
HUMAN RESOURCE OPTIMIZATION EFFORTS THROUGH DIGITAL TRANSFORMATION IN THE BOILER DIVISION OF PT. DAESE GARMEN

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ABSTRACT

Digital transformation has become a strategic necessity for the manufacturing industry in facing market dynamics and operational efficiency challenges. This study aims to analyze the implementation of digital transformation in optimizing human resources (HR) in the Boiler Division of PT Daese Garmen. Using a qualitative descriptive approach and case study method, data were collected through direct observation and semi-structured interviews. The results show that digitalization of work systems, such as computer-based steam pressure recording, QR/barcode-based attendance, and digital SOP distribution, successfully increased operational efficiency and accuracy. A job enlargement strategy was also implemented by transferring some helper tasks to foreman positions, in response to workforce reductions. Workload Analysis (WLA) revealed a gap between actual HR capacity and ideal needs, particularly for helper positions. These optimization efforts demonstrate that synergy between technology, employee training, and adaptive management is key to successful digital transformation in the context of technical work.

Keywords: digital transformation, HR optimization, job enlargement, workload analysis, work efficiency.

INTRODUCTION

Following the COVID-19 pandemic, advances in digital technology have accelerated change in a number of industrial sectors, including textiles and manufacturing. According to Wijaya and Nugroho, (Economy et al., 2023) Digital transformation encompasses more than just digitizing processes, but also involves integrating technology into every aspect of a business, including human resource management (HRM). A human-centered approach is particularly prominent in the Industry 5.0 era, where technology helps people become more strategic and productive.

Prasetyo et al. (Impact et al., 2025) states that organizational preparation at both the structural and cultural levels is necessary for digital transformation. This includes enhancing workers' digital capabilities, restructuring workflows, and modifying job descriptions to make them more tech-savvy. In workplaces like the boiler department, which has historically relied heavily on manual procedures, digitalization presents both challenges and opportunities for improving operational efficiency.

The international manufacturing company Daese Garment Co., Ltd., founded in South Korea and operating in Indonesia for over ten years, includes PT Daese Garmen. With an emphasis on exports to European and

American markets, the company is renowned as a significant apparel manufacturer for several global brands. In an effort to increase productivity and competitiveness globally, PT Daese Garmen has begun implementing digital transformation in line with the shifting industrial environment post-pandemic. The Boiler Division, which previously relied largely on manual labor techniques, is one of the divisions undergoing significant modifications. According to the study, (Subariyanti et al., 2025) This change not only involves the use of digital technology, but also strengthening HR management techniques through an Agile HR approach and job expansion.

As a player in the national apparel sector, the company has begun utilizing digital transformation to increase productivity and address workforce constraints caused by resignations and transfers. As a key production support unit, the Boiler Division has undergone substantial changes in reporting, work methods, and daily work monitoring.

Digitizing steam pressure recording, a QR/barcode-based online attendance system, and disseminating standard operating procedures (SOPs) through digital platforms are some of the efforts that have been undertaken. Furthermore, a job expansion plan for the foreman role has been implemented to optimize human resources by adding tasks previously performed by assistants. The Agile HR methodology, which prioritizes position flexibility and employee skill development, aligns with these efforts. (Dewanto et al., 2024)

These changes not only impact work effectiveness but also require companies to adjust their work structures, reporting systems, and HR governance. These adjustments align with a study by Andini & Harahap (2023), which confirmed that the success of digital transformation is largely determined by the synergy between business strategy, work systems, and HR development.

This research aims to examine how digital transformation can optimize HR performance in the Boiler Division of PT. Daese Garmen, as well as analyze implementation challenges in a previously manual-based work environment. The results are expected to serve as a practical reference for similar industrial companies currently digitizing their technical work units.

LITERATURE REVIEW

Digital Transformation in the Context of Industrial HR

Digital transformation is a process of structural change within an organization triggered by the adoption of modern information technology to improve operational efficiency, competitiveness, and responsiveness. In the context of the textile industry, such as PT. Daese Garmen, digital transformation plays a crucial role as a catalyst for increased productivity, particularly in technical divisions like the Boiler. A study by (Alayida et al., 2023) emphasizes that digital transformation can enhance company capabilities through competent and adaptive human resources. Human resources are considered the key players in determining the success of new technology implementation. With a knowledge-, skills-, and behavior-based

assessment approach, digital transformation drives performance improvements through human resource optimization.

