



Improving Digital Application Skills for LPG Cylinder Maintenance from a Human Resource Management Perspective at PT Bumi Musi Sukses

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Abstract.

Background

Digital transformation in LPG cylinder maintenance requires employees to adapt to information technology systems that support data accuracy, operational transparency, and safety assurance. As a maintenance partner of PT Pertamina, PT Bumi Musi Sukses has implemented digital applications to support LPG cylinder inspection, pressure testing, and maintenance documentation. However, the effectiveness of this digital system depends on employees' digital skills and the human resource management strategies used to support technology adaptation.

Objectives

This study aimed to analyze the improvement of employees' digital application skills in LPG cylinder maintenance from a human resource management perspective at PT Bumi Musi Sukses.

Methods

This study used a descriptive quantitative approach. The population consisted of 25 employees involved in LPG cylinder maintenance activities, while the sample consisted of 15 administrative staff selected using purposive sampling. Data were collected through questionnaires, observation, and documentation. The questionnaire used a five-point Likert scale and covered four variables: digital application skills, information technology adaptation, HRM-based training and support, and maintenance effectiveness and occupational safety. Data were analyzed descriptively using mean scores and interpretation categories.

Results

The findings showed that employees' digital application skills were in the high category. Administrative staff were able to operate the main features of the digital maintenance application, input LPG cylinder inspection data, and process maintenance requests independently. Technology adaptation was also categorized as very high, supported by intensive training, supervisor assistance, and the perceived ease of use of the application. From the HRM perspective, training and technical guidance helped reduce input errors and improve employee confidence in using digital systems. However, unstable internet connectivity remained the main obstacle because it caused data synchronization failure and repeated data entry. The use of digital applications had a positive impact on maintenance efficiency, data accuracy, reporting speed, transparency, and occupational safety.

Conclusion

Improving digital application skills contributes to more efficient and accurate LPG cylinder maintenance at PT Bumi Musi Sukses. HRM strategies such as continuous training, digital SOPs, field assistance, and employee motivation are important for strengthening technology adaptation. The company is advised to improve internet infrastructure and develop application features such as auto-save and offline mode to minimize data loss and support safer LPG cylinder maintenance.

Keywords: Digital Skills; Human Resource Management; Technology Adaptation; LPG Cylinder Maintenance; Occupational Safety.

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INTRODUCTION

PT Pertamina plays an important role in ensuring the distribution, quality, and safety of LPG cylinders used by the public. The safety of LPG cylinders is a fundamental aspect because cylinders that do not meet technical standards may create serious operational and safety risks. One important part of this safety assurance system is the role of LPG cylinder maintenance workshops or retesters, such as PT Bumi Musi Sukses, which carries out physical inspection, pressure testing, maintenance, painting, and final quality checks. As one of Pertamina's maintenance partners, PT Bumi Musi Sukses supports the safety and

reliability of LPG cylinder circulation through standardized maintenance procedures and quality control processes.

In line with digital transformation within Pertamina's operational environment, LPG cylinder maintenance workshops are required to integrate digital applications into their operational processes. Digital applications are used to improve the accuracy of technical data, accelerate reporting, and support real-time monitoring of cylinder eligibility status. Digitalization also helps reduce dependence on manual recording systems, which are more vulnerable to input errors and data loss. According to Armstrong and Taylor (2020), human resource management plays a strategic role in developing employee competencies so that workers are able to respond effectively to changes in technology and organizational systems. Therefore, the implementation of digital applications in LPG cylinder maintenance requires not only technological readiness but also employee readiness.

However, digital transformation does not only involve the availability of technology. Its success depends heavily on human resources who operate the system. Employees must be able to understand application workflows, input technical data correctly, respond to system updates, and adapt to new work procedures. Davis (1989), through the Technology Acceptance Model, explains that technology adoption is influenced by perceived usefulness and perceived ease of use. This means that employees are more likely to accept and use digital applications when they believe that the system is useful and easy to operate.

In the context of workplace digitalization, digital skills are an important component of employee competence. Digital literacy includes the ability to understand, use, and evaluate information through digital systems (Bawden, 2018). For administrative staff at PT Bumi Musi Sukses, digital skills are required to manage LPG cylinder maintenance data, submit maintenance requests, input inspection results, and ensure that technical records are accurate. Belshaw (2011) further emphasizes that digital literacy is not limited to technical operation but also includes cognitive understanding of digital workflows. Thus, employees must not only be able to operate the application but also understand how digital data supports operational accuracy and safety control.

