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Analysis of Optimization of Scan In and Out Goods Data Input Process to Increase Operational Efficiency at PT Indonesia Nippon Seiki

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ABSTRACT

This study aims to analyze and optimize the process of data entry for goods using the scan in and scan out system at PT Indonesia Nippon Seiki. The research employs a descriptive method with a quantitative approach to describe the actual conditions and identify problems occurring in the warehouse data management process. Data collection techniques include observation, interviews, and documentation to obtain comprehensive, valid, and relevant data. The results show that the barcode-based data entry system implemented has improved the speed, orderliness, and accuracy of inventory data recording in a more systematic and integrated manner. However, several obstacles are still encountered in its implementation, such as delays in data input due to scanning queues, barcode reading errors, discrepancies between system data and physical inventory, and network disruptions affecting real-time data access. These findings indicate that system effectiveness is not solely determined by technology but is also influenced by work procedures, human resource quality, and supporting infrastructure. Therefore, optimization efforts are required through workflow improvements, employee competency enhancement, network system strengthening, and the implementation of more effective and sustainable internal controls to improve the company's operational performance.

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INTRODUCTION

The development of the manufacturing industry in the era of globalization and digital transformation requires companies to improve efficiency, effectiveness, and accuracy in all operational activities. Companies no longer focus solely on production processes but also on integrated data management as a basis for managerial decision-making. Inaccurate data has the potential to lead to misinformation, distribution delays, and financial losses, which can impact overall company performance (Susanto, 2021; Hall, 2022).

In operational activities, particularly in logistics and warehousing functions, the use of technology-based information systems such as barcodes and integrated databases has become a primary requirement. These systems enable the rapid and real-time recording of incoming (scan-in) and outgoing (scan-out) goods, thereby improving data accuracy and minimizing human error. Numerous studies have shown that implementing digital systems in warehouse management can improve operational efficiency and accelerate the flow of goods distribution (Kumar & Singh, 2022; Wang et al., 2023).

PT Indonesia Nippon Seiki, a manufacturing company engaged in automotive component production, faces high operational complexity, particularly in logistics and warehousing management. In these activities, the process of inputting goods data through scan-in and scan-out mechanisms plays a crucial

role in ensuring the consistency between the physical condition of the goods and the data recorded in the system. The accuracy of this data is crucial for smooth distribution, effective inventory control, and accurate production planning.

However, the implementation of technology-based systems in practice does not always run as expected. Based on observations during the Internship Lecture (KKP), various obstacles were still encountered in the data input process, including input delays due to scanning queues, barcode reading errors due to suboptimal label conditions, discrepancies between the physical quantity of goods and system data, and network disruptions that hampered real-time recording. These conditions indicate that the existence of a technology system does not fully guarantee operational accuracy and efficiency.

Conceptually, an effective information system must be able to produce accurate, timely, and relevant information (Laudon & Laudon, 2021). Furthermore, from an accounting information system perspective, internal control plays a crucial role in maintaining data reliability and protecting company assets, including inventory data (Romney & Steinbart, 2021). Thus, the success of the system is not only determined by the technology used, but also by the quality of work procedures, coordination between departments, and the competence of human resources in running the system.

Previous research has generally focused on the implementation of warehouse information systems and the use of barcode technology to improve operational efficiency. However, studies specifically highlighting the optimization of data input processes for scan-in and scan-out activities, taking into account the interrelationships between technical, procedural, and internal control aspects, are still limited, particularly in manufacturing companies with high levels of operational complexity. Furthermore, issues encountered in the field indicate a mismatch between ideal system design and operational implementation, necessitating a more comprehensive analysis of these processes.

In the context of modern operational management, the integration of information technology and work practices is a key factor in creating sustainable efficiency. A good system is determined not only by technological sophistication but also by the alignment between the system and operational needs in the field. An imbalance between the two can lead to bottlenecks in work processes, ultimately impacting productivity and increasing the potential for errors in data management. Therefore, an approach that focuses not only on technical aspects but also on comprehensive business process evaluation is necessary.