HR Optimization and Job Enlargement Strategy

Human resource optimization in the Boiler Division of PT. Daese Garmen is implemented through three main approaches: competency development training, utilization of information technology, and implementation of job enlargement strategies. (Damanik, 2021) Job enlargement aims to increase task variety horizontally to make work more dynamic without increasing hierarchical responsibilities. This is in line with findings from (Salah et al., 2025) which states that role flexibility and cross-functional collaboration in digital work structures can create a more productive and resilient work environment.

Based on observations collected during fieldwork from March 3 to May 3, 2025, it was discovered that several helper job descriptions, such as scrubber tank cleaning, coal removal, and ash monitoring, were transferred to foreman positions. This step was taken following a reduction in human resources due to resignations and transfers, necessitating task restructuring to maintain operational continuity. This job enlargement was reinforced by incentive allowances as a token of appreciation for the additional responsibilities.

The Impact of Digital Transformation on Operational Efficiency

Significant changes have occurred in the recording and reporting processes in the Boiler Division, which were previously done manually using paper. The implementation of digital systems such as monitor-based steam pressure recording and digital reporting has reduced the potential for human error and increased information accuracy. As explained by (Salah et al., 2025) An integrated digital technology-based business information system can drive increased productivity when coupled with a sustainable HR management strategy. This system enables real-time monitoring and faster decision-making.

Human Resources Competence and Adaptability as Key Factors

As explained by (Innovation & Social Sciences, 2025) Organizational capabilities in the digital era depend heavily on individual readiness to adopt change. Employees with a positive work attitude, basic digital skills, and a willingness to participate in training are crucial assets in the transformation process. The study shows that successful digital transformation is always preceded by cultural adjustments and systematic training programs.

In the case of PT. Daese Garmen, development training for employees transferred to the Utility Division was conducted using a systematic approach over five working days. This training covered understanding pressure systems, compressor operating principles, and the use of personal protective equipment (PPE). This approach aligns with the sustainable personnel management framework proposed by (Sulaeman, 2025) where the balance

between technology and HR readiness is the key to the organization's long-term success.

Strategic Synergy between Technology and Human Resource Management

Digital transformation cannot stand alone without the support of adaptive and sustainable managerial policies. (Sulaeman, 2025) in his journal emphasized the importance of an integrative strategy between information systems and HR management in creating consistent productivity. This approach is evident in the implementation of a QR/barcode-based digital attendance system, the digitization of SOPs, and the redistribution of work roles through job enlargement in the Boiler Division. Considering the company's internal conditions and global trends in digital technology adoption, it can be concluded that the success of HR optimization through digital transformation is largely determined by the integration of training, new work structures, and managerial systems aligned with the company's vision.

RESEARCH METHODS

This research uses a qualitative descriptive approach with a case study method. The goal is to gain a deeper understanding of the HR optimization strategy through digital transformation implemented in the Boiler Division of PT. Daese Garmen. Data collection techniques include:

1. Direct observation in the field - to find out the actual conditions of task implementation and use of digital systems.
2. Semi-structured interviews - with several employees from various positions (helper, foreman, and staff) as well as the division head who is also a staff member to obtain a comprehensive overview of the implementation and challenges of digital transformation.

The research subjects were all human resources of the Boiler Division, totaling 11 people before optimization, with a focus on changes after reducing human resources to 9 people and implementing job enlargement.

Data analysis techniques are carried out through the following stages:

- a. Data reduction: filtering relevant data from interviews, observations, and documents.
- b. Data presentation: grouping findings by theme (e.g. digital system effectiveness, HR adaptation, and job description changes).
- c. Conclusion drawing and verification: compiling interpretations of data results to formulate final conclusions regarding the effectiveness of HR optimization strategies through digital transformation.

This method was chosen because it allows researchers to explore social and cultural realities in the work transformation process, particularly in previously highly manual technical operational environments.

RESULTS AND DISCUSSION

A. Initial Condition of Boiler Division and HR Problems

Before the digital transformation, the work system in PT. Daese Garmen's Boiler Division was still very conventional. All record-keeping was done manually using paper, from steam pressure reports and employee attendance to daily activity reports. Furthermore, the division of labor between helpers, foremen, and staff was not flexible. This reliance on manual processes led to delays in information, recording errors, and increased uneven workloads, especially during downsizing due to transfers and resignations.

