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JOURNAL OF TECH-E

| 2581-1916 (ONLINE) | 2598-7585 (PRINTED) |

Article

Enhancing Inventory and Transaction Management with Integrated E-Commerce Solutions: Case Study of Desasa Home Decor

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SUBMISSION TRACK

Recieved: 07, 16, 2024
Final Revision: 01, 08, 2025
Available Online: 02, 03, 2025

KEYWORD

E-Commerce Integration, Extreme Programming, Inventory and Transaction Management, Shopee API, User Acceptance Test

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A B S T R A C T

Esasa Home Decor is a store that specializes in selling various types of artificial flower home decorations. The use of information technology in data management is essential to ensure that inventory and transaction management are conducted swiftly and generate accurate reports. This system is integrated with the Shopee API to automatically retrieve product and transaction data. This integration allows for better monitoring of stock levels and transactions on the e-commerce platform, ensuring that the information remains up-to-date. The development method used in this study is Extreme Programming, which emphasizes close collaboration within the team and continuous testing to produce high-quality software. Data collection was conducted through interviews, analysis, and direct observation of the ongoing business processes at Esasa Home Decor. The result of this research is a management information system that facilitates store management and is integrated with the Shopee e-commerce platform. The User Acceptance Testing (UAT) yielded a score of 97.714%, indicating that the system is highly suitable for use. Additionally, the Black-Box testing concluded that the system functions as expected and according to plan. Thus, this system enhances the operational efficiency of Esasa Home Decor by streamlining inventory and transaction management while providing more accurate and timely reports.

DOI: 10.31253/te.v8i2.3168

I. INTRODUCTION

The rapid and sophisticated advancements in information technology, especially within the business sector, necessitate its use by business owners to effectively manage and develop their operations in order to remain competitive. The home decor industry, in particular, is highly competitive, with numerous stores vying for market share. To boost their competitiveness, many business owners turn to e-commerce platforms like Shopee. E-commerce facilitates electronic buying and selling between consumers and businesses, with computers acting as intermediaries in transactions [1].

Desasa Home Decor, located in Bandar Lampung, specializes in selling home decorations such as flower arrangements and wall ornaments. To expand its market reach, Desasa Home Decor utilizes Shopee. However, the manual management of transactions on this platform is time-consuming and complex. One significant challenge is managing sales figures, which requires meticulous recording of all items sold, including shipping costs, product prices, discounts, and taxes. Any discrepancies or errors in these calculations can lead to financial losses for the store.

One of the critical components of this system is the integration of the Shopee API, which facilitates seamless data synchronization between Shopee and the management information system of Desasa Home Decor. This integration allows for real-time updating of product and transaction data, eliminating the need for manual data entry and reducing the likelihood of errors. By leveraging the Shopee API, the system can automatically pull product details, order information, and shipping data directly from the Shopee platform, ensuring that the inventory and transaction records are always up-to-date and accurate. This not only streamlines the workflow but also enhances the overall efficiency and reliability of the store's operations.

Enhancing the current data management system by leveraging information system technology can significantly improve the performance of Desasa Home Decor. A web-based information system is more efficient, allowing employees and the owner to manage product histories, finances, and other needs without the cumbersome manual process of using books. They can manage data on their devices simultaneously and track sales figures across various e-commerce platforms by accessing the Desasa Home Decor information management system website.

In 2022, a study titled “Designing an Integrated Multichannel e-commerce System Based on a Website at PT XYZ” proposed solutions to address inconsistencies in stock information through data integration [2]. However, this solution was restricted to stock management and did not encompass comprehensive data management. Consequently, the researcher’s solution still requires further development.

This research aims to improve inventory and transaction management through integrated e-commerce solutions. The system will be developed using CodeIgniter version 4. The main research question is how to develop a management information system that can effectively manage data at Desasa Home Decor, integrate with the Shopee e-commerce platform, and reduce the workload for both employees and store owners.

II. LITERATURES REVIEW

Web-based applications can be accessed using browsers such as Chrome, Firefox, Safari, or Internet Explorer through a URL address [3]. A Management Information System (MIS) is an extensive and well-coordinated collection of information subsystems that are logically integrated. It is designed to convert data into information through various methods to improve productivity, tailored to the manager's style and nature, and in accordance with established quality standards [4].

