JURNAL MEDIA AKADEMIK (JMA)
Vol.2, No.9 September 2024
e-ISSN: 3031-5220; DOI: 10.62281, Hal XX-XX
PT. Media Akademik Publisher
AHU-084213.AH.01.30.Tahun 2023

# OPTIMIZATION INVENTORY MANAGEMENT AT SHOPEE INDONESIA: KEY TO IMPROVING EFFICIENCY AND CUSTOMER SATISFACTION

Oleh:

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**Abstract**. Inventory management system is a crucial component in e-commerce, including on the Shopee Indonesia platform. This study aims to evaluate the effectiveness of the current system and identify existing and proposed practices to improve Shopee's operational efficiency. The results of the analysis show that the inventory management system in Shopee Indonesia has been designed to support the smooth flow of goods. However, based on interviews with several warehouse managers and users, there are several challenges in realizing the expected practices, such as less than optimal product tracking and data handling that requires regular updates. Shopee uses sophisticated technology to manage inventory, but there are opportunities to improve data accuracy and responsiveness to changes in market demand. Among the existing practices, the use of algorithms for demand prediction shows positive results, but the implementation of these practices still requires adjustments. This study proposes several strategic steps, including improving serious system integration between inventory management and sales systems, as well as continuous training for employees. In addition, improving the real-time monitoring system will support better and faster decision making in terms of procurement and delivery of goods. Overall, although the inventory management system in Shopee Indonesia has shown effectiveness in many aspects, this study emphasizes the need for

*Received July 20, 2024; Revised July 31, 2024; August 22, 2024*
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innovation and implementation of best practices to overcome existing weaknesses. Thus, it is expected that there will be a significant increase in operational efficiency, which will have a positive impact on user experience and customer satisfaction.

**Keywords***:* Inventory Management, e-commerce, Operational Efficiency, Customer Satisfaction, System Automation.

## INTRODUCTION

Shopee Indonesia has emerged as one of the most dominant e-commerce platforms in Indonesia, with transaction volumes increasing every year. In this context, inventory management plays a vital role. Efficient inventory management will not only ensure product availability but also contribute to higher customer satisfaction. This is becoming increasingly important in the digital era where customers expect a fast and seamless shopping experience.

Shopee's inventory management system is based on cutting-edge technology that allows real-time stock monitoring. By utilizing analytical data, Shopee can predict product demand, so it can adjust the amount of stock available. Through this system, Shopee strives to minimize the risk of inventory shortages or excesses, which can often result in financial losses. According to Rafiq and Junaidi (2021), the use of technology in inventory management can improve overall business efficiency.

However, even though Shopee already has a fairly effective system, there are still some areas that need to be improved. One issue that is often faced is the problem of distributed data management. When sellers on Shopee do not update their inventory status in a timely manner, this can lead to inaccurate information about product availability. This of course has the potential to harm customers who want to make purchases. According to research by Lestari and Adnan (2020), it is important for e-commerce platforms to provide training to sellers on the importance of managing inventory properly.

Furthermore, integrating inventory management systems with effective distribution channels is also a challenge. Slow or inefficient shipping processes can affect customer satisfaction. Shopee needs to ensure that the existing logistics system is in synergy with inventory management so that products can be delivered on time. The application of technologies such as the Internet of Things (IoT) can help increase transparency and efficiency in the supply chain. This is in line with research conducted

by Juhudiman and Rahmawati (2022), which shows that the use of IoT can optimize the distribution process.

In addition, data analysis to understand customer behavior is also a vital factor in inventory management. Shopee must continue to conduct market surveys and data analysis to identify consumer trends and products that have high demand. With this information, Shopee can be more responsive to market needs. Research by Firman and Sari (2021) shows that collecting and utilizing consumer behavior data can provide significant competitive advantages in the e-commerce industry.

Finally, customer service should also be considered in the context of inventory management. There is a need to have a system that can respond to customer complaints efficiently, especially related to product availability issues. The use of chatbots and automation in customer service responses can be a solution to improve customer experience. Research by Santoso and Wilujeng (2023) states that improving customer service can help reduce the rate of returns and increase customer loyalty.

Overall, while Shopee Indonesia has created a fairly effective inventory management system, there is still room for improvement in several areas such as data management, logistics integration, customer behavior analysis, and customer service. By making improvements in these areas, Shopee can not only improve operational efficiency but also ensure higher customer satisfaction, which in turn will support the platform's growth in the increasingly competitive e-commerce market.

## THEORETICAL STUDY

Although Shopee has implemented a sophisticated inventory management system, challenges in managing demand remain. One of the main challenges faced is the unpredictable fluctuations in demand, especially during major promotional periods or national shopping days. Rapid changes in consumer preferences, coupled with special events, often create unexpected spikes in demand (Suharso, 2021). This uncertainty has the potential to cause a mismatch between available stock and market demand.

