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Research Article

Application of Science and Technology of Goods Inventory Information System in the Ellisya Online Store

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Abstract

This research aims to address Ellisya stores' inventory management needs by developing a comprehensive goods inventory information system. It involves designing, developing, and implementing an IT-based system to enhance inventory management accuracy and efficiency. The focus includes improving inventory prediction accuracy, ensuring data security, and proposing recommendations for a web-based inventory system. The Waterfall development method was chosen for its structured stages, facilitating technology integration to boost inventory management efficiency. The research findings highlight the positive impact of applying technology, using the Waterfall method, on operational efficiency, precise inventory predictions, data security, user satisfaction, and financial stability. Integrating science and technology presents practical implications, enabling real-time monitoring, administrative task automation, and streamlined stock management. This integration also strengthens data protection, positively influencing company reputation and customer trust. The research's novelty lies in its integrated approach, merging science, technology, and the Waterfall method to develop a website-based inventory system for Ellisya stores. This approach offers a fresh perspective on how technology can enhance structured system development for inventory management.

Keywords: Science, Technology, Information Systems, Goods Inventory

Abstrak

Penelitian ini bertujuan untuk mengatasi kebutuhan manajemen persediaan toko Ellisya dengan mengembangkan sistem informasi persediaan barang yang komprehensif. Ini melibatkan desain, pengembangan, dan implementasi sistem berbasis IT untuk meningkatkan akurasi dan efisiensi manajemen persediaan. Fokusnya termasuk meningkatkan akurasi prediksi persediaan, memastikan keamanan data, dan memberikan rekomendasi untuk sistem persediaan berbasis web. Metode pengembangan Waterfall dipilih karena tahapannya yang terstruktur, memudahkan integrasi teknologi untuk meningkatkan efisiensi manajemen persediaan. Temuan penelitian menyoroti dampak positif penerapan teknologi menggunakan metode Waterfall pada efisiensi operasional, prediksi persediaan yang tepat, keamanan data, kepuasan pengguna, dan stabilitas keuangan. Integrasi sains dan teknologi memiliki implikasi praktis, memungkinkan pemantauan real-time, otomatisasi tugas administratif, dan manajemen stok yang lebih efisien. Integrasi ini juga memperkuat perlindungan data, yang berdampak positif pada reputasi perusahaan dan kepercayaan pelanggan. Kebaruan penelitian ini terletak pada pendekatan terpadu, menggabungkan sains, teknologi, dan metode Waterfall untuk mengembangkan sistem persediaan berbasis web untuk toko Ellisya. Pendekatan ini menawarkan perspektif baru tentang bagaimana teknologi dapat meningkatkan pengembangan sistem terstruktur dalam manajemen persediaan.

Kata Kunci: Ilmu, Teknologi, Sistem Informasi, Persediaan Barang

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1. Introduction

The application of Science and Technology in inventory management significantly contributes to the efficiency and effectiveness of business processes. Science and technology enable the automation of various aspects of inventory management, such as stock monitoring, price adjustments, and automatic ordering (Yudatama et al., 2023). This reduces reliance on manual work, avoids human error, and increases operational efficiency. Science technology utilizes data and artificial intelligence to analyze purchasing patterns, sales trends, and other factors influencing inventory (Gowthami et al., 2023). In this way, companies can make more accurate projections for future inventory needs, avoiding excess or shortage of stock. A science and technology-based inventory information system enables real-time stock monitoring (Juniantoro & Yanti, 2023). It provides timely visibility into goods movement, helps in quick decision-making, and optimizes inventory levels. Applying science and technology in inventory systems can help integrate with other systems, such as finance and marketing. This allows inventory information to be accessed and used effectively by various divisions, creating better connectivity in business processes. Companies can increase accuracy, efficiency, and flexibility by utilizing science and technology in managing inventory. This creates a solid foundation for intelligent decision-making and adaptability in a dynamic business environment.