An Application Programming Interface (API) is designed by system developers to enable programmatic access to some or all system functions [5]. APIs facilitate programmers in 'deconstructing' software, which can then be further developed or integrated with other software. Acting as a bridge between applications, APIs allow programmers to utilize system functions, with this process being overseen by the operating system.

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This system will be developed using the PHP programming language. PHP is a server-side embedded scripting language, meaning that all syntax and program commands you write will be executed entirely by the server but can be included in regular HTML pages [6]. Additionally, this system will be built using the CodeIgniter 4 framework. CodeIgniter is an open-source web application framework for building dynamic PHP applications, functioning as a PHP framework with the MVC (Model, View, and Controller) model [7]. Besides being lightweight and fast, CodeIgniter also boasts comprehensive documentation along with examples of code implementation [8].

The management information system for Desasa Home Decor store will be developed using Extreme Programming (XP). XP is a methodology employed in software development aimed at improving the quality of software in response to changes and customer requirements [9]. In designing use case and entity relationship diagrams, UML is used, which is a one of the commonly utilized language standards in the industry for defining requirements, performing analysis and design, and illustrating architecture in object-oriented programming [10].

The Use Case diagram illustrates a series of interconnected interactions between the system and actors [11]. Meanwhile, the Entity-Relationship Diagram (ERD) is a graphical notation diagram used in database creation to connect one data to another [12].

Several previous researchers have conducted relevant research:

Ardiansah et al. research [13] with title 'Rancang Bangun Aplikasi Pelaporan Keuangan Berbasis Open Api dari E-Commerce', this research has effectively implemented the use of APIs for interactive and real-time data exchange between Shopee store accounts and Shopee's data center. The linked data can be displayed within a financial reporting information system, allowing for further intensive development. The research by Ardiansah et al. shares a similarity with this study in the use of Shopee API to generate financial reports. However, the difference is that this system focuses solely on sales information, prompting the addition of features like product data management and others. Yesa et al. research [2] 'Perancangan Sistem Terintegrasi Multichannel e-Commerce Berbasis Website pada PT XYZ', This research successfully developed a multichannel e-commerce integrated system, achieving an Effort Expectancy score of 98.6% during User Acceptance Testing (UAT). The study is similar to the one by Yesa et al. in terms of developing an integrated system with Shopee and using UAT for evaluation. The key difference is that Yesa et al.'s study had three user roles, while this research involves only two user roles. Mubaroq et al. research [14] 'Integrasi Website Pemasaran Multi-Channel Untuk Industri Pakaian (Studi Kasus: Signature Store', successfully created a website integrated with Signature Store's website and social media. The current research shares the integration with Shopee as a common feature with Mubaroq et al.'s study. In the current study, however, the integration with Shopee presented challenges. Mubaroq et al. developed their system using the Laravel framework, while this research will utilize the CodeIgniter 4 framework.

III. FRAMEWORK

A systematic framework and clear stages are essential to simplify the preparation of research and to explain the systematic logic employed in the research. The framework in this research is depicted in figure 1.

DOI: 10.31253/te.v8i2.3168

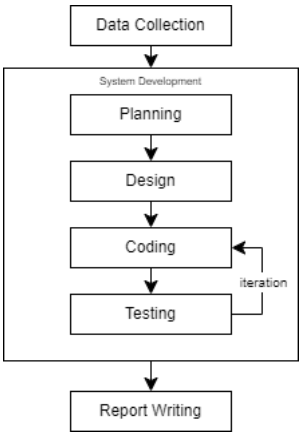

Figure 1. Research Stages

Below is the sequence of data retrieval processes from the Shopee API as depicted in Figure 2. In this research, the Shopee API is employed to access sales data from the seller account of Desasa Home Decor. The process begins with registering as a developer, followed by Shopee reviewing the registered profile. The verification process typically requires a significant amount of time; in this study, it lasted 14 days. After receiving confirmation via email that the profile has been verified, the next steps involve creating an application and testing it in the Sandbox environment.