Excess stock can increase storage costs and risk losing the value of the goods, while understock can lead to lost sales and decreased customer satisfaction (Pratama, 2020). In this context, it is important for Shopee to develop more effective methods in

predicting demand, such as using big data analysis and artificial intelligence technology that can take into account various factors that influence consumer behavior.

The next challenge is the complexity of coordination between various parties, including suppliers, logistics service providers, and internal teams. The success of inventory management depends largely on how well each entity can communicate and collaborate. An integrated system can minimize the risk of errors and increase operational efficiency. However, differences in the systems used by various parties can create difficulties in sharing the necessary information (Sukoco, 2022).

Building strong relationships with suppliers is key to facing this challenge. A good relationship can enable Shopee to obtain more accurate information regarding product availability and delivery times, making it easier to plan stock (Rizky, 2021). However, this also requires a significant investment of time and resources to build trust among stakeholders.

In addition, the diversity of products offered by Shopee also adds to the level of complexity. Different categories of goods have different demand patterns. Therefore, a one-size-fits-all approach to inventory management is inefficient (Hendrawan, 2022). Shopee needs to develop a more specific inventory strategy tailored to each product category to reduce the risk of overstocking and understocking.

In addition, the technological aspect is also very important. Although Shopee already uses a sophisticated inventory management system, continuous innovation is needed to be able to adapt to market changes. The use of sophisticated algorithms and machine learning in predicting demand can provide significant competitive advantages (Kusuma, 2021). However, the implementation of this technology also requires special training and skills from employees, which can be a challenge in itself.

Given the challenges faced, it is important for Shopee to continuously evaluate its existing inventory management system. Adjustments to strategies and technologies must be made periodically to be responsive to changes in market conditions and consumer behavior. Continuous efforts in data analysis can also help Shopee better understand existing trends and patterns, thereby minimizing the impact of unexpected demand fluctuations.

Ultimately, while Shopee has advanced in inventory management, the challenges that exist demand innovative strategies and approaches that can adapt quickly to changing

conditions. By strengthening collaboration between parties and making maximum use of technology, Shopee can overcome these challenges and continue to satisfy customers and improve its sales performance (Mardiana, 2021).

Inventory complexity on Shopee is a significant challenge as the platform handles a wide variety of products from different categories. Each category has different characteristics and market behaviors, which require different approaches in terms of inventory management. For example, electronics may have a shorter life cycle than fashion products. Therefore, Shopee must be able to accurately predict demand for each product category in order to manage inventory more effectively. This goal is not only important to meet consumer demand but also to minimize costs associated with storing unsold products (Chandra et al., 2020).

Data accuracy is a crucial element in inventory management. Accurate data helps Shopee monitor available stock, leading to informed decisions regarding ordering and inventory management. Understocking can result in lost sales, while overstocking can lead to increased storage costs and the risk of unsold items. In today's increasingly competitive world, data accuracy is a key factor in maintaining customer satisfaction and profitability (Jabbour et al., 2021).

System integration is another aspect that plays a major role in Shopee inventory management. By integrating the inventory management system with other systems such as sales and logistics, Shopee can speed up the flow of information and make more timely decisions. For example, if there is an increase in sales in a particular category, the system should be able to provide real-time information to trigger a reorder of the product before it runs out of stock. This integration also allows for better efficiency in overall supply chain management, which in turn can improve customer service (Gunasekaran et al., 2019).

Overall, the complexity of inventory in Shopee, the accuracy of the data required, and the importance of system integration are interrelated and contribute to the effectiveness of inventory management. Addressing these challenges with the right strategy will allow Shopee to continue to compete in the dynamic e-commerce market. Success in inventory management will help Shopee meet consumer needs more efficiently and improve its overall performance

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## RESEARCH METHODS

### Automation System

Automation systems in stock management are an increasingly popular innovation in various industrial sectors. With the development of information technology, companies can now utilize sophisticated software and cloud-based systems to monitor and manage inventory in real-time. This not only improves operational efficiency but also provides significant competitive advantages (Smith, 2020).

One of the main advantages of an automation system is its ability to reduce manual errors. With an automated system, the risk of errors in stock recording can be minimized. For example, the use of barcode scanners allows companies to track goods accurately and quickly, which contributes to cost reduction and increased productivity (Jones, 2021).

In addition, automation systems also allow for deeper data analysis. Data on sales and demand patterns can be analyzed to estimate future stock requirements. With the information obtained, companies can avoid situations of overstocking or shortages, which ultimately increases customer satisfaction (Lee, 2019).