The Goods Inventory Information System is very important in modern business management. The inventory information system allows companies to optimize inventory levels(Fajri et al., 2023). By accurately monitoring activities for incoming and outgoing goods, companies can avoid excess inventory, which can result in high storage costs, and vice versa, prevent stock shortages, which can affect product availability. Automating the inventory management process through information systems can increase operational efficiency. Technology can reduce delays in data updates, avoid human errors, and speed up the decision-making process regarding inventory (Dewi et al., 2023). Inventory information systems provide high accuracy in tracking goods, whether in the warehouse, delivery process, or stores. Timely and accurate information is critical to intelligent decision-making in inventory management. With an inventory information system, companies can track product performance more effectively. Data analysis can help in identifying best-selling products, managing product life cycles, and making strategic decisions regarding product aspects. With accurate inventory information, companies can respond more to customer requests, increasing customer satisfaction because the desired product is always available and can be delivered quickly. By understanding and implementing an inventory information system, companies can improve operational efficiency, increase decision accuracy, and remain competitive in an ever-changing business environment. This system is a critical foundation for supporting modern and adaptive business management.

Problems that are generally associated with the implementation of an inventory information system are a mismatch between the needs of users such as inventory managers and warehouse officers) and the design or functionality of the information system. This can happen if an adequate needs analysis is conducted after system development. An inventory system that needs to be better integrated with other systems used in the company (such as accounting or marketing systems) can cause an imbalance and lack of coordination in data and information management. The issue of inventory data security is also very important, especially if it involves sensitive information such as prices, stock quantities, or customer data. Poor security can result in data leaks or unauthorized use. The costs of developing, implementing, and maintaining information systems can be a problem factor. If these costs do not match the expected benefits, the company could experience losses. At the Ellisya Store, the problems are related to inventory optimization, inventory management, which is still very manual, the accuracy of search information for goods data, which needs to be better organized, and lack of customer satisfaction with requests for goods.

The rationality of this research is based on the need, impact, and benefits of applying Science and Technology (IPTEK) in managing goods inventory information systems. The relevance of the research theme to technological developments and continuously developing technology,

including Science and Technology (IPTEK), significantly impacts various aspects of business. The inventory information systems are one area that can benefit from these developments. This research tries to understand how applying science and technology can optimize inventory management in a modern business context. Modern businesses often face complex challenges related to inventory management, such as intense market competition, fluctuations in customer demand, and the thickness of supply chains. Applying science and technology is expected to provide solutions or strategies to overcome these challenges. The development of inventory management concepts continues to develop along with technological advances. This research intends to conduct a literature review of these developments and analyze how applying science and technology can improve inventory management concepts and practices. The focus on increasing operational efficiency and effectiveness is important for this research. Science and technology are expected to speed up processes, reduce costs, and improve overall performance in inventory management. The application of science and technology in the inventory system can have a direct impact on customer service. The ability to provide products quickly and accurately can increase customer satisfaction, and this research may attempt to evaluate that impact. This research aims to provide a deeper understanding of how the application of science and technology in inventory information systems can add value to organizations, increase operational efficiency, and overcome challenges that may be faced in inventory management.

The gap in this research is that it has yet to fully explore the development of science and technology in goods inventory information systems in line with the organization's business strategy. This alignment is important to ensure that the technology implemented supports overall business goals. The use of science and technology in goods inventory systems often involves exchanging sensitive data. Research gaps can arise if security and privacy aspects, including data security and compliance with privacy regulations, have yet to be the research focus sufficiently. Research gaps can arise if research has not covered the social and environmental impact of applying science and technology in inventory management. This may include ethical considerations, corporate social responsibility, and the environmental impact of the technology used. Using science and technology in goods inventory systems requires user involvement and acceptance. Research gaps can arise if there needs to be more research on how to effectively engage users and ensure acceptance of the technology at an operational level. Research that fills these gaps further contributes to understanding the effectiveness and impact of applying S & T in inventory information systems in modern business.