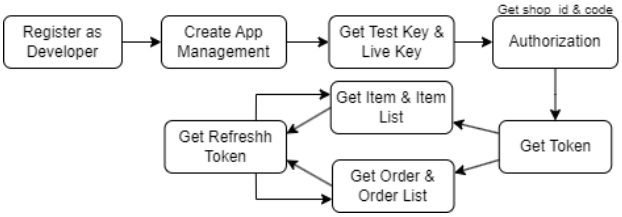

Figure 2. API Stages

IV. METHODS

This Study uses the Extreme Programming (XP) development method. The stages in the Extreme Programming development (XP) method.

1. Planning. In this stage, the researcher identifies problems, analyzes user and system needs, determines user stories, values, acceptance test criteria, and iteration plan.
2. Design. The system and architecture modeling was conducted using UML (Use Case Diagram) and database modeling was done using an Entity Relationship Diagram (ERD), and CRC Card.
3. Coding. This stage implements the system design results into a user interface using PHP, JavaScript, CSS languages with the CodeIgniter 4 framework.
4. Testing. The testing used in this research includes Black-Box testing and UAT (User Acceptance Testing).

V. RESULT

In the management information system of Desasa Home Décor Store, there are 2 actors involved in the system: Employees and Owner. Here is the description and responsibilities of each actor:

1. Employees are individuals responsible for managing data. Responsibilities: managing inventory data of supplies and outgoing goods, managing product data, extracting transaction data from e-commerce.
2. Owner is the business owner who has full responsibility for all functions within the system. Responsibilities: managing inventory data of supplies and outgoing goods, managing product data, managing financial reports, extracting transaction data from e-commerce.

The use case system diagram is as follows:

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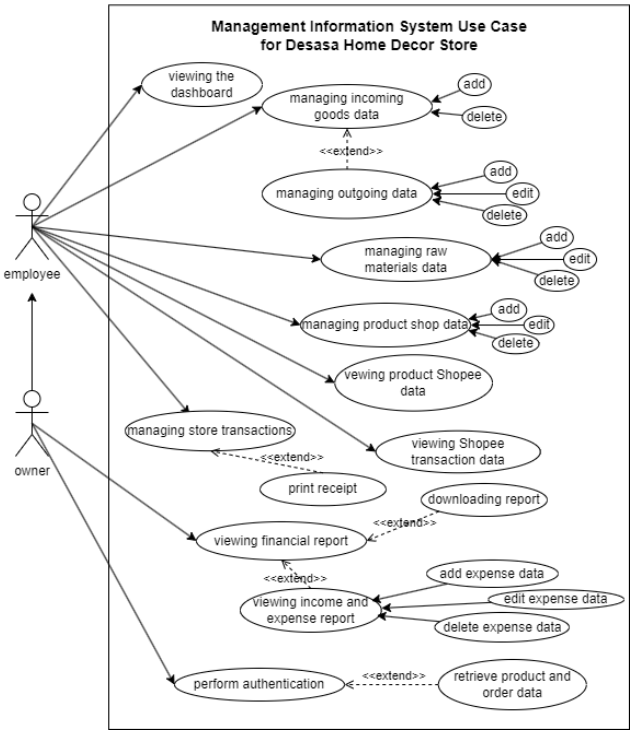

Figure 3. Use Case Diagram of Management Information Desasa Home Décor

Entity Relationship Diagram (ERD)

To understand the structure and relationships between various entities in the proposed system, we used an ERD (Entity-Relationship Diagram). Figure 4 shows the ERD diagram depicting the main entities and their relationships.