The field problem identified in this study is the existence of a digital skill gap among employees who were previously accustomed to manual work systems. This gap may cause operational inefficiency, repeated data input, and errors in technical documentation. In LPG cylinder maintenance, data accuracy is closely related to occupational safety because incomplete or inaccurate records may affect the traceability and eligibility status of cylinders. ISO 45001 (2018) highlights the importance of systematic occupational health and safety management, including proper documentation and control mechanisms to reduce work-related risks. Therefore, digital applications can support safety management when employees have adequate skills to use them correctly.

From a human resource management perspective, improving employees' digital application skills requires structured training, technical assistance, clear digital standard operating procedures, and continuous motivation. Noe (2017) states that training is a systematic effort to improve employees' knowledge, skills, and work behavior. In this study, training and supervisor assistance are viewed as important HRM strategies to help employees adapt to digital applications used in LPG cylinder maintenance. In addition, Venkatesh et al. (2003) argue that social support and facilitating conditions strongly influence technology acceptance and use. This suggests that management support, technical facilities, and workplace guidance are essential for successful digital adaptation.

Therefore, this study analyzes the improvement of digital application skills in LPG cylinder maintenance from a human resource management perspective at PT Bumi Musi Sukses. This study focuses on digital skills, technology adaptation, HRM-based training and support, and the impact of digitalization on maintenance effectiveness and occupational safety. The findings are expected to provide practical recommendations for strengthening employee digital competence, improving operational efficiency, reducing data input errors, and supporting safer LPG cylinder maintenance processes.

METHOD

Research Design

This study used a descriptive quantitative approach. This method was selected because the study aimed to describe employees' digital application skills, technology adaptation, HRM support, and the impact of digital application use on LPG cylinder maintenance effectiveness and safety.

Research Site and Time

The research was conducted at PT Bumi Musi Sukses, a maintenance partner of PT Pertamina located around Palembang, South Sumatra. The company provides maintenance and retesting services for 3 kg LPG cylinders. The independent project was carried out for approximately four months.

Population and Sample

The population consisted of all employees of PT Bumi Musi Sukses who were involved in operational and managerial activities related to LPG cylinder maintenance. The population included 25 employees. The sample consisted of 15 administrative staff selected using purposive sampling. The administrative staff were selected because they had direct responsibility for operating the digital application, receiving cylinder maintenance data, submitting work requests, and recording maintenance results.

Data Collection

Data were collected through questionnaires, observation, and documentation. The questionnaire was distributed to administrative staff using Google Form. The questionnaire used a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

The questionnaire consisted of four variables. Variable A was digital application skills, which measured employees' technical ability to operate the maintenance application. Variable B was information technology adaptation, which measured employees' readiness and acceptance of digital system changes. Variable C was the HRM perspective, including training and support, which measured the role of management in helping employees use the digital application. Variable D was maintenance effectiveness and occupational safety, which measured the impact of digital application use on reporting accuracy, transparency, maintenance quality, and LPG cylinder safety.

Observation was conducted in the workplace to examine how administrative staff operated digital applications in the LPG cylinder maintenance process. Documentation was used to obtain secondary data, such as company profile, organizational structure, digital SOPs, and maintenance activity records.

Data Analysis

The data were analyzed using descriptive statistics by calculating the average score of each questionnaire item and variable. The results were interpreted using categories such as very high, high, moderate, and low. Observation and documentation findings were used to strengthen the interpretation of questionnaire results.

RESULTS AND DISCUSSION

Results

The results are presented based on four main variables: digital application skills, information technology adaptation, HRM-based training and support, and maintenance effectiveness and occupational safety.

Digital Application Skills

The results showed that employees' digital application skills were generally categorized as high. Administrative staff were able to operate the main features of the digital maintenance application, input LPG cylinder testing data, and process maintenance requests independently.

Table 1. Results of digital application skills

Variable	Indicator	Main Finding	Interpretation
Digital application skills	Ability to operate the application independently	Most respondents agreed that they could operate the application without assistance.	High
Digital application skills	Understanding of application features	Respondents understood the main features and menus in the company's digital application.	Very high
Digital application skills	Speed of data input	Employees could input pressure test and leakage test data quickly.	Very high
Digital application skills	Accuracy of data entry	Employees rarely made typing or input errors after using the application.	Very high
Digital application skills	Ability to handle minor technical problems	Some employees were still unsure about handling application errors independently.	Moderate

The findings indicate that employees had good basic competence in using the digital application. However, their ability to solve minor technical problems still needs improvement.