In its implementation, the automation system can be integrated with other management systems, such as accounting and distribution systems. This integration results in a smoother flow of information between departments, so that each part of the company can operate synergistically (Martinez, 2022). In this way, strategic decisions related to stock management can be taken more quickly and accurately.

The use of technology to monitor and manage stock will also include the use of IoT (Internet of Things) technology in the future. Connected devices can provide real-time information about stock levels and product conditions. This allows companies to be more responsive to market changes and dynamic consumer demand (Ko, 2021).

Finally, although implementing an automation system requires a significant initial investment, the long-term benefits it brings, such as reduced operational costs and increased efficiency, make it a strategic move worth considering. Therefore, adopting an automation system in stock management is an important step towards modernizing and sustaining a business in today's digital era.

## RESULTS AND DISCUSSION

Data analysis is a very important tool in today's business world, especially in predicting demand and managing inventory. Using data analysis techniques, companies can understand market trends and consumer behavior, which helps them optimize inventory and respond quickly to any changes in demand.

One of the common methods used in data analysis to predict demand is the time series forecasting model. This model uses historical data to estimate the number of products that will be sold in the future (Makridakis, Spyromitros-Xioufis, & Assimakopoulos, 2018). With proper analysis, companies can identify seasonal patterns and long-term trends that can affect demand.

In addition, regression analysis is also often applied to understand the relationship between different factors that can affect demand, such as price, promotion, and economic conditions (Wang, 2020). By using regression models, companies can produce more accurate predictions, so they can manage stock more efficiently.

The application of big data in demand analysis is also increasingly common. Companies can process large and diverse data points, such as data from social media, customer reviews, and online search trends to gain deeper insights into consumer behavior (Bertini et al., 2021). Through this technique, companies can not only respond better to changes in demand but also plan more effective marketing strategies.

Effective inventory management is the result of a combination of accurate demand analysis and good inventory control. Companies that do not maintain a balance between supply and demand are at risk of overstocking or product shortages. With data analysis, companies can set optimal stock levels, reduce storage costs, and maximize profits.

Overall, data analysis plays a crucial role in demand forecasting and inventory management. The results of this analysis not only help companies operate more efficiently but also provide a competitive advantage in an increasingly dynamic market.

**Proposed Practice**

The use of artificial intelligence (AI) and machine learning has become a hot topic in various fields, including supply chain management and inventory management. One of the most prominent applications is increasing the accuracy of demand prediction. By utilizing machine learning algorithms, companies can analyze historical data and consumption patterns to predict future product needs. This not only improves operational

efficiency but also reduces costs associated with overstocking or stockouts (Choudhury, 2019).

In AI implementation, various techniques such as regression, decision trees, and artificial neural networks are used to analyze big data generated by business activities. A study by Weng et al. (2020) showed that the application of AI in demand forecasting can increase accuracy by up to 30% compared to traditional methods. This way, companies can better adjust their inventory based on more accurate predictions, leading to increased customer satisfaction and reduced inventory waste.

On the other hand, blockchain technology is also being adopted to increase transparency and security of inventory data. Blockchain offers a decentralized system that allows all transactions to be recorded permanently and irreversibly. This creates a strong case for trust between various stakeholders in the supply chain (Kshetri, 2018). The use of blockchain in inventory management allows real-time monitoring of products moving through the system, providing full visibility to all parties involved.

Integrating AI and blockchain into inventory management systems can create significant synergies. With AI enhancing demand prediction and blockchain ensuring security and transparency, companies can be more proactive in inventory management. For example, AI-generated prediction data can be recorded on the blockchain, so that all stakeholders have equal access to the same information (Dhanaraj & Park, 2019). This will reduce the risk of errors and improve collaboration between departments.

In conclusion, the application of AI to improve the accuracy of demand forecasting, combined with the integration of blockchain technology to increase the transparency and security of inventory data, is a very important strategic step in today's digital era. With these two technologies, companies can not only better meet market demand, but also build trust and efficiency in their supply chain systems. This is very important to face competitive challenges in an increasingly complex global market.

## Analysis of Practices

### Automation System

The use of modern technology in the company's operational system has had a significant impact on reducing human error and increasing operational efficiency. With automation, many processes that were previously done manually can now be managed

through sophisticated software. This not only has an impact on reducing the possibility of human error but also speeds up the time to complete tasks.

Advanced data analytics also plays a vital role in optimizing work processes. By leveraging advanced algorithms and data processing technologies, companies can analyze patterns and trends in their operations. This information provides valuable insights that can be used to make better decisions and identify areas for improvement.

As companies move to a more automated and data-driven work model, employees' workload is also reduced. They are no longer stuck in monotonous and boring routines, but can instead shift their focus to more strategic and creative tasks. This not only increases job satisfaction but also reduces the stress levels experienced by employees.