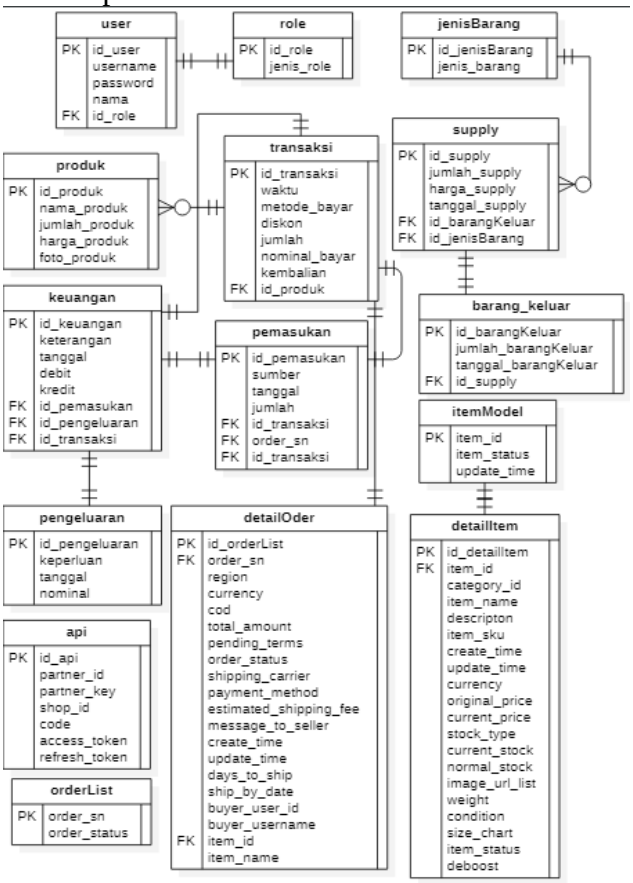

Figure 4. ERD

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To design the class structure and responsibilities in the proposed system, we used CRC cards (Class-Responsibility-Collaborator). Figure 5 shows the CRC cards depicting the main classes along with their responsibilities and collaborators.

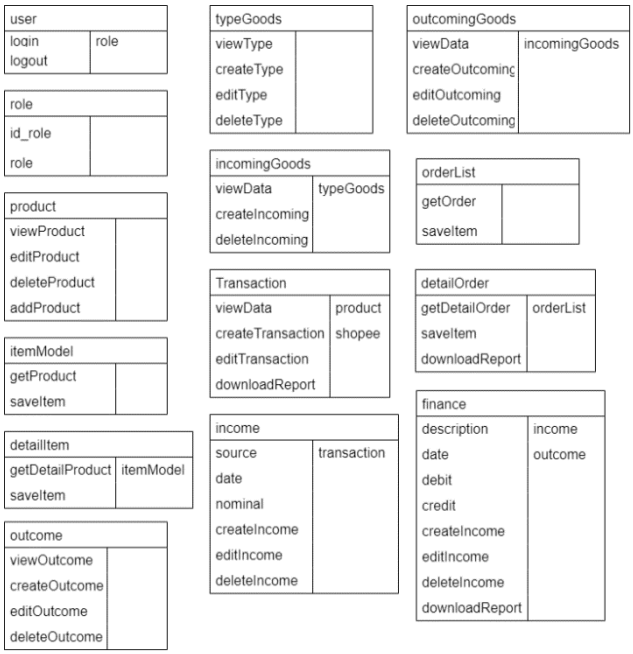

Figure 5. CRC Card

VI. DISCUSSION

The Desasa Home Decor Store Management Information System is a system designed to assist store employees and owners in managing store and e-commerce data. The manual store data management, previously done on paper, can now be done using the system, thus saving operational costs for the store. This Information System has two user levels: owner and employee.

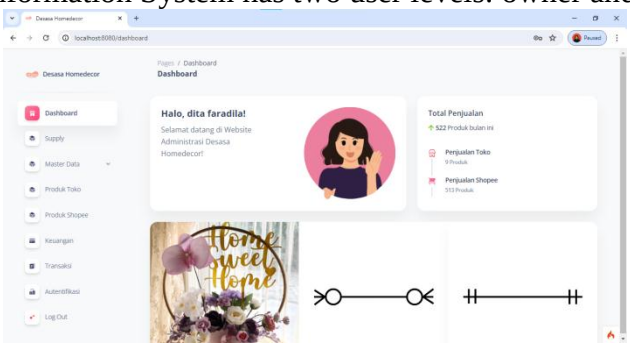

Figure 6. Dashboard page

On the supply page, users can view incoming and outgoing goods data. On this page, users can also add data and view details of each item. The supply page can be seen in the following Figure 7.