Information Technology Adaptation

Technology adaptation was categorized as very high. Employees perceived the digital system as useful and easier than the previous manual system.

Table 2. Results of information technology adaptation

Variable	Indicator	Main Finding	Interpretation
Technology adaptation	Perceived usefulness	Employees felt that the digital system made their work easier than the manual system.	Very high
Technology adaptation	Ease of use	The application interface was considered easy to understand.	Very high
Technology adaptation	Willingness to learn updates	Employees were willing to learn new application features.	Very high
Technology adaptation	Confidence in using technology	Employees felt more confident working with digital technology.	Very high
Technology adaptation	Acceptance of digital work obligations	Employees did not feel burdened by the obligation to use digital devices.	Very high

The results show that employees had a positive attitude toward digital transformation. Training, supervisor assistance, and ease of application use supported the adaptation process.

HRM-Based Training and Support

The HRM perspective showed that training and managerial support played an important role in improving employee digital competence.

Table 3. Results of HRM-based training and support

Variable	Indicator	Main Finding	Interpretation
HRM training and support	Training before implementation	Employees received sufficient training before the application was fully implemented.	Very high
HRM training and support	Practical training materials	Training materials were easy to apply directly in the maintenance area.	High
HRM training and support	Supervisor assistance	Supervisors provided guidance when employees experienced difficulties.	High
HRM training and support	Digital SOP availability	The company provided clear digital guidelines or SOPs.	High
HRM training and support	Motivation and appreciation	Employee appreciation for digital mastery was still limited.	Moderate

The findings indicate that training, guidance, and SOPs supported employee adaptation. However, reward and motivation systems for employees who mastered digital technology still need improvement.

Maintenance Effectiveness and Occupational Safety

The use of digital applications had a very positive impact on maintenance effectiveness and occupational safety.

Table 4. Results of maintenance effectiveness and occupational safety

Variable	Indicator	Main Finding	Interpretation
Maintenance effectiveness and K3	Accuracy of maintenance reports	Digital applications made maintenance reports more accurate.	Very high
Maintenance effectiveness and K3	Transparency and traceability	Documentation of eligible cylinders became more transparent and traceable.	Very high
Maintenance effectiveness and K3	Completeness of testing process	Digitalization helped ensure that no cylinder was missed in the testing process.	Very high

Maintenance effectiveness and K3	Real-time technical records	Real-time records improved safety assurance for LPG cylinders.	Very high
Maintenance effectiveness and K3	Service quality improvement	Digital skills improved the overall service quality of PT Bumi Musi Sukses.	Very high

The findings show that digital application use improved data accuracy, work speed, reporting transparency, and safety assurance. The system helped ensure that LPG cylinders were properly recorded and tested before being declared suitable for circulation.

Summary of Findings

Table 5. Summary of main findings

Variable	Main Result	Key Issue
Digital application skills	Employees were competent in operating the main application features.	Minor technical troubleshooting still needs improvement.
Technology adaptation	Employees accepted and adapted well to digital systems.	Internet instability remained an obstacle.
HRM training and support	Training, supervisor guidance, and digital SOPs supported adaptation.	Reward and motivation systems need strengthening.
Maintenance effectiveness and K3	Digitalization improved accuracy, transparency, reporting speed, and safety.	Infrastructure reliability must be improved.

Discussion

The findings of this study show that the digital application skills of administrative staff at PT Bumi Musi Sukses are generally in the high category. Employees were able to operate the main features of the digital maintenance application, input LPG cylinder testing data, and process maintenance requests independently. This condition indicates that the transition from manual recording to a digital system has been accepted at the operational level. From a human resource management perspective, this finding is in line with Armstrong and Taylor (2020), who stated that employee competence development is a strategic function of human resource management in supporting organizational change. In this study, the improvement of digital skills reflects the success of competency development in response to digital transformation.

However, the results also show that employees' ability to handle minor technical problems remains at a moderate level. This indicates that although employees are competent in using the main application features, they still require additional support when facing application errors or technical disruptions. Noe (2017) emphasized that training should not only introduce new systems but also equip employees with practical problem-solving skills. Therefore, PT Bumi Musi Sukses needs to strengthen technical troubleshooting training so that employees can respond more independently when the application experiences minor operational problems.