2. Literature Review

Research conducted by(Winarti et al., 2020)with the title Designing a Web-Based Sales Information System at the Unimuda Sorong Campus Mart Store using PHP and MySql resulted in research, namely building a sales system with Notepad++ and a database using MySQL. This system can provide product information from the UNIMUDA Sorong Campus Mart Store to users, especially customers so that users find it easy to find new information about the goods being sold. In addition, the system can provide sales of goods where product orders can be made online, so buyers do not have to come to the UNIMUDA Sorong Campus Mart Shop.

Research conducted by(Madre et al., 2021) carries out system design using several tools: Case Diagrams, Context Diagrams, Data Flow Diagrams, and database tables. Followed by creating a program using the Codeigniter 3 framework, Bootstrap 4, and the MySQL application for the database. Black box testing and performance improvement using an SEO website analyzer were then evaluated and given to the company.

Research conducted by(Maulidda & Jaya, 2021)developing website-based information system software via Whatsapp Gateway using the PHP and MySQL programming languages as the database as well as an application programming interface system from Zenziva as the SMS and WhatsApp Gateway service provider.

Research conducted by Bimantoro et al. (2022) creates a web-based inventory system that is used to produce the system needed by PT. Metro Akses Pratama in processing the inventory

process and simplifying the data processing process. In this application, managers can find goods, incoming goods, and outgoing goods data and print all related reports periodically (one month).

Patappari & Muhlisa (2023) designed a Web-Based Goods Inventory Information System at Throve Store Soppeng, which can make it easier for the shop to process goods data and provide information regarding stock of goods both as a whole and based on stock that is almost gone.

3. Methods

The data collection method that the researcher used was observation. The observational data collection method is an approach that involves direct observation of events, activities, or phenomena being researched without interference or influence from the researcher (Sarosa, 2021). Collecting observational data aims to gain an in-depth understanding of certain behaviors, interactions, or situations directly from the field(Jailani, 2023). The researcher observed the Ellisya Store by looking directly at the goods inventory system, starting from requesting goods from the warehouse, then requesting goods from suppliers, receiving goods from couriers, to making goods receipt reports and stock reports. Apart from observation, researchers used library research in conducting this research.

The system development method that researchers use is the waterfall method. The Waterfall method is an approach or model of the software development life cycle implemented linearly and sequentially(Sumarno, 2021). In this method, software development is broken down into a series of stages or phases passed sequentially, similar to a waterfall flow, where each stage produces outputs that become input for the next stage. The Waterfall method is often described as a predictive model because it requires in-depth planning and paperwork before entering each stage. The Waterfall method divides the software development life cycle into several stages that must be undertaken sequentially(Ashari, 2023). Each stage produces outputs that become the basis for the next stage, and each stage has specific responsibilities and goals. The stages in the waterfall method are Requirements Analysis, Design, Implementation or Coding, Testing, Implementation and Installation, and Maintenance.
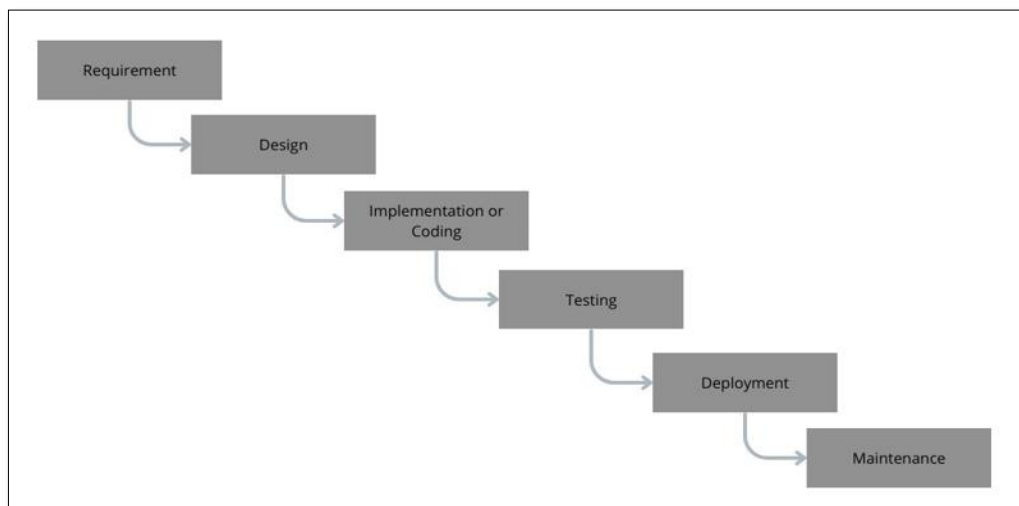