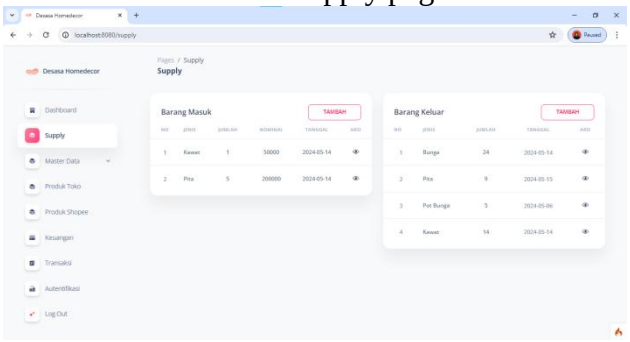

Figure 7. Supply Page

DOI: 10.31253/te.v8i2.3168

On the store products page, users can view a list of products in the form of cards consisting of product images, names, prices, and stock availability. Users can also edit and delete existing product data on this page. The store products page can be seen in the following Figure 8.

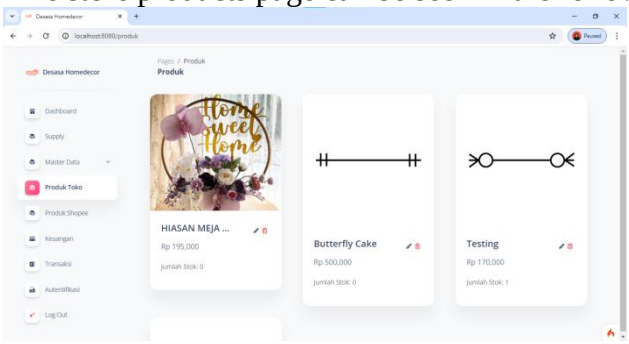

Figure 8. Product Store Page

The Shopee products page contains a list of product data obtained from the integration of the Shopee API with the system. This table contains item IDs and product names. Users can view more detailed product data by clicking on the detail button represented by an eye icon. The Shopee products page can be seen in the following Figure 9.

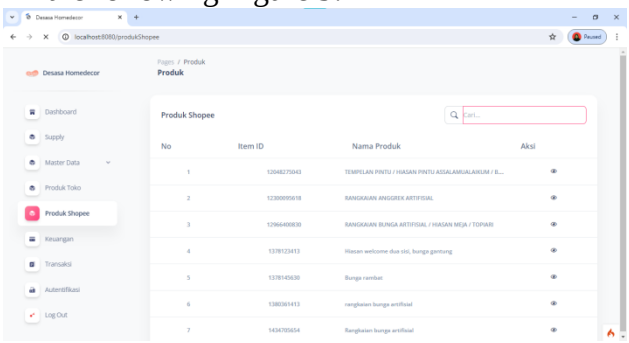

Figure 9. Product Shopee Page

On this page, the owner can view financial reports that occur in both the store and Shopee. At the top, there are several cards displaying the total revenue, total expenses, and net profit or remaining funds earned. On this page, users can download financial reports by clicking the download report button. The financial page can be seen in the following Figure 10.

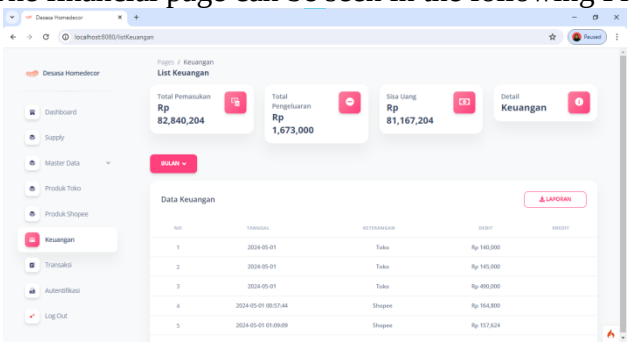

Figure 10. Finance Page

The transaction page contains a list of store transactions and a list of Shopee transactions pulled using the API. On this page, users can also search for transaction data by entering the desired keyword. The transaction page can be seen in the following Figure 11.

