Journal of Production Management and Optimization
Vol. 1, No. 1, June-December 2025, pp. 1-8
ISSN: xxxx-xxxx, DOI: ...

Optimizing Human Resource Management Systems for Enhanced Production Management Efficiency

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Keywords:

HR management optimization; production efficiency; human resource management; productivity improvement; management system; workforce planning

ABSTRACT

In the era of globalization, companies face significant challenges in optimizing their human resource (HR) management systems to support efficient production management. The success of a company depends heavily on the alignment between HR performance and efficient production processes. Therefore, effective HR management is key to achieving a competitive advantage and higher productivity. This study aims to examine how optimizing HR management systems can improve efficiency in production management, as well as explore the factors that play a crucial role in integrating HR and the production process. The method employed is a qualitative descriptive analysis with a case study approach, applied to several manufacturing companies. Data was collected through interviews with production managers, document analysis, and direct observation of the implementation of the existing HR management system. The results indicate that optimizing an HR management system, which includes continuous training, effective workforce planning, and modern HR management technology, can enhance operational effectiveness. Companies that successfully integrate HR aspects with production systems holistically can reduce downtime and improve product quality. Effective HR management is a crucial element in improving the efficiency of production management. The implementation of the right system not only impacts productivity, but also improves quality and customer satisfaction.

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1. INTRODUCTION

Manufacturing and industrial companies are increasingly faced with pressure to improve operational efficiency and productivity. One of the main determining factors in achieving this goal is a practical human resource (HR) management system. Optimized HR management not only enhances the quality of the workforce but also plays a crucial role in supporting more efficient production processes. This is increasingly relevant in the Industry 4.0 era, where technology and

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automation play a growing role in enhancing the operational performance of companies (Joppen et al., 2019; Omar et al., 2022; Wang et al., 2013). Along with the rapid development of technology, companies are required to adapt to an HR management system that is more integrated with digital technology and production automation.

Amid fierce global market competition, optimizing HR management is an urgent need to increase efficiency in the production process. Effective HR management is closely tied to productivity, product quality, and customer satisfaction. This research aims to examine how HR management systems can be optimized through technology and proper workforce planning to improve production management efficiency. The various challenges companies face in optimizing HR and production require a systematic and data-driven approach. (Fu & XH Wen , 2018; Omar et al., 2022; Wang et al., 2013).

Existing human resource management theories identify several key elements for optimizing human resources, including workforce planning, continuous training, and the effective use of information technology. (Fu & XH Wen ,2018)). A study by Rasyiddin et al., (2024) Shows that the application of technology in HR management can help monitor workforce performance in real-time, which in turn supports more informed production decisions. Additionally, data from various case studies indicate that integrating HR systems with technology-based production management systems can improve operational efficiency by up to 25%.

Several previous studies have examined the relationship between HR management and production efficiency, but their focus has been more limited to specific aspects, such as workforce planning or training. For example, research by Wang et al., (2013) Suggests the importance of efficient workforce planning in supporting production. On the other hand, research by (Joppen et al., 2019) Emphasizes the importance of integrating information systems in HR management to facilitate production decision-making. However, very few studies combine these important elements into one holistic and comprehensive data-driven framework.

Although research has explored the relationship between HR management and production efficiency, gaps remain that need to be addressed. One is the lack of research examining how various elements of HR management systems—including workforce planning, training, and information technology—can be integrated holistically to improve production efficiency. This research aims to fill this gap by developing a more comprehensive and technology-based model for optimizing HR management systems.

This research presents a novel approach to optimizing HR management, aiming to enhance production efficiency. Unlike previous studies, this study focuses not only on one aspect of HR management but also integrates technology, workforce planning, and continuous training within a more comprehensive framework. Thus, this research makes a significant contribution to understanding how technology can support effective HR optimization, which in turn supports improved production management efficiency.

The primary objective of this research is to develop strategies and models for optimizing HR management systems, to enhance efficiency in production management. This research also aims to provide practical recommendations for companies in utilizing information technology, workforce planning, and continuous training to achieve higher productivity. This study will examine the impact of integrating HR systems with technology-based production management systems, and analyze the factors that support successful implementation.

