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Optimizing Logistics System Monitoring with FIFO Method Using Intelligent System

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ABSTRACT

Efficient and well-organized logistics systems are crucial for maintaining operational smoothness and customer satisfaction. In this research, we delve into the optimization of logistics system monitoring using the First-In, First-Out (FIFO) method based on smart system technology. The FIFO method has become a widely used approach in inventory management and product distribution. However, achieving optimal FIFO implementation can be challenging due to demand fluctuations and changing priorities. In the proposed optimization method, we integrate data analysis and artificial intelligence to enhance the utilization of the FIFO method in logistics system monitoring. This method gathers real-time data on inventory levels, customer demands, and resource availability. Employing intelligent algorithms, the method analyzes data to identify demand trends, predict future inventory needs, and optimize the sequence of product deliveries using the FIFO method. The conducted tests indicate that this optimization method successfully improves delivery efficiency and reduces operational costs within the logistics system. Moreover, the method can adapt to real-time changes in demand and priorities, enhancing flexibility and responsiveness in logistics system monitoring. This research makes a significant contribution to the development of more efficient and intelligent logistics monitoring systems.

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1. INTRODUCTION

In the ever-evolving logistics industry, optimizing logistics system monitoring is key to achieving operational efficiency and customer satisfaction. Effective logistics system monitoring ensures timely goods delivery, efficient inventory management, and quick adjustment to demand changes. One commonly used method in inventory management is the FIFO (First-In, First-Out) method, where the first goods to come in will be the first to go out.

However, in practice, optimal FIFO implementation can be challenging due to unpredictable demand fluctuations, priority changes, and resource limitations. Therefore, a smarter and more adaptive approach is needed in logistics system monitoring to ensure efficient FIFO use.

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In this study, we propose an optimization method for logistics system monitoring using the FIFO method based on an intelligent system. This method integrates data analysis and artificial intelligence to optimize the use of the FIFO method in inventory management and goods delivery.

The proposed optimization method collects real-time data about goods inventory, customer demand, and resource availability. This data is then analyzed using intelligent algorithms to identify demand trends, predict future inventory needs, and optimize the sequence of goods delivery using the FIFO method.

By using an intelligent system, this optimization method can adapt to demand changes and priorities in real-time. This allows for quicker and more accurate decision-making in managing inventory and delivering goods. In addition, this method also helps in avoiding the risk of running out of stock and ensuring efficient goods delivery.

In this study, we will test and evaluate the effectiveness of this optimization method in improving delivery efficiency, reducing operational costs, and enhancing customer satisfaction in the logistics system. We will also discuss the practical implications of this study and provide recommendations for the development of a smarter logistics monitoring system in the future.

2. RESEARCH METHODS

2.1. Research Approach

This study uses an experimental design with the aim of implementing and testing the FIFO method in logistics system monitoring using an intelligent system. This design allows us to observe the effects of the application of the FIFO method and intelligent system on the efficiency and accuracy of stock monitoring.

2.2. Research Location

This research was conducted at the logistics facilities of the clothingartkinveksi company with the address Kp. Sindangsari rt01/10 desa pananjung kec. Cangkuang kab Bandung. The selection of this location is based on the diversity and complexity of logistics operations that can reflect various scenarios of using the FIFO method with an intelligent system.

2.3. Research Subjects

The research subjects involve the logistics management team, warehouse operators, and system analysts who are directly involved in stock management and logistics system monitoring. The participation and cooperation of the relevant parties are key to gaining a deep understanding of the implementation of the FIFO method with an intelligent system.

The research subjects refer to a series of systematic steps and activities designed to improve the efficiency and accuracy of stock management in a logistics system. The application of the FIFO (First In, First Out) method supported by intelligent system technology is at the core of this process.

2.4. Implementation of Intelligent System

The intelligent system will be implemented by utilizing the latest technology such as machine learning and real-time data analysis. This system will be connected with existing hardware and integrated with the stock management software currently in use.

2.5. Application of FIFO Method

The steps of applying the FIFO method involve organizing stock based on the First In, First Out principle. The intelligent system will monitor and manage the flow of incoming and outgoing goods according to FIFO rules, while continuously updating the stock database. Developing a prediction model to predict future inventory needs based on trends and patterns found in data analysis. Integrating the prediction model with the intelligent system to optimize the sequence of goods delivery using the FIFO method.

2.6. Data Collection

Data will be collected through direct observation, interviews with relevant personnel, and daily operational records. Quantitative data will include processing time, stock accuracy, and stock management efficiency. Collecting real-time data about goods inventory, customer demand, and the availability of relevant resources in the logistics system. Using sensors and monitoring devices integrated with the logistics system to collect data automatically.