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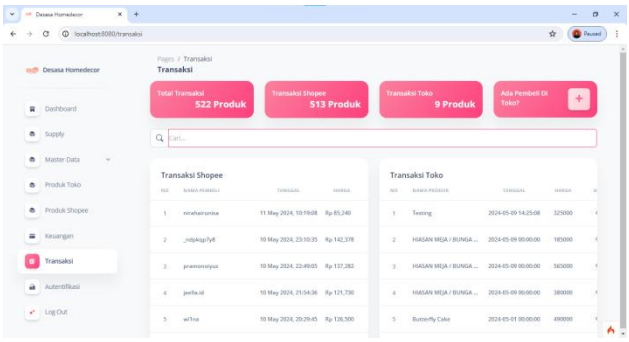

Figure 11. Transaction Page

The authentication page is accessible by the owner to authenticate the account and retrieve product and order data from Shopee. This page contains several cards with different functions. The "Shop Authenticate" card is used to obtain the authentication URL, which is used to log into the Desasa Home Decor Shopee store account. The second card is used to obtain the token, which is used to retrieve Shopee product and order data. The "Refresh Token" card is used to refresh the token because the validity period of the previously obtained token is only 4 hours. Cards 4 and 5 are used to retrieve product and order data, which will then be saved to the database. The authentication page can be seen in the following Figure 12.

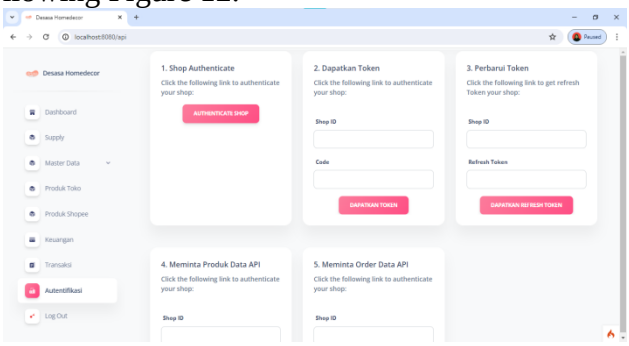

Figure 12. Authenticate Page

In this study, two types of testing were conducted. The first one is Black-Box Testing, Black Box Testing entails evaluating the functionalities of developed software features. This testing is performed to confirm whether the software operates according to expectations or not [15]. The Black-Box testing phase utilizes the validation method. This approach is used to assess the validity of the built functions and ensure that the system aligns with the stakeholders' requirements outlined during the planning phase. The system testing is conducted by two individuals: Fitriyani, representing the Employee role from Desasa Home Decor Admin, and Sintia Dyas Dewantari, the Owner of Desasa Home Decor store. The results of the Black-Box testing indicated that all features are functioning well and as requested initially.

The second type of testing is User Acceptance Testing (UAT). User Acceptance Testing (UAT) is a technique used to assess whether the system meets the anticipated user requirements identified during the requirements analysis phase [16]. The testing was based on the non-functional requirements of the system that had been defined. UAT was carried out by having respondents use the system and then provide feedback on the given form. UAT uses five-point evaluation criteria: 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree, and 1 for strongly disagree. This testing took place on May 31, 2024, at the Desasa Home Decor store, involving 5 respondents, consisting of 2 owners and 3 admins of Desasa Home Decor. The results of the UAT testing for this system yielded a score of 97.714%, indicating that the system is highly suitable for use.

VII. CONCLUSION

Based on the obtained result, it can be concluded that the management information system for Toko Desasa Home Decor has been successfully developed. It is integrated with the Shopee e-

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commerce platform and built using the CodeIgniter 4 framework. This system aims to reduce the workload for both employees and store owners. The results of the UAT testing for this system yielded a score of 97.714%, indicating that the system is highly suitable for use. The implementation of e-Commerce integration significantly improves inventory and transaction management, ultimately enhancing operational efficiency.

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DOI: 10.31253/te.v8i2.3168

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DOI: 10.31253/te.v8i2.3168