Figure 1. Waterfall Model Stages

The Waterfall method has clarity in its processes but needs to improve, especially its inability to respond to changing needs that may arise during the project. The Waterfall method is a software development model that has been widely used, especially in projects with predictable requirements that do not change significantly.

4. Results

a) Analysis of Goods Inventory Information System Needs

In the inventory information system design stage, several system requirements are needed, including checking stock data, ordering goods from suppliers, and requesting incoming and outgoing goods. Users in the inventory information system are the warehouse department, purchasing department, sales department, administrator, finance department, and director.
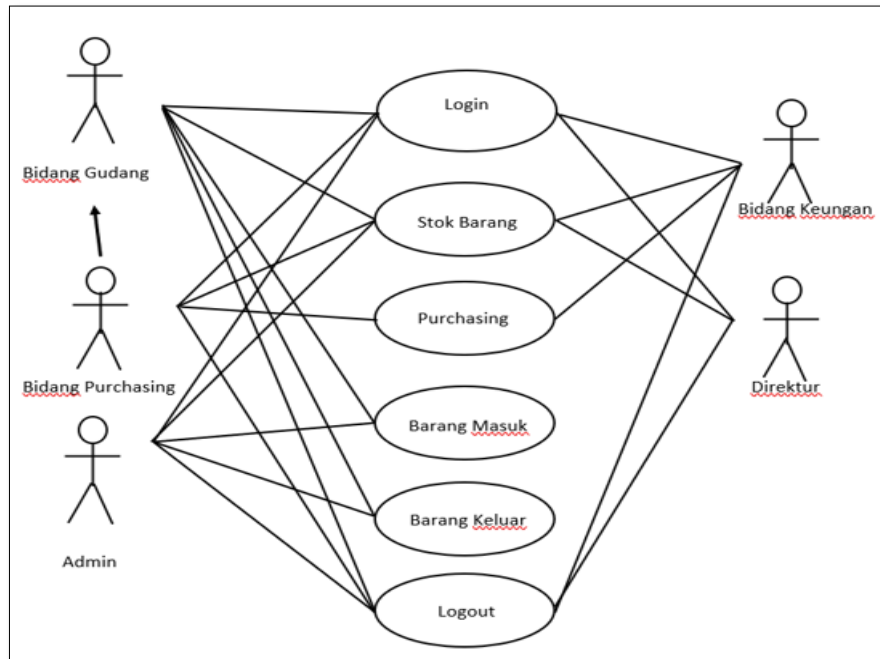

Figure 2. Usecase Diagram of the Inventory Information System

b) Database Design

Database design using an Entity Relationship Diagram is a data model in the form of a conceptual data modeling graphic notation that describes the relationship between storage and is an image or diagram that functions to show information created, stored, and used in a business system. The database design of the inventory information system is as follows:
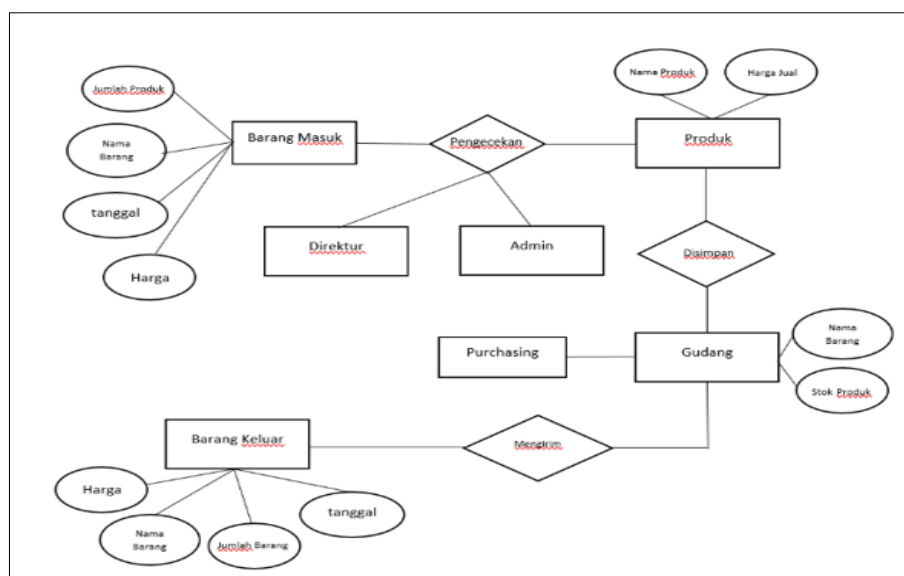