2.7. Data Analysis

The collected data will be analyzed using statistical methods and data analysis techniques. Measurements of efficiency and stock accuracy before and after the application of the FIFO method with an intelligent system will be compared to evaluate the positive impact produced.

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2.8. Result Validation
The research results will be validated by involving the related team, and suggestions or recommendations will be obtained for further improvements or development of this method in the context of logistics system monitoring. This research method is expected to provide a comprehensive understanding of the implementation of the FIFO method with an intelligent system in improving

3. RESULTS AND DISCUSSION

3.1. Research Results
System Efficiency:
Findings; the application of the FIFO method with an intelligent system improves system efficiency, with a faster response time.
Analysis; The presence of an intelligent system helps in detecting stock changes in real-time, allowing for a quicker response to inventory dynamics.
Stock Accuracy:
Findings; There was a significant increase in stock accuracy, with better alignment between records and physical stock.
Analysis; The integration of the FIFO method helps in reducing the risk of stock errors and improving inventory information accuracy.
Stock Release Processing Time:
Findings; The stock release processing time experienced a significant decrease.
Analysis; The intelligent system makes a significant contribution in speeding up the stock release process, optimizing operational efficiency.
Accuracy of FIFO Management:
Findings; The FIFO method was successfully executed accurately, maintaining the First In, First Out principle well.
Analysis; The successful implementation of FIFO reduces the risk of old stock damage and supports more effective inventory management.
User Satisfaction Level:
Findings; The level of user satisfaction increased, with positive responses to ease of use and benefits obtained.
Analysis; The good implementation of the FIFO method with an intelligent system has a positive impact on user satisfaction.
System Responsiveness to Demand Changes:
Findings; The system's responsiveness to demand changes increased.
Analysis; The system's ability to quickly adjust stock provides a competitive advantage in facing market demand fluctuations.
General Performance of the Intelligent System:
Findings; The general performance of the intelligent system reached a satisfactory level, with high reliability, data processing speed, and good prediction accuracy.
Analysis; The intelligent system provides a robust technology foundation for logistics system monitoring.
3.2. Discussion
Contribution to Literature:
Analysis; This study makes a significant contribution to the literature by showing that the application of the FIFO method with an intelligent system can effectively optimize logistics system monitoring.
Managerial Implications:
Analysis; The research results have significant managerial implications, providing a basis for companies to adopt the FIFO method with an intelligent system to improve efficiency and customer satisfaction.
Weaknesses and Opportunities:
Analysis; Potential weaknesses arising from this research include potential barriers to technology implementation. Future research opportunities may include further development on security aspects and system integration.
Recommendations:

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Analysis; Recommendations include routine system maintenance, advanced training for users, and further exploration of intelligent technology development.
This discussion highlights the success and positive impact obtained from optimizing logistics system monitoring using the FIFO method with an intelligent system, providing direction for further improvements and development in logistics management.

4. CONCLUSION

In this study, we successfully implemented an optimization method for logistics system monitoring using the FIFO method based on an intelligent system. Through the collection and analysis of real-time data, the development of prediction models, and the implementation of an intelligent system, we have achieved significant results in improving delivery efficiency, optimal inventory use, responsiveness to demand changes, and reducing operational costs in the logistics system.

In the analysis of the results, we found that the use of the FIFO method with an intelligent system helps in arranging the sequence of goods delivery based on accurate data analysis, reducing the waiting time for goods delivery, and increasing responsiveness to demand changes. In addition, this optimization method also helps in optimizing inventory use, reducing the risk of running out of stock, and significantly reducing operational costs.
Based on the results of this study, we provide several suggestions for further development in optimizing logistics system monitoring with the FIFO method using an intelligent system:

Development of More Accurate Prediction Models: Conduct further research to develop more accurate prediction models in predicting future inventory needs. The use of artificial intelligence techniques and predictive analysis can help improve prediction accuracy.

Integration with New Technology: Integrate the intelligent system with new technologies such as the Internet of Things (IoT) and Big Data to collect and analyze larger and more complex data. This will help in improving data analysis, improving predictions, and providing deeper insights into logistics system monitoring.
Development of More Integrated Inventory Management Systems: Develop more integrated inventory management systems with the FIFO optimization method and intelligent system. This will allow for more efficient and automatic inventory management, as well as ensuring optimal stock availability.

Increased Responsiveness: Continue to improve system responsiveness to customer demand changes. Use intelligent technology and real-time data analysis to quickly identify demand changes and make the necessary adjustments in goods delivery.

By implementing these suggestions, it is expected to continue to improve efficiency, customer satisfaction, and the sustainability of the logistics system in facing ever-evolving challenges.

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