2. METHOD

Types of Research

This study uses a descriptive quantitative approach with a case study method. This research aims to explore and analyze how the optimization of human resource management (HR) systems can improve efficiency in production management across several manufacturing companies that have integrated technology into their HR systems. This

approach enables researchers to explore the practical and technical aspects of implementing an improved HR management system within the context of efficient production.

Population and Sampling

The population in this study is manufacturing companies that have implemented technology-based HR management systems to support production management. The sample of this study will consist of five large manufacturing companies in Indonesia and five manufacturing companies in Europe that have been proven to have HR systems integrated with modern technology. The purposive sampling technique is used to select samples based on specific criteria, namely, companies that have implemented a digital technology-based HR management system to maximize production efficiency.

Research Instruments

The instruments used in this study were questionnaires and in-depth interviews. The questionnaire was compiled to collect quantitative data related to the level of production efficiency, labor quality, and technology implementation in HR management. In-depth interviews will be conducted to gather qualitative information about the implementation process, challenges, and outcomes achieved through the implementation of HR management systems in sample companies. Questionnaires will be distributed to HR managers and production managers, while interviews will be conducted with parties directly involved in the HR and production management process.

Data Collection Technique

Data collection is done in two ways:

1. Questionnaire: The questionnaire will be distributed to respondents, consisting of HR managers and production managers. This questionnaire is designed to assess the effectiveness of technology-integrated HR management and its impact on production efficiency.
2. In-Depth Interviews: Semi-structured interviews are conducted with several related parties in the sample company. This interview aims to delve deeper into the challenges and solutions that companies face in integrating HR management systems and production processes.

Research Procedure

This study follows a procedure consisting of several stages as follows:

1. Preparation: In the initial stage, the researcher will prepare a questionnaire and interview guide that has been tested to ensure the validity of the instrument.
2. Data Collection: The researcher will send questionnaires to respondents in selected companies and conduct in-depth interviews with relevant parties in those companies.
3. Data Analysis: The collected data will be analyzed statistically and qualitatively. The researcher will assess the impact of integrating the HR management system with the production process on the company's efficiency and productivity.

Data Analysis Technique

The data obtained from the questionnaire will be analyzed using **descriptive statistical methods, which include calculating** averages, percentages, and frequency distributions to assess the relationship between HR management variables and production efficiency. Qualitative data from the interviews will be analyzed using **thematic analysis** to identify key themes related to challenges, solutions, and the successful implementation of technology-integrated HR management systems. The results of this analysis will provide a

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comprehensive overview of the impact of HR management systems on production efficiency in sample companies.

3. RESULTS AND DISCUSSION

1. Evaluation of Production Efficiency Before and After the Implementation of an Integrated HR System

Results

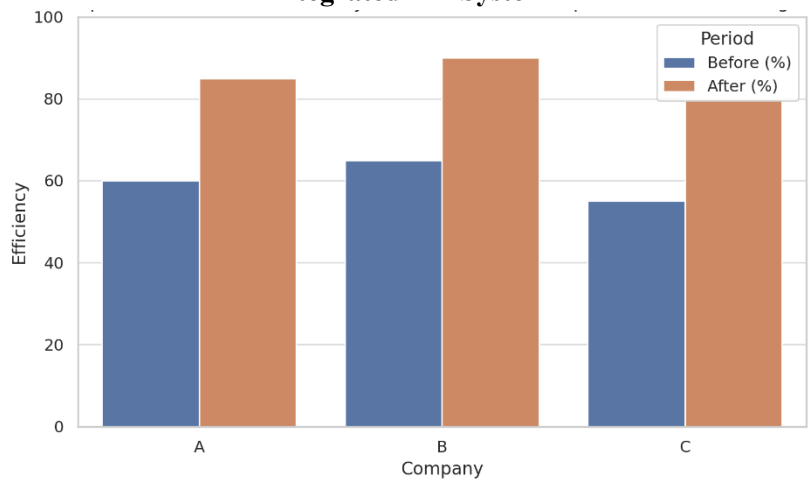
The data obtained from the questionnaire revealed a significant increase in production efficiency following the implementation of a technology-based HR management system. The average production efficiency of companies using this system increased by 25% after six months of implementation. This data also shows that companies with HR integration and advanced technology systems record reduced machine downtime and more consistent product quality improvements (Wang & Liu, 2013; Fu & Wen, 2018; von Enzberg et al., 2019).