Figure 3. Design of the Goods Inventory Information System Database

c) Activity Diagram

Activity diagrams provide a visual view of activities or tasks in a system or process. Activity diagrams help stakeholders to understand, document, and analyze workflows in a system or process.
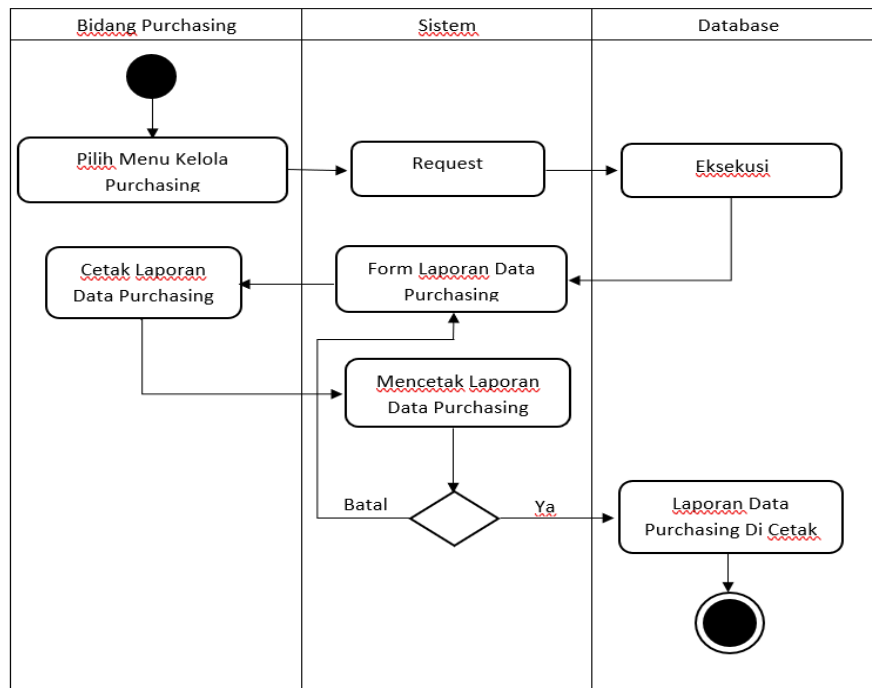