B. Implementation of Digital Transformation and Job Enlargement Strategy

Digital transformation is carried out through several initiatives, including:

1. Digitalization of steam pressure recording using an integrated monitoring system.
2. Digital attendance based on scanning employee ID card barcodes
3. Digital SOP distribution via monitor screen.
4. Monitoring the use of PPE using CCTV.
5. Daily reporting via email, no more paper.

In line with its digital transformation, the company is implementing a job enlargement strategy to address the talent shortage, particularly in helper positions. Several technical tasks, such as scrubber cleaning, coal transportation, and ash residue monitoring, are now delegated to foremen, with compensation in the form of additional benefits. This strategy is considered effective in maintaining operational continuity without adding new employees.

C. Workload Analysis (WLA) and Ideal HR Requirements

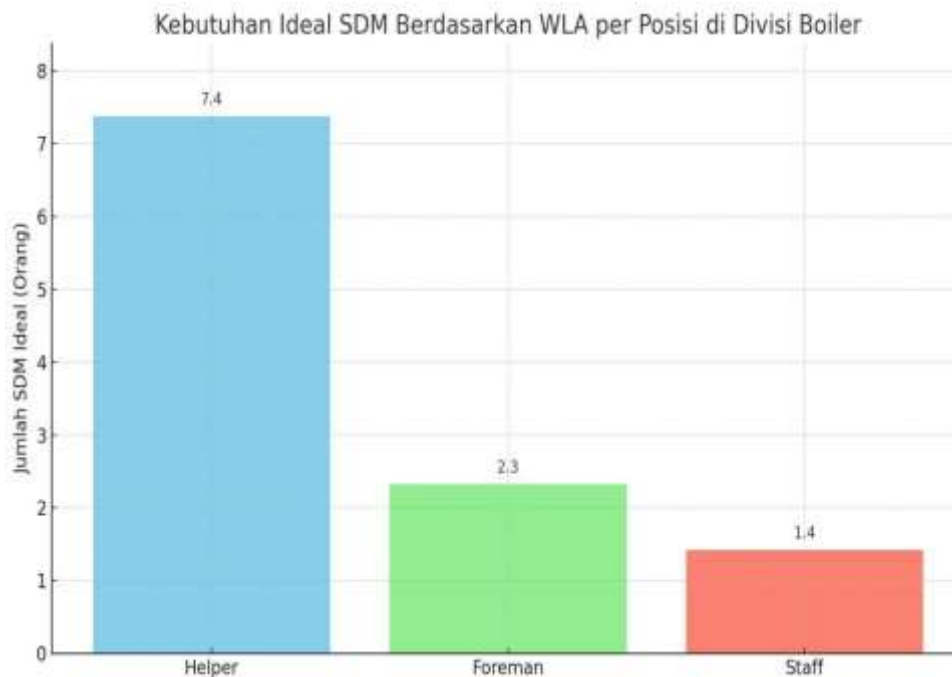
Based on observations and analysis of effective working hours, WLA calculations were performed to determine the ideal human resource requirements for each position. The following table shows the results of these calculations:

Table 1. Workload Analysis (WLA) Calculation Results

Position	Total workload (minutes/month)	Ideal effective time (minutes/month)	Ideal needs of people (minutes/month)
Helper	62,330	8,448	7.3
Foreman	19,657.5	8,448	2.3
Staff	12,021.9	8,448	1.4

The table shows that although the number of available helpers is 5, the ideal requirement is more than 7. This gap is being bridged by job enlargement to foremen and the use of technology to expedite administrative activities.

Figure 1. Graph of Ideal Human Resource Needs Based on WLA



From the graph it can be seen that:

- a. Helpers are the position with the highest workload, reaching 62,330 minutes per month. When divided by the ideal work capacity, the requirement is approximately 7.4 people. The actual number is only 5. This indicates a significant structural gap that can lead to work overload, decreased productivity, and potential human error in the execution of technical tasks.
- b. Foremen have a total workload of 19,657.5 minutes per month, equivalent to the ideal requirement of 2.3 people. Two active foremen are currently available, who are also receiving additional workloads from helpers through a job enlargement strategy as a short-term solution to maintain operational continuity without hiring new staff.
- c. Staff have a total workload of 12,021.9 minutes per month, equivalent to the ideal requirement of 1.4 people. This number is within acceptable limits, as most staff activities are administrative and supported by digital systems, making time efficiency easier to achieve compared to field technical positions.