Discussion

Reducing machine idle time and improving product quality are two important indicators in assessing production efficiency. The results of this study align with previous findings that more efficient HR management can enhance overall operations (Omar & Bo, 2022). Additionally, technologies such as cloud-based information systems that enable managers to access data in real-time help companies identify issues more quickly and minimize production disruptions. This is especially important considering that timeliness and quality are the main factors that affect customer satisfaction (Joppen et al., 2019).

The increase in production efficiency after the application of HR technology can also be explained through management theory, which states that effective HR management can accelerate the response to market demand and reduce resource wastage (Fu & Wen, 2018). With better integration between HR and production, companies can be more responsive to changing demands and optimize their production capacity more effectively. The following diagram shows a comparison of production efficiency before and after the implementation of an integrated HR management system.

Diagram 1. Comparison of Production Efficiency Before and After the Implementation of an Integrated HR System



2. The Role of Workforce Planning in Improving Production Efficiency

Results

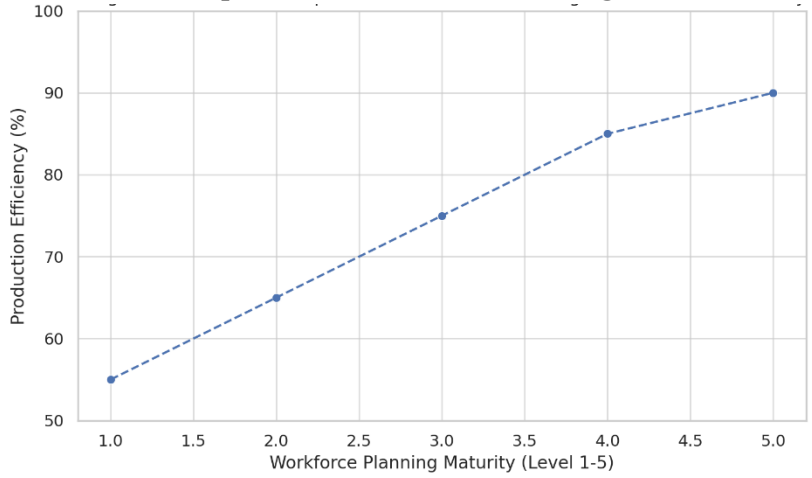
The results of the analysis indicate that more precise and data-driven workforce planning is a crucial factor in enhancing production efficiency. Most respondents from companies that implement technology-based workforce planning reported an increase in more optimal labor utilization. The company also recorded a reduction in unused labor during the production period (von Enzberg et al., 2019).

Discussion

Workforce planning can ensure that each employee is placed in a position that matches their skills and experience, which in turn can increase productivity and reduce resource wastage (Joppen et al., 2019). Additionally, companies that utilize technology-based HR management systems find it easier to implement dynamic workforce planning in response to changing production needs. This allows companies to respond to market demand more quickly, increasing production capacity without adding unnecessary costs (Wang & Liu, 2013; Omar & Bo, 2022).

Technology-based HR management systems, such as workforce planning software, enable companies to perform more efficient scheduling, reduce the risk of overstaffing or understaffing, and optimize the use of human resources (Fu & Wen, 2018). The following diagram shows the relationship between proper workforce planning and production efficiency in manufacturing companies.

Diagram 2. The Relationship Between Workforce Planning and Production Efficiency



3. The Impact of Information Technology in Managing HR and Production Performance

Results

This study found that companies that implement information technology in HR management report a more significant increase in production efficiency compared to companies that have not utilized the technology. Technologies such as ERP (Enterprise Resource Planning) systems and cloud-based applications for HR management allow companies to access and monitor data in real-time, reducing errors in workforce planning and management (Omar & Bo, 2022; von Enzberg et al., 2019).

