in the Industrial Revolution 4.0 era, including the role of education and training in developing digital skills, as well as the need to adapt to technological changes and global trends (SS Hidayat & R. Harahap, 2020). Daryanto and Kadir discussed the importance of strengthening human resources through vocational education in the Industry 4.0 era, including developing technical skills and non-technical skills that are relevant to industry needs (A. Daryanto & A. Kadir, 2020).



The challenges and opportunities provided by the industrial revolution 4.0 era in managing employee performance can be through training, so that quality, professional and competent human resources can be created (Ricardianto, Nasution, Naiborhu, & Triantoro, 2020). HRM can be carried out superiorly, creatively and innovatively by improving the quality of employees in mastering technology, apart from that, management goals can be achieved effectively in the activities carried out in HR management. So designing and designing innovative and training activities in looking for ideas for strengthening skills must be more creative (Sabrina, 2021). The strategy for successful HR management is not just training, education, coaching, recruitment, system changes, opportunities and rewards. But HR must also increase creativity and change a fixed mindset to a growth mindset, so that they are ready to adapt and revolutionize themselves to rapid technological developments, so that superior, creative and innovative human resources will be created, and adaptive to the onslaught of the industrial revolution 4.0 (Tahar, Setiadi, & Rahayu, 2022).

CONCLUSION

Industrial Revolution 4.0 has brought significant changes in various aspects of industrial and business life, which directly affects human resource management (HR). The main challenges facing HR in this era include increasing technological competence, adapting to rapid change, and developing new skills that are relevant to the needs of modern industry.

- a. Improved Technological Competency: One of the biggest challenges is the need to increase technological competence among employees. With technology continually evolving, employees must have the relevant skills to operate and utilize new technology. As technology advances such as the Internet of Things (IoT), artificial intelligence (AI), and big data, technological competence becomes very important. HR must have a deep understanding of these technologies and be able to integrate them into daily work processes. Continuous training and education is the key to ensuring HR remains relevant and competent.
- b. Adapt to Rapid Change: Industrial Revolution 4.0 is characterized by rapid and dynamic change. The ability to adapt quickly to these changes is critical. HR must be flexible and ready to learn and adapt to new technology and processes that continue to develop. Organizations need to create a work culture that supports innovation and change.
- c. New Skills Development: Apart from technical skills, the Industry 4.0 era also demands the development of non-technical skills such as problem solving, creativity, collaboration and communication. These skills are necessary to maximize the use of new technologies and to work effectively in teams that may be geographically dispersed or working remotely. A comprehensive and ongoing training program must be implemented to develop these skills.
- d. Change Management and Leadership: Effective leadership and good change management are essential to ensure a smooth transition to the Industry 4.0 era. Leaders must be able to inspire and motivate the team to accept and adopt change, as well as provide the necessary resources and support.
- e. Social and Economic Challenges: Apart from technical challenges, the Industrial Revolution 4.0 also brings social and economic challenges, such as job reduction due to automation and increased job uncertainty. Organizations need to develop strategies to address these impacts, including through retraining programs and developing new skills for affected employees. Policies that support employee welfare and maintain a balance between technology and human aspects are very important.

- f. **Cyber Security:** With increasing connectivity and use of digital technology, the risk of cyberattacks also increases. Organizations must ensure that they have strong security measures in place to protect their data and systems. Cybersecurity is a shared responsibility between HR management and the IT department to protect sensitive information and business operations.
- g. **Data-Based Performance Management:** The use of big data and analytics allows for more effective employee performance management. Data-driven performance management helps in identifying trends, setting goals, and providing constructive feedback. However, this implementation requires proper systems and analytical skills among HR managers.

To overcome these challenges, organizations need to adopt several key strategies:

1. **Investment in Training and Development:** Organizations must continue to invest in training and development programs to ensure employees have the skills necessary to deal with new technologies.
 - **Reskilling and Upskilling:** Focus on developing new skills (reskilling) and improving existing skills (upskilling) to ensure employees are ready to face technological changes.
 - **Ongoing Training Program:** Implement ongoing training programs that include technical and non-technical training, such as problem solving, creativity, and communication.
2. **Adaptive Leadership:** Leaders must have a clear vision and be able to motivate and guide employees through change.
 - **Leadership Development:** Train leaders to have a clear vision, the ability to inspire, and strong change management skills.
 - **Effective Communication:** Encourage open and transparent communication between management and employees to build trust and ensure all parties understand the company's vision and goals.
3. **Organizational Flexibility:** Organizations must develop a flexible work culture that supports innovation and rapid adaptation.
 - **Innovation Culture:** Build a culture that encourages innovation, collaboration and creativity. Provide space for employees to experiment with new ideas.
 - **Work Flexibility:** Adopt flexible work models such as remote or hybrid work, which can increase employee satisfaction and productivity.
4. **Employee Welfare Policy:** Policies that support employee well-being, including mental and physical health, are critical to maintaining morale and productivity.
 - **Health and Wellbeing:** Develop a comprehensive wellbeing program, including physical and mental health, work-life balance, and support for employees in dealing with work stress and pressure.
 - **Awards and Recognition:** Implement a fair reward and recognition system to motivate employees and increase retention.
5. **Strong Cybersecurity:** Implement strong cybersecurity measures to protect the organization's data and systems from cyber threats.
 - **Cyber Security Training:** Provide training to employees on cybersecurity practices to protect data and systems from cyber threats.
 - **Data Security Policy:** Develop and implement strong data security policies to protect sensitive company and employee information.
6. **Use of Data Analytics:** Leverage data analytics for better performance management and decision making. Data analytics has become a very important tool in performance management and decision making, especially in the era of Industrial Revolution 4.0. By leveraging big data and analytics, organizations can



gain deeper insight into their operations and make more informed decisions. Data analytics plays an important role in performance management and decision making in the Industry 4.0 era. by collecting, analyzing, and interpreting employee performance and business operations data, organizations can make more informed and strategic decisions, increasing efficiency, productivity, and long-term success. Effective implementation of data analytics requires investment in technology, training, and an organizational culture that supports data-driven decision making.

Overall, these challenges require a strategic and proactive approach from HR management to ensure that organizations can adapt well to the changes brought by the Industrial Revolution 4.0. With the right investments in training, skills development and change management, HR can become a powerful asset in facing the challenges and exploiting the opportunities offered by this new era.

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