Furthermore, the development of the Industry 4.0 concept emphasizes the importance of digital integration throughout a company's value chain, including warehousing and distribution activities. The implementation of technology such as barcode scanning should support data transparency and speed information flow. However, without the support of an adequate internal control system and competent human resources, such technology may not deliver optimal results. This demonstrates that optimizing the data input process is not only related to the tools used, but also encompasses aspects of operational governance and oversight.

Furthermore, from a management accounting perspective, the accuracy of inventory data has direct implications for the quality of a company's internal reports, particularly in cost planning and control. Inaccurate data can lead to distortions in production cost calculations, raw material requirements planning, and operational performance evaluations. Therefore, improvements in the data input process not only impact daily operational activities but also influence the quality of information used by management in strategic decision-making.

Based on this description, this study aims to analyze the scan-in and scan-out data entry process at PT Indonesia Nippon Seiki, identify factors affecting the effectiveness and accuracy of this process, and formulate optimization efforts that can support increased operational efficiency and the reliability of the company's information system.

LITERATURE REVIEW

Warehouse Information System

A warehouse information system is part of a management information system used to manage inventory data in an integrated manner, from receiving and storing to issuing goods. This system plays a role in providing accurate, timely, and relevant information to support operational and strategic decision-making. In the modern industrial context, warehouse information systems are generally integrated

with digital technologies such as real-time databases and automated tracking systems, thereby increasing the transparency and accuracy of inventory data (Zhou et al., 2023).

The implementation of an effective information system in warehousing can improve operational efficiency by reducing recording time, increasing stock visibility, and systematically controlling the movement of goods. Research shows that information system integration in warehouse management significantly contributes to improved logistics performance and reduced data recording errors (Rahman & Putri, 2022).

Warehouse Management

Warehouse management is a series of activities related to the management of goods in a warehouse, including receiving, storing, maintaining, and distributing goods. Warehouse management focuses not only on the physical aspects of storage but also encompasses the organization of work procedures, the use of technology, and human resource management to achieve operational efficiency and effectiveness (Heizer et al., 2022).

Effective warehouse management can improve inventory data accuracy, accelerate distribution processes, and minimize operational costs. In practice, good warehouse management requires integration between information systems, standard operating procedures (SOPs), and adequate internal controls. This is supported by research showing that warehouse operational efficiency is significantly influenced by system quality and coordination between work processes (Sari & Nugroho, 2023).

Inbound Goods Process

The inbound process is the initial stage in warehousing activities, encompassing the receipt of goods from suppliers or internal company units. This activity includes physical inspection of goods, document verification, data recording, and placement of goods in designated storage locations. An effective inbound process relies heavily on proper procedures and accurate data recording (Kumar & Singh, 2022).

Frequent problems in the inbound process include discrepancies between the physical quantity of goods and the receiving documents, delays in recording, and misidentification of goods. These conditions can disrupt operational continuity and lead to inaccurate inventory data. Therefore, a system capable of supporting accurate and real-time recording is necessary to minimize the potential for errors (Wang et al., 2023).

Outbound Goods Process

The outbound process is the activity of removing goods from the warehouse to meet customer demand or production needs. This process includes picking, checking, data recording, and shipping. Accuracy and speed in the outbound process significantly determine a company's level of service to customers (Chopra & Meindl, 2022).

Errors in the outbound process, such as mismatched item quantities or recording errors, can lead to discrepancies in stock data and disrupt distribution. Therefore, an accurate recording system and standardized work procedures are required to ensure consistency between system data and the physical condition of goods in the field (Prasetyo et al., 2023).

Barcode Scanner Technology in Warehouse Systems

Barcode scanner technology is a form of automation in warehouse systems used to identify and record item data quickly and accurately. Barcodes enable each item to have a unique identity that can be read automatically by the system, thereby reducing reliance on manual recording (Ivanov et al., 2023).

The use of barcode scanners in warehouse systems has been proven to increase recording efficiency, reduce human error, and improve inventory data accuracy. Furthermore, barcode integration with warehouse information systems allows for real-time monitoring of goods movement, supporting faster and more accurate decision-making (Lee & Chen, 2022).