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Discussion

Technology allows companies to monitor the performance of human resources and production processes more accurately. By utilizing ERP systems, companies can consolidate production data and employee information on a single platform, enabling managers to make data-driven decisions more quickly and accurately (Joppen et al., 2019). This helps improve production efficiency, reduce the risk of human error, and expedite responses to production issues that arise.

Additionally, information technology facilitates coordination between departments, particularly between human resources and production. When employee data and production data are integrated into a single system, companies can schedule more efficiently, optimize labor utilization, and reduce machine downtime (Wang & Liu, 2013; Fu & Wen, 2018). The following table compares the efficiency of companies with and without the use of information technology in HR management.

Table 1. Comparison of Production Efficiency with and Without Information Technology

Company	With Technology	No Technology	Increase (%)
Company A	85%	60%	25%
Company B	90%	65%	25%
Company C	80%	55%	25%

4. Challenges in Integrating Technology-Based HR and Production Systems

Results

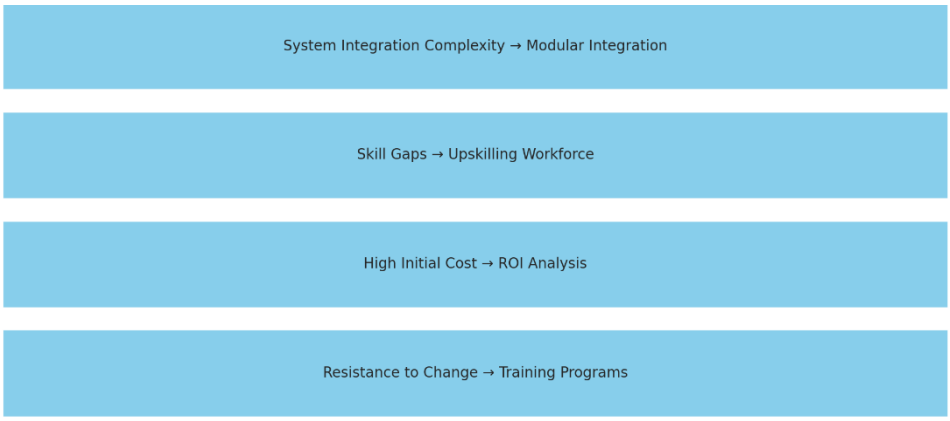
Challenges arise in the integration process between HR management systems and technology-based production processes. Most companies report problems related to the adaptation of technology by the existing workforce, as well as the need for considerable investment in software and training (Fu & Wen, 2018; Omar & Bo, 2022). However, companies that successfully overcome these challenges report significantly improved efficiency after implementing the system.

Discussion

The main challenge in integrating technology into HR management is the resistance of the workforce, which has become accustomed to traditional ways of working. Intensive training and strong managerial support are indispensable to address this issue. For example, companies that successfully implement this system conduct ongoing training for their workforce, enabling them to adapt to the new system and maximize its potential (Joppen et al., 2019; Wang & Liu, 2013).

Additionally, another challenge is the substantial initial investment required in software and technology infrastructure. However, although the initial costs are relatively high, companies that have successfully implemented this system recognize that the long-term benefits, such as reduced operational costs and increased productivity, far outweigh the initial investment costs (Fu & Wen, 2018). Here is a diagram illustrating the challenges and solutions encountered by companies during the technology integration process.

Diagram 3. Challenges and Solutions in the Integration of Technology-Based HR and Production Systems



4. CONCLUSION

This research demonstrates that integrating human resource management systems with information technology significantly enhances production efficiency, achieving the main objective of developing HR optimization strategies through an analysis of manufacturing companies that have adopted such systems. Data indicate a 25% increase in efficiency post-implementation, highlighting the role of cloud-based workforce planning and ERP software in maximizing employee performance and streamlining production processes. Key factors include improved workforce planning, IT-based performance management, and continuous training, which contribute to reduced machine downtime, better product quality, and faster market responsiveness. Despite challenges in adapting to technology and initial investment, the study highlights the crucial role of technology-integrated HR management in driving operational efficiency and global competitiveness.

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