This graph provides a powerful visual illustration of the imbalance between workload and workforce availability. The most pronounced imbalance is found in the helper position, which is central to the daily operations of the Boiler Division. Therefore, strategic measures such as the use of digital technology, redistribution of work tasks, and additional compensation for employees with expanded responsibilities are crucial.

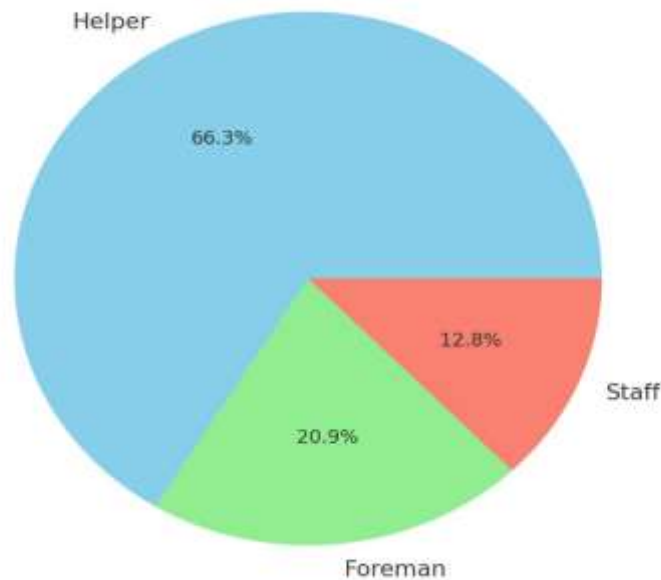
Furthermore, the results of this graph demonstrate the importance of data-driven workforce planning. This not only prevents work overload, which can lead to decreased performance, but also serves as a basis for long-term

decision-making regarding HR planning, operational cost efficiency, and overall work system improvement.

By using a quantitatively visualized WLA approach, management can be more accurate in designing an organizational structure that is responsive to the dynamics of work needs, especially in the industrial era 4.0 which demands high speed, accuracy, and efficiency in every operational line.

Figure 2. Pie Chart of Ideal Workload Distribution per Position

Distribusi Persentase Kebutuhan Ideal SDM (WLA)



Based on the calculation results, it is known that:

- Helper positions account for approximately 68% of the total ideal human resource requirement. This indicates that helpers play a dominant role in carrying out daily technical activities, such as coal transportation, combustion chamber cleaning, and managing combustion residues (ash and dust).
- The Foreman position occupies the second proportion, namely around 21%, which shows that the coordinating and operational supervision roles have a significant portion.
- Meanwhile, the Staff position is at the lowest proportion, at around 11%, because the nature of the work is more administrative and digital data-based monitoring.

This proportion reinforces the need for a job enlargement strategy, particularly for the Foreman position, to help balance the workload previously concentrated on Helpers. By shifting some tasks and implementing efficient digital systems, companies can reduce the risk of burnout and ensure smooth operations, even if the actual workforce is below ideal requirements.

Visualization of Workload Comparison and Ideal Capacity (Stacked Bar)

To strengthen the analysis of the effectiveness of workload distribution and actual work capacity in the Boiler Division, a stacked bar diagram is used which displays two main variables, namely:

- Total actual workload (minutes/month) based on field observation results
- Ideal effective working time (minutes/month) based on the working time standard for one person (8,448 minutes/month)

Figure 3. Stacked Bar Diagram of Workload vs. Ideal Capacity per Position



Based on the graph above, it can be seen that:

- In the Helper position, the actual workload reached 62,330 minutes per month, far exceeding the ideal capacity for one person. In this context, at least seven helpers are needed to distribute the workload evenly and optimally. However, the actual number is only five.
- The total workload for the Foreman position is 19,657.5 minutes per month, which should ideally be handled by 2.3 people. However, currently, there are only two foremen available, who also take on additional tasks from helpers through a job enlargement scheme.
- For Staff positions, a workload of 12,021.9 minutes/month indicates a need for approximately 1.4 people, which can be achieved through work rationalization and reporting digitization.