Optimizing the Data Input Process

Optimizing the data input process is a systematic effort to increase the speed, accuracy, and efficiency of data recording. In the warehousing context, optimization is not only related to the use of technology but also includes improving work procedures, enhancing human resource competencies, and strengthening internal control systems (Romney & Steinbart, 2021).

Recent research shows that optimizing the data input process through the integration of digital technology and improving workflows can significantly increase operational productivity and reduce the rate of recording errors. Furthermore, an integrated system also simplifies the monitoring and evaluation of warehouse operational performance (Hidayat & Prakoso, 2023).

Previous Research

Previous research shows that implementing digital-based information systems in warehousing can improve operational efficiency and data recording accuracy. Rahman and Putri (2022) found that digitizing warehouse systems contributes to increasing the speed of inventory recording and facilitating integrated inventory management. Meanwhile, Sari and Nugroho (2023) stated that implementing a Warehouse Management System (WMS) can reduce human error in the inventory data recording process.

Another study by Hidayat and Prakoso (2023) showed that optimizing warehouse administration through the implementation of standardized work procedures and information technology support can improve operational effectiveness and inventory data reliability. However, most research still focuses on general system implementation, so more specific studies related to optimizing data input processes for scan-in and scan-out activities in the operational context of manufacturing companies still need further development.

RESEARCH METHOD

This study used a descriptive method with a quantitative approach to analyze the process of inputting goods data through scan-in and scan-out activities. The descriptive approach was chosen because this study aims to describe the actual conditions of the operational process and identify problems that occur in the field. Meanwhile, a quantitative approach was used to support the analysis based on measurable data, thus making the research results more objective and scientifically accountable.

The research was conducted at PT Indonesia Nippon Seiki, specifically in the warehouse department, which is responsible for recording and inputting incoming and outgoing goods data. The research location was selected based on the relevance of operational activities to the research focus, namely the data input process based on a scanning system. Data collection was conducted throughout the research period, allowing researchers to obtain a comprehensive overview of the workflow and obstacles encountered in daily operational activities.

Data collection techniques in this study included observation, interviews, and documentation. Direct observations of the scan-in and scan-out processes were conducted to understand the workflow, procedures implemented, and obstacles encountered during the process. Interviews were conducted with involved parties, such as warehouse operators and administrators, to obtain more in-depth information regarding the implementation of work procedures and any issues encountered. Furthermore, documentation was used to collect supporting data in the form of operational reports, system logs, and other documents relevant to the inventory data entry process.

Data analysis techniques were carried out by systematically processing data obtained from observations, interviews, and documentation. This data was analyzed to identify issues occurring in the inventory data entry process and to evaluate the effectiveness and efficiency of the current system. The results of the analysis were then used as a basis for formulating alternative solutions and recommendations for improvements to optimize the data entry process. Therefore, this research is expected to contribute to improving operational performance and the reliability of information systems in warehousing activities.

RESULTS AND DISCUSSIONS

Overview of the Goods Data Input Process

Research results indicate that the goods data input process at PT Indonesia Nippon Seiki is carried out through a technology-based system using a scan-in and scan-out mechanism. This process includes several main stages: receiving goods (inbound), scanning barcodes, recording data into the system, and issuing goods (outbound), followed by data verification. The implemented system is integrated with the company database, enabling real-time data recording.

In general, the current process flow aligns with the concept of a warehouse information system, which emphasizes speed, accuracy, and data integration. This system facilitates the company's ability to monitor goods movement and maintain stock availability more effectively.

Identification of Problems in the Data Input Process

Despite the technology-based system, observations indicate that several obstacles remain in its implementation. Problems identified include delays in the input process due to scanning queues, barcode

reading errors due to suboptimal label conditions, inconsistencies between system data and the physical condition of goods, and network disruptions that hinder real-time system access.

These issues demonstrate that system effectiveness is determined not only by the technology used, but also by operational conditions in the field. Obstacles in the data input process have the potential to reduce the quality of the resulting information, particularly in terms of accuracy and timeliness.