The high level of technology adaptation found in this study also confirms that employees perceived the digital system as useful and easy to use. This finding supports the Technology Acceptance Model proposed by Davis (1989), which explains that perceived usefulness and perceived ease of use are key factors influencing users' acceptance of technology. Administrative staff felt that the digital system made their work easier than the previous manual system, especially in recording maintenance data, submitting requests, and tracking the status of LPG cylinder maintenance. This positive perception helped accelerate the adaptation process.

The role of management support was also clearly reflected in the findings. Training, supervisor assistance, and digital standard operating procedures helped employees adapt to the digital application. This is consistent with Venkatesh et al. (2003), who argued that social influence and facilitating conditions play an important role in technology acceptance and use. In this study, supervisor guidance and accessible SOPs functioned as facilitating conditions that reduced employee uncertainty when using the application. These HRM interventions also helped minimize input errors and improve employee confidence in digital work processes.

From the perspective of digital literacy, the findings indicate that employees were not only able to operate the application technically but also understood its function in supporting maintenance accuracy and reporting transparency. Bawden (2018) explained that digital literacy involves the ability to use and understand information in digital formats, while Belshaw (2011) emphasized that digital competence includes cognitive understanding of digital workflows. In the context of LPG cylinder maintenance, this means that employees need to understand how correct data input affects traceability, maintenance records, and product safety.

The study also found that unstable internet connectivity was the main obstacle in the implementation of digital applications. Although employees had good digital skills, weak connectivity caused data synchronization failures and repeated data entry. This finding shows that digital transformation cannot rely only on employee competence; it also requires adequate technological infrastructure. In line with Venkatesh et al. (2003), facilitating conditions such as reliable devices, stable networks, and technical support strongly influence the success of technology use in the workplace.

The impact of digital application skills on maintenance effectiveness and occupational safety was very positive. Digitalization improved report accuracy, accelerated documentation, increased transparency, and helped ensure that no LPG cylinder was missed in the testing process. This finding is relevant to ISO 45001 (2018), which emphasizes the importance of systematic documentation, risk control, and safety management in the workplace. In LPG cylinder maintenance, accurate and traceable digital records are essential because they help ensure that only cylinders meeting safety standards are declared suitable for distribution.

Overall, the findings suggest that digital skills, technology adaptation, HRM support, and occupational safety are closely connected. Employees with stronger digital skills are more capable of using the system accurately and consistently. Meanwhile, HRM strategies such as continuous training, supervisor guidance, SOP provision, and motivation help strengthen employee adaptation to information technology. Therefore, improving digital application skills is not only important for work efficiency but also for maintaining the safety and reliability of LPG cylinder maintenance at PT Bumi Musi Sukses.

CONCLUSION

This study concludes that the digital application skills of administrative staff at PT Bumi Musi Sukses are generally in the high and competent category. Employees are able to operate the main features of the LPG cylinder maintenance application, input technical data, and support digital work processes independently.

The main supporting factors for technology adaptation are management support, intensive training, supervisor assistance, and clear digital SOPs. However, unstable internet connectivity remains the main obstacle because it can cause data synchronization failure and repeated data entry.

From a human resource management perspective, training, technical guidance, and digital SOPs are effective strategies for improving employees' digital competence and reducing operational errors. However, reward and motivation systems should be strengthened to encourage employees to master digital technology more actively.

Improved digital application skills have a positive impact on work efficiency, data accuracy, reporting speed, transparency, and occupational safety. The digital system helps ensure that LPG cylinder maintenance and testing processes are properly documented, thereby reducing the risk of unfit cylinders being distributed to consumers.

The company is advised to improve internet infrastructure in the workplace, provide continuous digital troubleshooting training, strengthen reward systems for digitally competent employees, and coordinate with application developers to add auto-save and offline mode features.

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AUTHOR CONTRIBUTION STATEMENT

Athalla Naufal Dianto contributed to the conceptualization of the study, data collection, field observation, data analysis, and preparation of the initial manuscript draft. Trisninawati provided academic supervision, methodological guidance, validation, and manuscript review. I Bagus Endrawan contributed to manuscript review, critical revision, and final approval of the article. All authors have read and approved the final version of the manuscript.

CONFLICT OF INTEREST AND FUNDING

The authors declare that there is no conflict of interest regarding the publication of this article.

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