This visualization demonstrates the imbalance between actual workforce capacity and actual workload, particularly for Helper positions. Therefore, digital transformation strategies and workload redistribution are crucial for maintaining work efficiency and operational continuity.

In addition, this diagram also emphasizes the importance of continuous monitoring through WLA, so that managerial decisions regarding workforce structure are not only based on estimates, but on systematically measured data.

Effectiveness of Digital Transformation on Work Efficiency

Digital transformation has been proven to increase work efficiency by reducing the risk of human error and accelerating reporting processes. The following table compares manual and digital systems:

Table 2. Comparison of Activities Before and After Digital Transformation

Activity	Before Transformation (Manual)	After (Digital) Transformation	Positive impact
Steam pressure recording	Handwriting	Computer input	Accuracy increased
Absence	Present book	QR/barcode	Cannot be manipulated
SOP Distribution	Paper stickers	Information monitor screen	quickly socialized
PPE Supervisor	Direct supervision	CCTV auto detect	Effectiveness of supervision
Daily Reporting	Delivered directly	Work email/application	more efficient

Human Resource Adaptation to System Changes

The success of a system transformation depends heavily on the readiness and adaptability of Human Resources (HR). New employees or those transferred to the Utilities Division receive intensive 5-day training that includes:

- a. Understanding pressure systems
- b. Compressor working principle
- c. Use of personal protective equipment (PPE)

Digital Competence as a Foundation

Digitalization is synonymous with improving human resources' digital competency capabilities—such as digital literacy, data analytics, and cybersecurity. Recent research emphasizes that technology-based training, such as e-learning, virtual reality (VR) simulations, and the use of big data analytics, has been shown to increase employee effectiveness and readiness for digital system changes. (Larasati & Perkasa, 2025)

Sociotechnical Systems Approach

Sociotechnical theory emphasizes the importance of integrating human (social) and technical aspects. Adaptation is not only about technology, but is also influenced by organizational structure, work culture, and leadership styles that support innovation and flexibility. (Adolph, 2016)

Adaptive Strategy and Competency-Based Learning

A competency-based HR management model enables organizations to assess specific skills needs and design relevant intensive training—as implemented in employee rotations to the Utilities Division. This strategy encourages re-skilling, up-skilling, competency certification, and performance evaluation based on digital and technical competencies. (Gifa et al., 2025)

HR Paradigm Shift to Digital-Strategic

Digital transformation shifts the focus of HR management from administration to strategy—focusing on talent development, increased productivity, and innovation. Companies that successfully leverage technology in HR management demonstrate increased operational efficiency, more objective decision-making, and more effective career planning through e-HRM systems and analytics. (Winanda1 & Veri, 2025)

Practical Challenges and Recommendations

Some common challenges include employee resistance to new technologies, digital literacy gaps, and inadequate IT infrastructure. Recommended strategies include targeted digital training, organizational policies that support innovation and continuous learning, and consistent leadership support. (Rahmadi & Rusmiati, nd)

Output and Impact

By integrating technical training with digital competency strategies and a socio-technical systems approach, organizations can achieve more capable and resilient human resource adaptation, seamless integration between technology and operations, and increased productivity and organizational flexibility in responding to system and technology changes. (Winanda1 & Veri, 2025)

CONCLUSION

The digital transformation implemented in the Boiler Division of PT Daese Garmen has proven to be a strategic step in addressing operational challenges, particularly related to work efficiency and human resource (HR) management. The use of digital technologies such as computer-based steam pressure recording and QR/barcode attendance has increased accuracy, accelerated reporting, and improved work communication. The success of this transformation was also supported by a job enlargement strategy, which allows for redistribution of the workload without increasing the number of employees. This change in work structure has proven effective, especially when combined with appropriate training so that HR can adapt to expanded responsibilities. The Workload Analysis (WLA) results indicated an excess workload in helper positions, which can be addressed through digitalization-based workforce planning and the provision of appropriate incentives. In terms of individual readiness and organizational structure, the success of the transformation is also influenced by an adaptive mindset, a good training system, and a flexible managerial approach. Overall, digital transformation is not just a technical innovation, but a process of changing work culture that requires a comprehensive commitment from all elements of the organization to achieve sustainable HR optimization.

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