Furthermore, the increased productivity resulting from the use of modern technology not only contributes to achieving business targets but also creates a more positive and collaborative work environment. In this context, companies can better facilitate innovation and collaboration between teams. This creates an ecosystem that encourages growth and development for both individuals and the organization as a whole.

**Data analysis**

The implementation of advanced technology has become an effective solution to overcome human error in various sectors. In an increasingly digitalized world, organizations are trying to utilize automation and data analysis systems to improve operational efficiency and minimize risks. One example is the use of software that can analyze large amounts of data quickly and accurately, reducing the possibility of misidentification or incorrect processing of information.

In the health sector, the use of information technology such as EHR (Electronic Health Records) has made the patient data management process more accurate and efficient. With this system, data can be accessed instantly by medical personnel, which reduces the risk of errors in treatment and diagnosis (Bates et al., 2014). In addition, automation in information processing allows hospitals to be faster in handling administration, which in turn improves the quality of service to patients.

In the financial sector, data analytics also plays a vital role in detecting fraud. With advanced algorithms, financial institutions can monitor transactions in real-time and

identify suspicious patterns. This not only reduces human error but also increases the resilience of the financial system (Kumar & Singh, 2020). The use of AI to process and analyze financial data helps in better decision making and more accurate information for stakeholders.

In the manufacturing industry, automation is key to increasing productivity. Robots and advanced machines can perform repetitive tasks with high consistency, reducing variability that is often caused by human error (Wang et al., 2016). This not only increases efficiency but also shortens production time and reduces costs. The application of this technology leads companies to a leaner and more competitive process in the global market.

Advanced technology has also penetrated the education sector. With the presence of e-learning platforms, information can be delivered in a more interactive and interesting way. Educational data analysis helps in understanding student learning behavior, making it easier for educators to formulate appropriate teaching strategies (Siemens, 2013). This reduces errors in traditional teaching methods that are sometimes less appropriate to individual needs.

While there are many benefits to implementing advanced technologies, challenges remain. Success in adopting these technologies depends on the organization's readiness to make changes and adequate workforce training. The involvement of all parties in this process is essential to maximize the benefits.

Overall, the implementation of automation technology and deep data analysis not only reduces the opportunity for human error but also increases efficiency in every sector. With the right innovation and good strategy utilization, organizations can optimize their operational performance and increase customer satisfaction.

**AI and Machine Learning**

Artificial Intelligence (AI) and Machine Learning have enormous potential to improve predictive accuracy and operational efficiency across sectors. By leveraging advanced algorithms and in-depth data analysis, AI is able to identify patterns that may not be visible to humans, resulting in more accurate predictions. In addition, the implementation of machine learning in operational processes can automate routine tasks, reduce the possibility of human error, and increase overall productivity. This is not only

beneficial for companies in optimizing resources, but also contributes to achieving better results in data-driven decision making.

**Blockchain**

Blockchain has emerged as an innovative solution to the data transparency and security issues often faced in various sectors, including finance and government. With its ability to create immutable and widely distributed records, the technology can increase trust and accountability among users. However, blockchain implementation is not without its challenges, as it often requires significant upfront investment in technological infrastructure and human resource training. Therefore, despite its great potential, the decision to adopt this technology must be carefully considered financially and strategically.

## CONCLUSION AND SUGGESTIONS

In today's digital era, effective inventory management is one of the important aspects in e-commerce business operations. This study examines the inventory management system at Shopee Indonesia, which is designed to support efficient operations. Although this system has been developed with modern technology, there are a number of challenges that need to be faced. One of the main challenges is suboptimal data management. Inaccuracies in data collection and processing can lead to errors in decision making, which affect product availability and customer satisfaction.

In addition, limitations in demand forecasting are also a significant challenge for Shopee. Although the company has used various analytical tools, market uncertainty and changes in consumer behavior make predictions difficult. This can potentially lead to excess stock or shortages of items that customers want. These limitations add to the complexity of inventory management and can lead to financial problems for the company.

Furthermore, the need for better integration between sales and logistics systems is a major concern. The separation of these two systems can cause irregularities in the flow of information, resulting in late delivery or inaccurate information to customers. To address these issues, this study proposes the implementation of several strategic steps.

First, data management optimization can be done through the application of big data and machine learning technology to improve the accuracy of data collection and

analysis. Second, the use of analytical tools that are more responsive to changes in market trends allows Shopee to make better demand predictions. Third, the integration of sales and logistics systems needs to be strengthened by utilizing digital platforms that allow for a smoother flow of information between the two aspects.

By implementing these strategic steps, it is expected that Shopee Indonesia can face challenges in the inventory management system and improve its operational efficiency. The importance of this research lies in its contribution in providing applicable solutions for companies in managing inventory better, as well as maintaining customer satisfaction in the increasingly competitive framework of the e-commerce market.

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