Figure 4. Goods Ordering Activity Diagram

The goods ordering activity diagram provides an overview of the information system in the purchasing department, where the system can manage information on incoming goods and create reports on incoming goods.
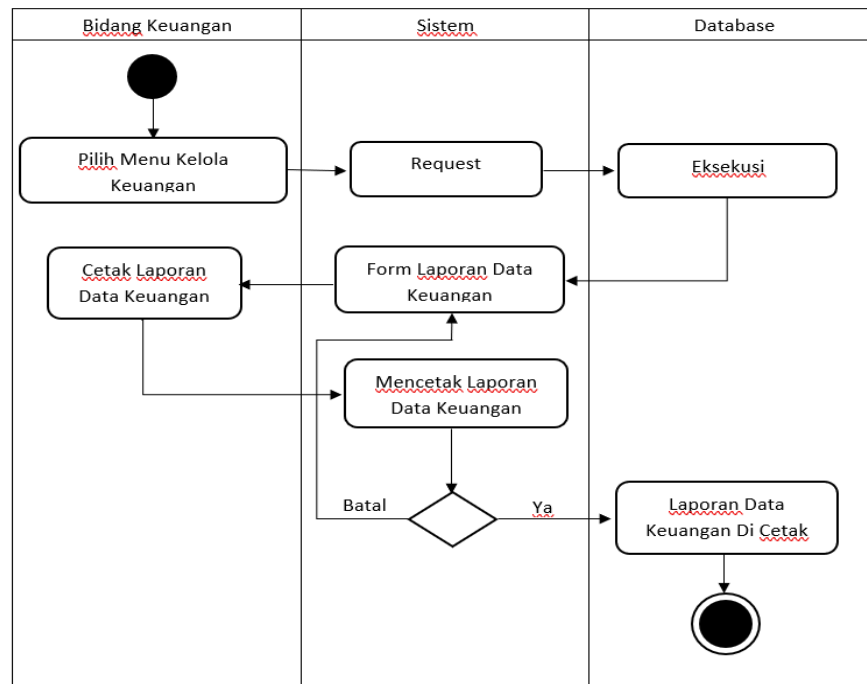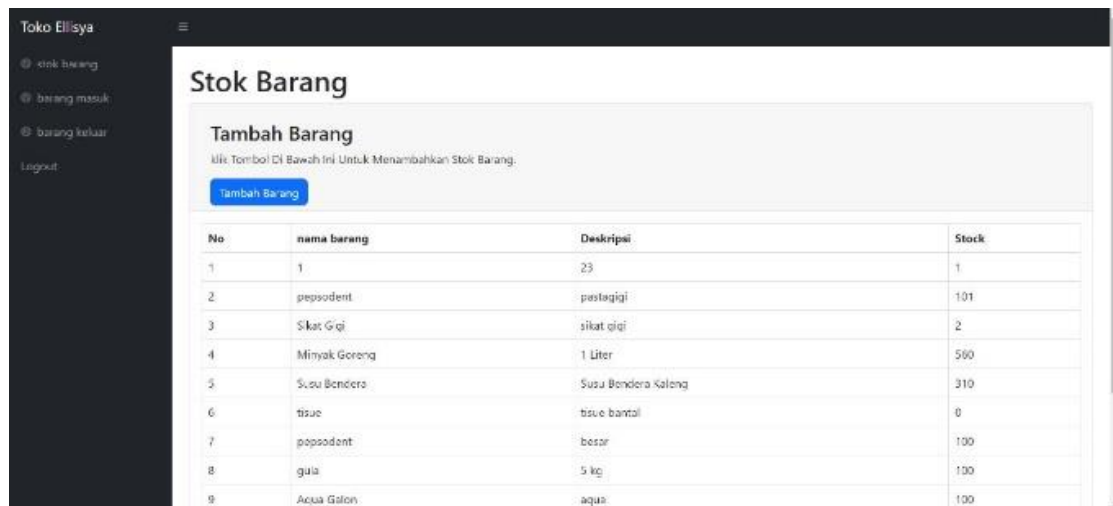

Figure 5. Finance Department Activity Diagram

This activity diagram describes the activities of the financial department with a system for managing payments for purchasing goods from suppliers and reporting payments for purchasing goods.