Analysis of Conformity with Theory

Related to information systems theory, these conditions indicate that the system in use does not fully meet the characteristics of quality information, namely accuracy, timeliness, and relevance (Laudon & Laudon, 2021). Delays in data input result in information not being available in real time, while errors in the scanning process can reduce data reliability.

From a warehouse management perspective, these findings indicate that operational efficiency is suboptimal. According to Heizer et al. (2022), efficiency in warehouse management is influenced by the integration between systems, work procedures, and human resources. In practice, obstacles such as scanning queues and data discrepancies indicate bottlenecks in the workflow, leading to operational bottlenecks.

Furthermore, from an internal control perspective, discrepancies between system data and the physical condition of goods indicate that control mechanisms are not functioning optimally. Romney and Steinbart (2021) emphasized that internal control aims to maintain data reliability and protect company assets, including inventory data. Therefore, the verification process is a crucial component in ensuring the accuracy of the data generated.

Gap Analysis between Theory and Practice

The research results also show a gap between theoretical concepts and field practice. Theoretically, the data input process is designed to be systematic and structured. However, in practice, this process is often adjusted to dynamic operational conditions, such as increased product volumes that require accelerated work processes.

This situation demonstrates the need for flexibility in implementing work procedures without neglecting the principles of accuracy and precision. Furthermore, the use of technology such as barcode scanners can theoretically increase efficiency, but in practice, it is still influenced by technical factors such as the condition of the equipment and the quality of the barcode labels, as well as the human factor in system operation.

Efforts to Optimize the Data Input Process

Based on the analysis, comprehensive optimization of the data input process requires consideration of several aspects. First, improving work procedures to reduce queues during the scanning process, for example, through more efficient workflow arrangements or the addition of scanning devices. Second, improving human resource competency through training on system usage and the importance of data accuracy. Third, improving the quality of technology infrastructure, particularly the system network, so that data input can be carried out in real time without interruption. Fourth, strengthening internal controls through a more systematic data verification process to ensure consistency between system data and the physical condition of goods.

With these optimization efforts, it is hoped that the goods data input process will be more effective and efficient, thereby improving operational performance and the reliability of the company's warehouse information system.

CONCLUSION

Based on the research results, it can be concluded that the process of inputting inventory data through the scan-in and scan-out system at PT Indonesia Nippon Seiki is supported by an integrated technology-based system, thereby increasing the speed and regularity of inventory data recording. This system has generally helped the company manage the flow of goods in a more systematic and controlled manner, and supported the provision of information needed for warehouse operations.

However, the effectiveness of the system's implementation has not been fully optimized, as several obstacles have been encountered, such as delays in the input process due to scanning queues, barcode reading errors, discrepancies between system data and the physical condition of goods, and network disruptions that impact real-time data access. These findings indicate that the success of an information system is determined

not only by the technology used, but also by factors such as work procedures, the quality of human resources, and adequate supporting infrastructure.

Furthermore, the research results also indicate a gap between theoretical concepts and field practice, where operational processes often require flexibility to adapt to dynamic work conditions. In practice, demands for work speed can potentially impact the level of accuracy in data input. Therefore, a balance between efficiency and accuracy is necessary to ensure optimal system performance and reliable information.

Therefore, comprehensive optimization of the inventory data entry process requires improved workflow, enhanced human resource competency, strengthened technological infrastructure, and the implementation of more effective internal controls. These efforts are expected to increase operational efficiency and the reliability of the warehouse information system, thereby supporting the quality of decision-making in inventory management. The results of this study are also expected to serve as a reference for developing studies in the fields of information systems, operational management, and technology-based accounting.

Based on the research findings, companies are advised to improve the data entry process to reduce queues during scanning activities, as well as improve network quality and device maintenance to ensure optimal system performance. Furthermore, improving employee competency through ongoing training is crucial to minimize data entry errors. Strengthening internal controls, particularly at the data verification stage, also needs to be implemented more systematically to ensure consistency between system data and the physical condition of the goods. For future research, it is recommended to develop a more in-depth analysis using a measurable quantitative approach to provide a more comprehensive picture of the performance of the inventory data management system.

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