5. Discussion

a) User Interface Design

Interface design is a stage for creating the appearance or design of the system to be created. User interface design is very important to be easy to use, attractive and comfortable for users. The inventory information system interface was designed:
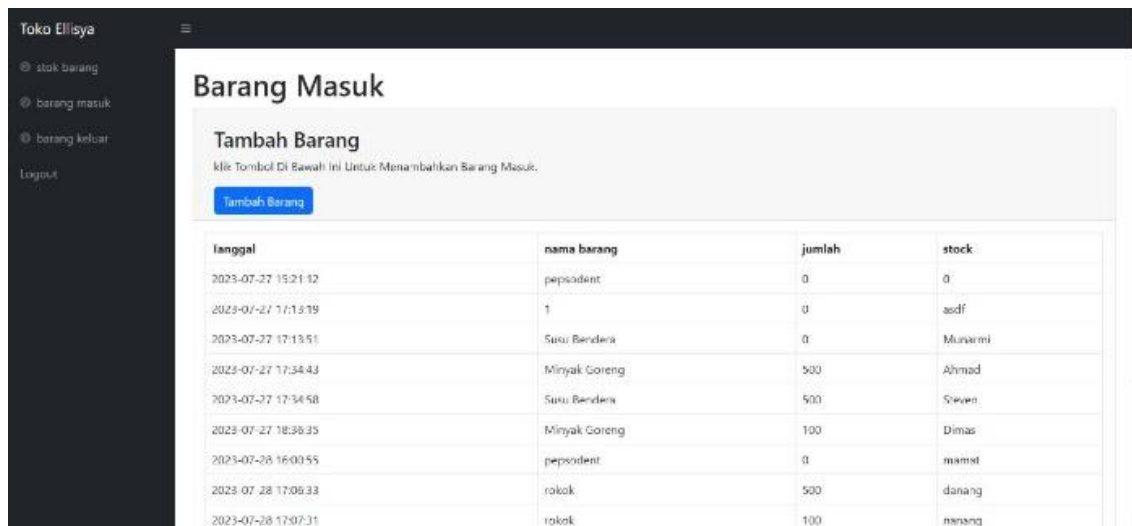

Figure 6. Goods Inventory Interface

The goods inventory interface enters goods data from the goods purchasing process. The warehouse department can add, edit, and delete inventory data in this interface.

Figure 7. Goods Inventory Interface

The goods inventory interface enters goods expenditure data from the goods sales process. In this interface, the warehouse department can add, edit and delete goods release data.

c) Hardware Requirements

The hardware used in the inventory information system includes:

Table 1. Hardware Specifications

Server Items	Server Item Requirements
Disk Space	2GB
Storage Type	HDD
Bandwidth	Unlimited
OS	Windows 7/8.1/10
Protocol	HTTP/2+QUIC Support

Source: Researcher's Plan (2023)

d) Software Requirements
So that the inventory information system can run well, the software needed to be used is as follows:

Table 2. Software Specifications

Frameworks	Laravel Command (PHP Artisan)
	Code Igniter
Interpreter	PHP interpreter
Databases	Mysql
Management Database	phpMyAdmin
Script Language	Visual Studio Code

Source: Researcher's Plan (2023)

With increasingly better information systems in warehouses or goods storage, this is one of the key factors in the smoothness and efficiency of a company. Efficiency in warehouse management impacts the company's productivity and operational performance, customer satisfaction, and business sustainability. Using a good inventory system is expected to reduce the risk of errors and loss or theft of inventory. That is why companies need to have an optimal storage or warehouse system so that it can run effectively.

6. Conclusion

Creating an inventory information system at Ellisya stores can help owners and employees in several areas, such as increasing operational efficiency by automating the processing of incoming and outgoing stock. Monitoring and managing the reordering of goods. Increasing efficiency and reducing inventory costs is one of the advantages of creating a goods inventory system. Avoid unnecessary excess stock and better risk management where the company knows accurate stock information. Identifying risks and knowing those related to stock shortages. Utilizing new technology to analyze data in real-time and improve employee quality. Easy to control goods tracking and management in identifying goods, making it easier to control goods and reducing the risk of losing goods.

In the inventory information system that has been created, employee behavior is very influential in running this system, where employees are required to have accuracy and responsibility for all information on incoming and outgoing goods, as well as in account ownership, such as maintaining information on email and passwords for each employee so that it not misuse by irresponsible parties. Moreover, the owner should always pay more attention to website updates and receive user input and suggestions, especially regarding the dashboard's appearance, to remain user-friendly. Regarding website security, its security must also be paid attention to and maintained.

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